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Green revenues, profitability and market valuation: Evidence from a global firm level dataset

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Abstract

Substantial private investments in low carbon technologies and capital assets are necessary to meet climate change mitigation targets. This paper examines how diversifying and specialising production towards environmental goods and services is associated with the profitability and market valuation of firms. We use a new green revenue dataset of global listed firms covering approximately 98% of global market capitalisation for the period 2009-2016. Revenues from environmental goods and services is growing rapidly and totalled US$1.6 trillion in 2016, representing around 4% of turnover. The utilities sector including green electricity and water contributes the most to global green revenues. In these sectors, we find evidence that incentives already exist so that orienting production towards green goods and services simultaneously enhances firms' economic performance, suggesting that existing policy interventions are encouraging the provision of public goods by creating a "win-win". For other sectors, there are currently insufficient market incentives to shift radically into the environmentally friendly market space. While early movers have been able to increases operating profit margins, increasing the share of green activities has not necessarily increased the accounting rate of return on investment, suggesting that capital costs are high. Additional policy support is likely needed to create a clear investment case for making climate friendly production choices throughout the economy.

Keywords: Green growth; Corporate Financial Performance; Porter Hypothesis.
JEL Classification: G32, L25, Q52, Q54, Q55

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1 Introduction

Responding to environmental problems and policies as well as changing demand towards low-pollution or energy efficient products, a growing number of firms are changing commercial focus towards the production of environmental goods and services. According to FTSE Russell (2018) the "green economy" at 6% of the globally listed equity market, was worth as much as the fossil fuel sector in 2018. This paper explores how shifts from non-green to green activity affects the financial and market performance of frontier firms in the green economy.

The question of whether environmental and economic performance can go hand in hand has been around, ever since the major environmental policies were enacted in the 1970s. The conventional view is that rational firms will invest in profitable opportunities, but any additional effort required to provide public goods by reducing pollution necessarily has to come at a cost (Palmer et al., 1995). These arguments are used to oppose stringent unilateral environmental policies on the grounds that there is a trade off-between environmental performance (social benefits) and the economic performance of firms (private costs). This rather static view is challenged by Porter (1991) and Porter and van der Linde (1995) who argue that firms in fact do not always make optimal choices and that continual opportunities for resource efficiency and technological improvements exist, because of incomplete information, organisational inertia and other problems that plague the real world. Under this view – what has become known as the Porter Hypothesis – the trade off can be relaxed with well designed and stringent environmental policies, for example, by reducing uncertainty around investments and stimulating innovation and progress that improves resource productivity and economic performance. Porter and van der Linde (1995) also argue that as consumers become more sophisticated and green market segments open up globally, the early-mover "clean" companies can gain a lasting competitive edge.

A vast empirical literature has put these conflicting predictions to the test. There is general agreement that the introduction of environmental policies has led to higher pollution abatement costs (as a share of business capital expenditures) (Pasurka, 2008), but firms typically do not face the full burden of regulatory costs due to exemptions and compensation measures (Ekins and Speck, 1999; Stavins, 2003). Moreover, environmental regulation can help companies identify inefficiencies and induce technical change (as measured by R&D or patents) (Calel and Dechezleprêtre, 2016; Fabrizi et al., 2018), especially with market-based instruments (Ambec et al., 2013). Having established that firms can innovate in response to environmental policies, the secondary question is, how this affects firms' bottom line performance. The Porter Hypothesis focuses on whether the regulatory cost can be partly, fully or more than fully recovered by the "innovation offsets". A number of studies explicitly test this question, but the evidence remains inconclusive according to recent reviews (e.g. Ambec et al., 2013; Cohen and Tubb, 2017).[1]

[1] Ambec et al. (2013) finds that the positive effect on innovation are realised with some time lag, and that generally, it does not outweigh the negative costs of environmental regulation, thus supporting the *weak* version of the Porter hypothesis. On the other hand, a meta analysis by Cohen and Tubb (2017) finds that a positive effect of environmental policies is more likely at the country level rather than the firm level, supporting the "strong" version of the Porter hypothesis i.e. that environmental policies induce innovation and increase competitiveness over time.

The majority of empirical studies contributing to the evidence base for the Porter Hypothesis instead tackle smaller pieces of the puzzle. Ambec and Lanoie (2008) distinguish two channels through which environmental innovation can impact firms' environmental and economic performance: the "cost channel" whereby firms reduce input costs through improving efficiency and mitigating risk, and the"revenues channel" whereby firms increase revenue by developing new, cleaner products in response to changing customer preferences and capturing market share (Ambec and Lanoie, 2008; Dechezleprêtre et al., 2019). So far, most studies test the former channel and find, on the whole, that policy induced innovation can lead to reduced costs by improving energy efficiency (Bloom et al., 2010; Horbach and Rennings, 2013) or productivity (Van-Leeuwen and Mohnen, 2017). Meta-analyses on the relationship between firms' environmental and financial performance find that overall, the relationship is positive (Endrikat et al., 2014; Horváthová, 2010; Albertini, 2013)[2] but heterogeneous, for example depending on the initial level of financial performance (Wagner and Blom, 2012). Studies on stock market impacts usually find that *dirty* firms tend to be punished by investors and suffer negative abnormal returns (for example following disclosure of emissions data) (Baboukardos, 2017; Lourenço et al., 2012b), whereas the effect of being *clean* or being perceived to be committed to sustainability [3] could be positive (Flammer, 2015; Song et al., 2017) or negative (Oberndorfer et al., 2013).

Fewer studies examine the "revenues channel". In theory, shifting commercial focus towards environmental goods and services could lead to higher profitability for firms because a) they result from a long-term investment plan in research and development which allows for more product differentiation and can lead to higher product price premia and lower competition (Berrone et al., 2013), b) green product differentiation is more visible than internally-driven green activities and thus has higher commercial value (Dangelico and Pontrandolfo, 2010) or c) company reputation improves through marketing (González-Benito and González-Benito, 2005; Driessen et al., 2013). Examining whether diversifying into the environmentally friendly market space is privately rewarded is important to inform policy debates. Private rewards imply that market forces can stimulate innovation and foster a profit-driven response to environmental problems. Lower public costs of the low carbon transition is politically appealing, especially in the context of market economies.

In this study we build on the handful of studies that empirically test the "revenue channel" - whether orienting production towards low carbon goods and services contributes to market value creation, or if not doing so is penalised. In terms of financial performance, González-Benito and González-Benito (2005) find that ecological product design has no impact on Return on Assets using a cross sectional regression on a sample of 186 Spanish companies, Jabbour et al. (2015) find that green product development has a positive influence on a variety of performance measures (marketing, operational and environmental) for a sample of 62 Brazilian companies, while Palmer and Truong (2017) find higher net income in firms that introduce green new

[2] Horváthová (2010) finds that negative relationships between environmental and financial performance tends to be found in studies using less sophisticated methods, whereas a positive effect tends to be found when more advanced methods (panel data estimation with reduced omitted variable problems) and better data with longer time frames are used.

[3] For example with adoption of environmental management systems, Corporate Social Responsibility (CSR) announcements or being included in a sustainability stock index.

products using a sample of 79 global firms. Few studies explicitly examine the effect of market-oriented environmental activities on stock market performance. However, Dechezleprêtre et al. (2017) in a study of spillovers from low carbon patents find some evidence to suggest that investors attribute higher values to clean innovations which also have higher spillover than dirty innovations.

Overall, while the evidence is inconclusive, it largely points to the difficulty in rejecting the Porter Hypothesis. The possibility prevails, that well-designed, stringent environmental policies could simultaneously reduce environmental impact and enhance economic performance of firms, such that the provision of public goods from the private sector results in a "win-win". However, the question still remains, how can private sector investments in low carbon technologies be accelerated? Indeed to address the looming climate emergency (IPCC, 2018) estimates indicate that each year trillions of US dollars of investment are required to drive the low carbon transition (Stern, 2015). Given the scale of the challenge, both public and private sector investments are needed. Yet private sector investments will be likely key to drive forward low carbon innovation and keep the costs down, as was seen in the earlier IT revolution (Mazzucato et al., 2015; CPI, 2018). Thus, it is important to understand how policy design can be improved to enhance the economic viability of "going green" such that large scale private sector low carbon investments can be mobilised.

This paper contributes to the evidence on the "revenue channel" by exploiting the variation across firms in the degree to which they have already developed "green" activities. The fact that growth in low carbon innovation and new green markets is observed (Popp, 2019) indicates that environmental policies are working to some extent and in some sectors, to correct market failure and harness the ability of markets to deliver public goods. We examine if these strategic moves into new markets for low carbon goods and services[4] by frontier firms pay off, and if they are rewarded or punished by investors. We aim to shed light on how policies can be fine-tuned to unblock barriers to mainstreaming shifts into the low carbon economy.

We use newly constructed firm level data that estimate green revenue as a proportion of total revenue. We match key firm characteristics and firm financial performance variables to the green revenue data. We use a unique firm level dataset from FTSE Russell which, to our knowledge, is the first database that provides comprehensive and detailed information into the environment-focused commercial activities of publicly listed firms, tracking the share of revenues generated through green goods and services over time. Our dataset includes information on over 16,000 global publicly listed firms across 48 countries operating from 2009 to 2016 in a wide range of industries.[5] We identify over 3,500 firms which derive revenues from production and sale of green goods and services. Using this data, we are able to test whether changes to the share of green revenues affect the financial and market performance of firms, overcoming a number of key limitations in the previous literature. First, our green revenue share variable

[4]These are either produced with technologies that economise on exhaustible resources and emit less green house gases, for example electricity produced by renewables, or emit less carbon during its use phase whilst providing similar functions as conventional goods and services, for example hybrid and electric cars.

[5]The raw data is available for the years 2008-2017. We limit the analysis to the years 2009-2016 due to limited coverage in the first and last year.

is able to capture within-firm strategic shifts away from conventional, non-green to the green economic activities. Indicators of the degree of firms' environmental efforts are scarce in the prior literature, particularly for a large sample of firms spread geographically. Second, we overcome the external validity issue in previous studies that are typically limited in geographic or sectoral scope. Our dataset covers all global publicly listed firms representing approximately 98% of global market capitalisation over an eight year panel across 48 countries. Third, we examine the impact of firms' green revenue share on a range of financial performance variables including both accounting based and market based measures, capturing both current and expected profitability. For accounting based measures, we examine both operating profit margin (how successful the management is in creating profits from its sales) and more comprehensive measures of investment profitability that capture return on investments, i.e. Return on Assets and Return on Equity. A contribution of our paper is to show the linkages between various financial performance variables. Fourth, we address potential selection bias that arise from "treated" frontier firms that move into the green space early being different from non-green firms. We show that green firms tend to be on average larger and more profitable, and we employ inverse propensity score weighting (Guadalupe et al., 2012) to address this. Lastly, we disaggregate our results by sectors, providing new insights into sectoral heterogeneity. Our estimates provide the first comprehensive empirical assessment of the impact of diversifying towards green goods and services on financial and market performance.

Our results are overall in line with the Porter Hypothesis, and suggest that the environment - competitiveness trade-off could be relaxed with well designed and targeted environmental policies, yet important sectoral heterogeneities exists in the relationships between producing green revenues and firms' economic performance. The observed heterogeneities across sectors and economic performance indicators can help explain the often inconclusive findings in the existing literature and may guide policy design. We find that across all industries, increasing the share of revenue generated from the sale of green goods and services is associated with higher operative profit margins. This suggests higher price premia are available from proactive moves into the environmentally friendly market space. Hence an important role that public policy can play to accelerate and harness private sector low carbon investments is to ensure the level of firms' "green effort" is known to consumers and investors, for example, through the provision of information. Why then is a rapid and broader shift into the production and sale of low carbon goods and services not observed? Interestingly, we find that higher operating margins do not translate to higher return on investments, except in the utilities sectors. We show that this is in part due to the higher capital investment requirements of engaging in the production of green goods and services, as shown by Hirth and Steckel (2016). High asset requirements pose a barrier for firms to shift into green markets. Hence policy should tackle this barrier to make green investments economically viable across a broader range of sectors by facilitating cheaper access to green capital. This may be in the form of tax incentives or risk sharing through public-private partnerships. In addition to accounting based measures of current profitability, we also examine expected profitability using market-based measures to assess how a change in commercial focus towards green affects stock market investors value firms. We find that an increase in firms' green revenue share affects investors expectations positively, but again only for utilities. These findings highlight important challenges for climate policy action, because meeting the climate goals requires transitions to low carbon alternatives across a broad set of sectors. While utilities, and electricity generation in particular, are key for the low-carbon transition, policies need to increasingly target non-utility sectors to achieve a broad diffusion of green technologies.

Our paper proceeds as follows. In Section 2, we provide further background by first discussing the limitations of various performance measures used in the previous literature that capture firms' efforts to reduce their environmental impact and second, by unpacking various financial performance measures used. In Section 3, we describe our data including the new measure of firms' green revenue share and provide descriptive evidence on the changing size and composition of the green economy in recent years. In Section 4, we first set out the different measures of current and expected profitability and provide descriptive statistics, then turn to empirically assessing the impact of green revenue shares on current profitability. In Section 5, we begin by reporting the overall results for our full sample then discuss their robustness. We examine heterogeneous effects for utilities and non-utilities, as well as the largest manufacturing sectors in Section 6. We discuss the findings and conclude in Section 7.

2 Greening of firms, financial performance and market performance

2.1 Measures of firms' green activities

One of the key challenges when assessing the impact of engaging in the green economy on firms' performance has been the difficulty to precisely measure whether and by how much firms shift from non-green to green activities.[6] Previous studies have used a number of indicators to capture internally-driven environmental efforts that are relevant to the "cost channel", but they are often crude, binary measures such as the adoption of voluntary environmental management systems (Wagner and Blom, 2012; Hojnik and Ruzzier, 2017; Jacobs et al., 2010; Yin and Schmeidler, 2009), whether or not a firm is included in a green stock index (Ziegler, 2012; Oberndorfer et al., 2013), or the announcements of philanthropic gifts for environmental causes (Jacobs et al., 2010).[7] One problem with these proxies is that it is not clear that the control group firms are untreated (make no environmental effort), hence there is likely to be considerable measurement error, which may lead to biased results. Alternatively, studies have used pollution intensity data such as CO_2 emissions and toxic chemical substance emissions (e.g. Fuji et al., 2013), toxic waste (Al-Tuwaijri et al., 2004), water waste (Rassier and Earnhart, 2015) and other waste (e.g. Trumpp and Guenther, 2017). A major constraint with many of these measures is that the

[6] This is rarely measured and good proxies are hard to obtain not least because of the lack of precise and widely accepted framework for defining and measuring production of goods and services that have a positive environmental outcome (OECD and Eurostat, 1999). This is also because all human activities have an impact on the environment hence efforts to reduce environmental impact relative to other activities are inherently difficult to measure (de Melo and Vijil, 2016).

[7] For detailed reviews see (Blanco et al., 2009; Albertini, 2013; Ghisetti and Rennings, 2014; Endrikat et al., 2014; Crifo and Forget, 2015; Friede et al., 2015; Dechezleprêtre et al., 2019).

sample size is restricted because such information is usually obtainable only for a small sample of companies in a few sectors[8] in a single country. Moreover, meta analysis shows that the pollutant type for environmental performance indicators affects the environmental-financial performance relationship, hence composite pollution indicators are preferred (Horváthová, 2012).

Patent applications offers one measure of the level of attention a firm pays to environment. Specifically, studies have looked at the share of "green" or "clean" patents relative to total patents, to capture firms' strategic shift towards low carbon markets (Lanjouw and Mody, 1996; Jaffe and Palmer, 1997; Veugelers, 2012; Dechezleprêtre et al., 2017). While patent counts and their citations offer a relatively homogeneous measure of technological novelty and are available for long time series, they mainly capture inventions rather than diffusion or adoption of new technologies, and have well known drawbacks as indicators of firm innovation activity.[9]

For indicators capturing the level of environmental efforts relevant to the "revenue channel", studies have thus far utilised information on green innovation and green product introductions through questionnaires (Rennings and Zwick, 2002; Rennings et al., 2004; Bloom et al., 2010; Martin et al., 2012; Jabbour et al., 2015) or analysis of press releases (Palmer and Truong, 2017) to capture firms' commercial shifts towards environmental products. Robust statistical analysis is difficult when using these indicators because sample size tends to be small (external validity is also threatened because of limited sectoral and geographical coverage) and there is usually no time variation.

We employ a new and unique measure tracking the share of revenues derived from green goods and services over time at the firm level, using data from FTSE Russell. This database provides detailed information into the environment-focused commercial activities of publicly listed firms, thus capturing firms' decision to shift towards the low carbon economy over time. This data allows us use fixed effects panel data estimation to test how shifts towards green activities affect firm performance, controlling for unobserved heterogeneity at the firm, time, or sector level. Controlling for such heterogeneity is advantageous given that environmental efforts may be driven for example by firm specific characteristics such as corporate culture or time specific shocks such as an introduction of regulation.

Our dataset also covers firms across a broad range of sectors, thus facilitating study of environmental goods and services across a wide range of sectors (See section 3 for detail). In the analysis, we include sector fixed effects enabling us to control for time invariant sector characteristics, thus complementing the existing literature (e.g. Konar and Cohen, 2001; Hibiki et al., 2003; Rexhäuser and Rammer, 2014). Our results can therefore be interpreted as capturing general effects across the economy. This is important because both the propensity of firms to generate revenues from environmental goods and services, and how this affects profitability is likely to vary considerably across sectors, for example due to the role of technology or policies.

[8]Usually energy sector, traditional environmental sectors such as water and waste, or energy intensive sectors

[9]For example, not all innovations are patented, different technologies are differently patentable, and the propensity to patent innovations varies considerably across types of firms, sectors and countries (Malerba and Orsenigo, 1995). Granted patents capture only successful innovations, therefore representing only a fraction of innovation activity (Lychagin et al., 2016). Finally, given that some sectors rely more on patents than others, using patent data may lead to a biased view of the green economy.

Our data is particularly well-suited for assessing the "revenue" channel through which shifts in commercial focus towards environmental goods and services may impact financial and market performance. The panel data structure and wide coverage capturing within variation in green activities of a firm allows us to circumvent many limitations in previous analysis highlighted above. It also allows us to explore sector-specific heterogeneities.

2.2 Unpacking firm level financial performance measures

We link firm level financial information to our firm level green revenue share, resulting in a panel datasets that contains information on firms' environmental and financial performance. The literature has used a wide range of measures to assess the link between environmental and financial performance. Current profitability is typically captured by accounting-based variables such as net income (e.g. Palmer and Truong, 2017), return on sales (ROS) (e.g. Wagner and Blom, 2012; Ghisetti and Rennings, 2014), return on assets (ROA) (e.g. Fuji et al., 2013; Trumpp and Guenther, 2017) and return on equity (ROE) (e.g. Przychodzen and Przychodzen, 2015). Expected profitability is instead captured by market-based variables including market value of equity (e.g. Moliterni, 2018), total shareholder return (e.g. Trumpp and Guenther, 2017), or Tobin's Q (e.g. Hibiki et al., 2003; Rassier and Earnhart, 2015). Horváthová (2010) argues that a key distinction is between forward looking financial variables that capture market expectations and accounting-based measures capturing past (delivered) performance. No study in this literature has articulated the difference or links between various financial performance measures how to interpret them. One of our contributions is to start unpacking the key profitability measures and show how they relate to each other. This motivates our choice of dependent variables and estimation strategy, as well as the interpretation of our results.

Accounting based measures of current profitability

Current profitability measures generally fall into two groups: those capturing operating profit margins (how much profit is being produced per dollar of sales) and those capturing return on investments (how efficient a firm is at using its assets or equity to generate earnings). The former group typically use Returns-on-Sales (ROS) or earnings ratios (EBIT- and EBITDA-margin)(See Appendix C.1 for variable definitions).[10] The latter group represents more comprehensive measures of profitability that evaluate earnings against investments. Common variables in this latter group are Return-on-Assets (ROA) and Return-on-Equity (ROE), which take into account firms' asset- or equity resource requirements respectively, and in essence measure how efficient a firm can generate profits given the capital investment entrusted to it. Investors are typically be more

[10] These may also be referred to as the operating margin. Both terms are used interchangeably. EBIT-margin is measured as Earnings before Interest and Taxes (EBIT) divided by Revenues. EBITDA-margin is measured as Earnings before Interest, Taxes, Depreciation & Amortization (EBITDA) divided by Revenues. The EBIT-margin and ROS are often used interchangeably, the main difference being that the nominator of the EBIT-margin (EBIT) includes non-operating income and non-operating expenses which are not in the nominator of ROS (Operating Income). Non-operating income (expense) includes for example interest or tax income (payments). Operating Income is: gross income - total operating expenses. EBIT is: pre-tax income + interest expense + tax expense. We use all three variables in our analysis.

concerned about these financial resource-based profitability indicators. The two groups of indicators are related through the DuPont decomposition (Equations 1 to 3) (see e.g. Fairfield and Yohn, 2001; Soliman, 2008):

$$ROS = \frac{Operating\ Income}{Sales} \tag{1}$$

$$ROA = \frac{Net\ Income}{Assets} = ROS \cdot \frac{Sales}{Assets} \tag{2}$$

$$ROE = \underbrace{ROS \cdot \frac{Sales}{Assets}}_{ROA} \cdot \frac{Assets}{Equity} \tag{3}$$

If a higher share of revenues derived from green goods and services is associated with higher ROS, this indicates that going green is related to higher profit margins. In other words, a higher share of "green" sales can be turned into profits. As shown in Equation 2, ROA is the ratio of net income to total assets, or ROS multiplied by the inverse asset requirement ($Sales/Assets$, capturing operating efficiency and also known as asset turnover). Certain sectors or activities may exhibit higher asset requirements, for example, capital intensive industrial production, or innovative processes that require higher initial investments. ROE is similar to ROA, but also takes account of leverage effects, by incorporating differences between debt or equity financing. The term $Assets/Equity$ captures leverage (i.e. the proportion of a firm's assets that has been financed by equity rather than debt). Even though it is the most comprehensive measure, assessing firms' profitability using ROE alone can be potentially misleading - a firm's ROE depends positively on leverage.[11] [12] The decomposition into its components is therefore important and provides additional insight into the drivers of firm profitability.

Market based measures of expected profitability

We can also ask whether increasing the green revenue share affects market expectations of a firm's expected future profitability. A large, closely related literature explores how investors' respond to companies' voluntary environmental efforts including improving Corporate Social Responsibility (CSR), announcements about sustainability commitments, inclusion in sustainability stock indexes or by Environmental Social and Governance (ESG) scores. These environ-

[11]For instance a firm's ROE may increase mechanically due to higher leverage implying that a firm is increasing its debt level (potentially increasing its default risk), rather than achieving higher operative efficiency or asset turnover.

[12]High dept ratios can be perceived as more risky since they require firms to have relatively stable cash flows to be able to pay off debt. A low ratio indicates that a business has been financed in a conservative manner, with a large proportion of investor funding and a small amount of debt. Generally bankruptcy risk increases with leverage.

mental efforts more closely relate to reducing in-house environmental impacts and are thus more relevant to the "cost channel". The evidence has been mixed but studies using more recent data tend to find that investors penalise firms that do not embrace sustainability and climate mitigation (Moliterni, 2018). In these studies, expected profitability is typically captured by market capitalisation (also referred to as the market value of equity) (see e.g. Moliterni, 2018; Lourenço et al., 2012a), or Tobin's Q (see e.g. Hibiki et al., 2003; King and Lenox, 2001; Ziegler, 2012; Rassier and Earnhart, 2015). Market capitalisation (or market value of equity) is the product of the share price and the number of shares, in other words, the aggregate market value of a firm at a point in time. In contrast, Tobin's Q is a more comprehensive measure that also takes the book value of firms' assets into account and is defined as follows (see e.g. Claessens and Laeven, 2003; Klapper and Love, 2004):

$$Tobin's\ Q = \frac{Market\ Capitalisation + Book\ Value\ of\ Debt}{Book\ Value\ of\ Total\ Assets} \tag{4}$$

Building upon the Efficient Market Hypothesis,[13] Tobin's Q isolates the perceived value of the firm relative to the book value of its assets, and reflects investors' expectations about expected future profitability (Fama, 1991; Ball, 1995; Bharadwaj et al., 1999).[14]

3 Data and Descriptives

We combine two main datasets for the analysis: FTSE Russell Green Revenues and Thomson Reuters Worldscope. Merging the two data sources results in a panel of approximately 16,500 firms. Our data provides comprehensive and detailed information on the annual level of green activity and the financial and market performance of global publicly listed firms.

3.1 Green Revenues

The FTSE Russell Green Revenues is a proprietary dataset, containing detailed information on listed firms' annual revenues attributable to "green" goods and services. Our data covers global publicly listed firms across 48 countries representing approximately 98% of global market capitalisation for the period 2009 and 2016. To estimate each firm's contribution to the green economy, FTSE Russell (2010) first define the green economy, using what is called a Green Revenues classification model, containing ten broad green sectors and 60 green sub-sectors (see Table A.1 in Appendix), and covering a wide range of activities related to the environment, both goods and services. The data includes sectors traditionally regarded as green, such as low-carbon energy generation, energy efficiency equipment, and waste- and natural resource

[13] This is a hypothesis in financial economics that states that financial markets fully and immediately reflect all available information.

[14] The denominator of Tobin's Q is the book value of a firm's assets. This is important as it scales the market capitalisation relative to the total assets that are available for distribution in case of firm liquidation. It is important to note that any analysis using Tobin's Q requires firms' to have a share price and a related market capitalisation. Thus any analysis using this measure is limited to listed firms.

management, but also sectors that are not traditionally classified as green, such as finance and investment, railways operation, smart cities design and engineering. Thus, it recognises that the green economy embraces a broad range of sectors and comprises firms of different shades of green. Having defined the green sectors, a FTSE team of analysts search through firms' annual reports for evidence of engagement in green subsectors. Revenues that are attributed to that green subsector are reported where available. For each firm and year, the aggregate of sub-sector green revenues is divided by total revenues to express a firm-year level green revenue share with values between 0 and 100. There are many cases where firms indicate that they are active in a green sub-sector but the exact revenue attributed to that activity is not disclosed. In these cases, the data provider reports a possible range of values – a minimum and maximum value – of the green revenues by sub-sector.

Approximately 3,500 of the 16,500 firms in our sample have some green revenue. Overall, the average minimum green revenue share increased from 1.8% in 2009 to 2.4% in 2016. For the subset of firms that have non-zero green revenues during the sample period, the average minimum green revenue increased from 11.5% in 2009 to 13.4% in 2016, representing an overall increase of roughly 16% over seven years.[15]

When the green subsector revenue is not reported, the minimum green revenue is typically set at zero. We therefore face a distribution of minimum green revenue share that is highly skewed towards zero.[16] We address this issue in the following way. For our baseline estimation, we utilise the information on the relative importance of a sector within a firm. As an example, consider an automobile company generating 95% of its revenues from passenger cars and 5% from financial services. Of their passenger cars, an undisclosed share of their revenues are derived from electric and hybrid cars. In this case the potential range of green revenues reported for the firm is 0-95%. In order to develop a more precise estimate, we impute the missing subsector green revenue share using yearly averages of firms in the automobile sector - say green vehicles account for 5% of total automobile revenues on average in this sector. We then use this value, such that the green revenue share range for this firm is narrowed to 0-4.75%[17]. This is possible because a company's sector revenues are never missing in the data, and the relative importance of a sector within a company is always known (for further details see Appendix B). It is important to note that the imputation is conducted at the company sub-sector level, hence there is no threat of introducing additional endogeneity issues into our estimates.[18] As a robustness check in Section 5.3, we also examine a more conservative measure where the minimum green revenue is used. Figure 1 shows the distribution of green revenue shares. The first bar indicates that around 30% of firm-year observations report levels of green revenue share between 0 and 2.3%[19].

[15]The imputed green revenue share increased from 2.4% to 3.2% between 2009 and 2016. For the firms that have some green revenue during the sample it increased from 15.1% to 17.5%, equivalent to a 16% increase.

[16]Approximately 70% of the minimum green revenue share at the firm level is less than 1% (see Figure B.2 in the Appendix).

[17]Based on the calculation $0.95 \cdot 0.05 = 0.0475$

[18]When referring to "green revenues" we refer to the green revenue measure after applying the sub-sector imputation. We also refer to this measure as "estimated green revenue" or "augmented" green revenue variable. When referring to the "minimum green revenue" we refer to the 'raw' FTSE Russell lower-bound minimum green revenue.

[19]About 25% of the firm-year observation in this sub-sample do not report any green revenues. See Figures B.2 and B.3 for a comparison of distributions before and after the imputation

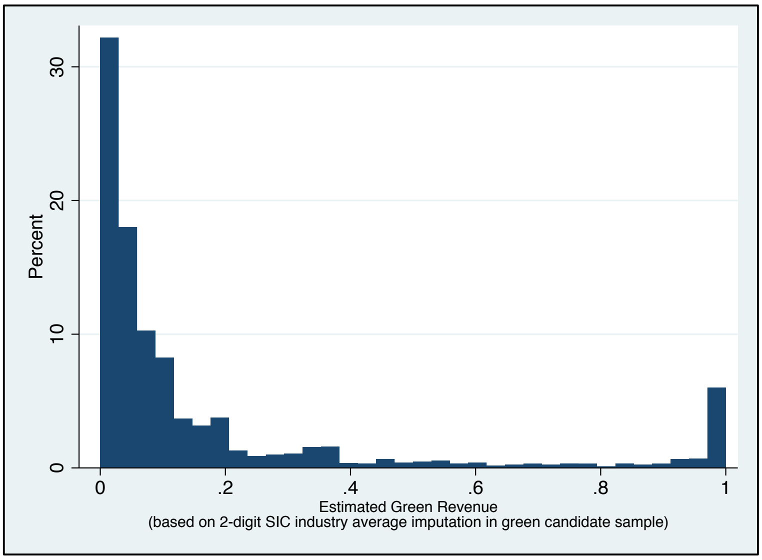

Figure 1: Distribution of Green Revenue based on augmented Green Revenue variable

The green revenue measure allows us to provide the first comprehensive overview of the size and composition of the global green economy among publicly listed firms. Figures 2 and 3 show respectively the green revenue share by industry and the trends by sector. Figures 2 shows the green revenue shares and absolute US dollar amounts aggregated at the 2-digit sector level. We see that the green economy spreads across many sectors but is largely concentrated in energy and manufacturing. Across most sectors we observe that the revenue share ranges roughly between 2 and 15%. The industry with the highest green revenues in absolute terms is Electricity, Gas, & Sanitary Services, which generates approximately 25% of revenues from green goods and services on average. This sector consists largely of renewable electricity generation, as well as water- and waste-management. Significant green revenues are also generated by manufacturing sectors. The four largest manufacturing sectors in terms of green revenues (manufacturing of electronics, industrial & commercial machinery, transport equipment and chemicals) together generate approximately USD 550 billion (see Figures B.6 and B.7 for green revenue decomposition by 3-digit SIC codes). Figure 3 show that there has been an increase in the green revenue from 2009 to 2013 and a slight decrease thereafter. The global green revenues account for approximately US$1.6 trillion in 2016 (up from about US$ 1 trillion in 2009). According to (Forbes, 2018) the global revenue of the largest two thousand firms accounts for about US$39 trillion. A back-of-the-envelope estimate suggests that green revenues account for approximately 4% of total turnover globally among listed firms.[20]

[20]It is important to note that non-listed firms and smaller listed companies are not covered by FTSE Russell, hence our analysis provides a lower-bound of the true size.

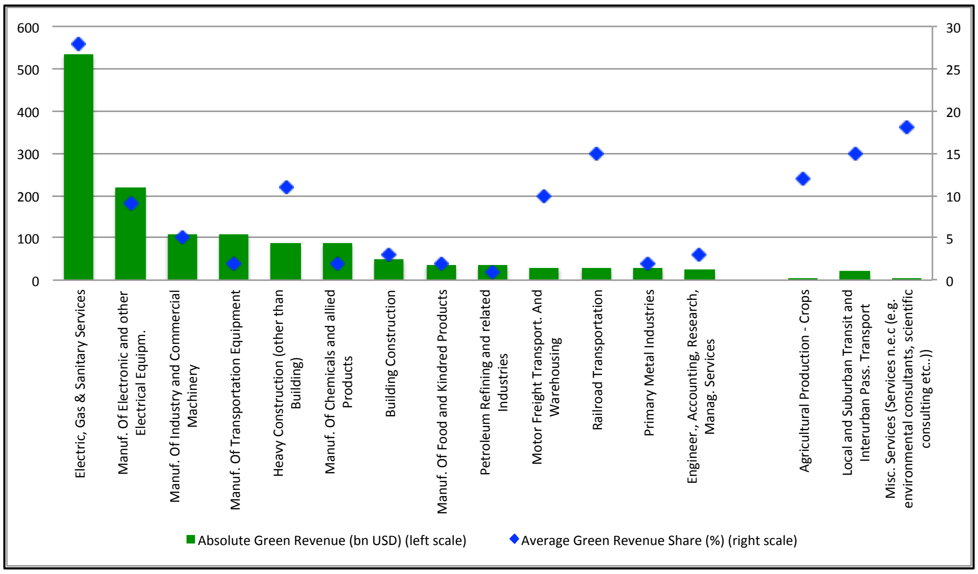

Figure 2: Green Revenue and Average Green Revenue Share by Industry (2-digit SIC) in 2016

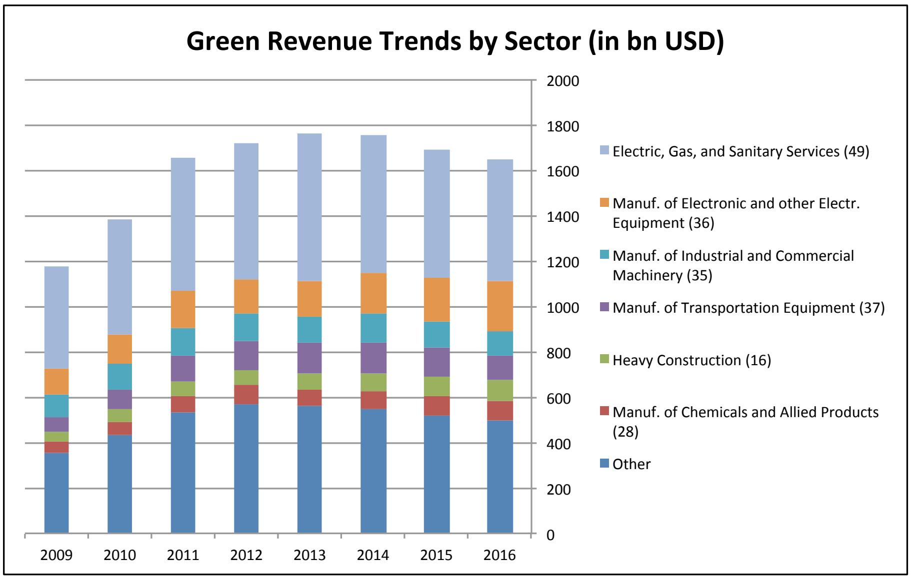

Figure 3: Green Revenue Trends by Sectors

3.2 Financial Performance Variables

Firm-level economic variables are obtained from Thomson Reuters Worldscope.[21] We restrict our sample to improve the robustness of our analysis. We exclude financial firms (SIC 6000-6999) from our sample because the accounting for firms in these sectors is different (see e.g. Fama and French, 1992; Faulkender and Petersen, 2006).[22] We also restrict our sample to ensure results are not driven by three specific factors: (1) anomalies in the data, (2) specific corporate events

[21] As variables are expressed in local currency units, we convert to USD using the annual official exchange rate obtained from the World Development Indicators provided by the World Bank (The World Bank, 2018).

[22] Financial firms typically do not generate any revenue. They may also have statutory capital requirements and their leverage has a different meaning.

(e.g. corporate reorganisations), and (3) extreme values.[23] We follow the approach by, among others, Opler et al. (1999), Vermoesen et al. (2013), and Liu et al. (2014) and exclude all firm-year observations with negative book equity or sales.[24] Furthermore, we exclude all firm-year observations with a change in total assets greater than 100% (following e.g. Duchin et al., 2010; Vermoesen et al., 2013). Such large jumps typically indicate major events such as mergers and acquisitions or other corporate reorganisations. Finally, we winsorize all continuous variables symmetrically at the top and bottom 1% to avoid that any remaining outliers drive the results Clarkson et al. (2015).

Table 1: Descriptive Statistics

	Median	Mean	Std. Dev.	Min.	Max.
EBIT-margin	0.08	-0.05	1.06	-9.05	0.73
EBITDA-margin	0.13	0.03	0.94	-7.98	0.88
Return-on-Sales (ROS)	0.08	-0.07	1.12	-9.77	0.53
Return-on-Assets (ROA)	0.05	0.03	0.14	-0.73	0.32
Return-on-Equity (ROE)	0.09	0.05	0.29	-1.50	0.84
Min. Green Revenue	0	0.03	0.14	0	1
Green Revenue Share	0	0.04	0.14	0	1
# employees	2636	10935	25243.88	7	170953
Log(Assets/Sales)	0.30	0.43	0.88	-1.27	3.87
D(R&D>0)	0	0.40	0.49	0	1
Leverage	0.04	0.12	0.17	0	0.74
Dividends per Share (USD)	0.01	0.27	0.59	0	3.6
Sales Growth	0.06	0.11	0.34	-0.69	1.98
Tobin's Q	1.37	1.89	1.49	0.51	9.50
Log (Sales/Assets)	-0.30	-0.44	0.96	-11.54	1.27
Log (Assets/Equity)	0.69	0.80	0.56	0.03	2.93

Table 1 presents the descriptive statistics of our sample. We see that our sample contains relatively large firms with an average (median) of about 11,000 (2,600) employees. The median firm reports short-term profitability indicators of 8% (ROS), 5% (ROA), and 9% (ROE). The mean values tend to be lower as the distribution of these indicators tends to be skewed to the left. The share of green revenue share is on average 3%. The mean (median) Tobin's Q is 1.89 (1.37), which indicates that the median firm is valued higher by the market than the replacement cost of its assets in line with previous literature (e.g. Duchin et al., 2010; Jermias, 2008)[25]. When comparing descriptive statistics for firms that have positive green revenue shares vis-à-vis firms with no green revenues (see in Appendix Table D.3), green firms emerge on average to be

[23]There is much debate on these restrictions - while some papers impose few restrictions on the data (e.g. Fama and French (1992); Khanna et al. (1998); Anderson et al. (2012); Mollet and Ziegler (2014)), others apply more restrictive exclusion criteria. Being too restrictive in excluding observations is problematic as the sample-selection may drive results and can reduce the external validity of the findings. It can also increase the likelihood of a type 2 error, which implies failing to reject a null hypothesis (of no difference), even though a true difference exists.

[24]The dependent variables are ill-defined with negative equity or revenues, which is why these observations are conventionally excluded. Moreover, negative equity implies that firms' liabilities exceed their assets, which can be driven by large accumulated losses over multiple time periods. These are excluded so that that firms in financial distress do not drive our results.

[25]Duchin et al. (2010) report a mean Tobin's Q of 1.77. Jermias (2008) report a mean of (log) Tobin's Q of 0.615, which is equivalent to 1.85 in Tobin's Q.

larger and more profitable than non-green firms, yet have on average lower values of Tobin's Q. This indicates that frontier firms in the green economy are systematically different. This has important implications for our empirical strategy (e.g. selection bias, endogeneity concerns), which will be discussed in Section 4.1.

4 Empirical Strategy

We are interested in the relationship between producing green goods and services and firms' current profitability, and their expected future profitability. In our first specification we focus on the relationship between green revenue share and various measures of current profitability. We estimate the following model:

$$Y_{it} = \beta_1 GR_{i,t-1} + \beta_2 V'_{it} + SIC_{it} + \alpha_i + \epsilon_{it} \tag{5}$$

where i and t index the firm and year respectively. Y_{it} is a financial performance measure (EBIT-, EBITDA-margin, ROS, ROA, or ROE). $GR_{i,t-1}$ is a continuous measure of green revenue share. We incorporate a one year lag-structure to minimise the possible concerns about reverse causality (i.e. more profitable firms are more likely to diversity into the environmental market place).[26] We also include a vector of firm-specific controls V'_{it} including the number of employees (log), the (log) assets-to-sales ratio, a dummy variable indicating whether a firm invests in R&D, and (log) leverage (debt divided by asset). We use the number of employees as a proxy for firm size following Telle (2006) and Fuji et al. (2013).[27] The assets-to-sales ratio captures capital-intensity or capital requirements for production. It also proxies entry-barriers since in markets with high assets-to-sales ratios, entry is more difficult due to higher capital requirements and sunk costs (O'Brien, 2003; Rexhäuser and Rammer, 2014). We include an R&D dummy variable taking the value of 1 if a firm has reported positive R&D expenditures to control for the innovative activity of a firm.[28] We also include leverage (Debt/Assets) to control for firms' level of debt and their financing structure (of debt versus equity financing).[29] The vector SIC_{it}

[26] Our relatively short panel prohibits extending further back the lag structures because it reduces the sample size and increases the likelihood of a type 2 error.

[27] We include employees rather than total assets as our control for firm size to reduce issues of multicollinearity with our other control variables in particular the assets-to-sales ratio.

[28] The use of a continuous measure of R&D may bias our estimate given that R&D expenditure is not a mandatory or standardized reporting item for firms dan firms face incentives to strategically misreport their R&D expenditure (Beatty et al., 2013) as knowledge of competitors' R&D expenditure allows insight into firms' short-and long-term strategy and operations (Li, 2016). The dummy variable limits the bias to our estimate.

[29] The importance of leverage in models explaining firm performance has been widely discussed in financial economics beginning with the landmark paper by Modigliani and Miller (1958). The subsequent literature has underlined and shown empirically the importance of firms' financing structure for their profitability and valuation (see also Myers, 2001). Following Modigliani and Miller (1958), many studies investigated the relationship between firms' financing structure and economic performance and show that existing capital markets are not sufficiently perfect and that the type of financing and firm leverage impact their performance. This literature has examined the impact of financing on both accounting-based profitability (e.g. ROS, ROA, ROE), as well as market based profitability such as Tobin's Q (see e.g. Berger and di Patti, 2006, for a discussion). A number of theories have been developed to explain the impact of financing decisions on firm performance. One view focuses on tax advantages of debt over equity financing. Interest (paid on debt) is often tax-deductible, which implies that an additional dollar of interest paid is partly offset by lower taxes, making debt financing relatively cheaper. Hence,

represents 3-digit industry-by-year dummies that account for unobserved year-specific effects. α_i are firm-fixed effects that absorb the effects of time-invariant firm level characteristics such as initial commitment to "going green" or initial productivity. Finally, ϵ_{it} is an idiosyncratic error term. We cluster the standard errors at the firm level to account for correlation in unobserved components of the outcomes within a firm.

To investigate the market valuation of engaging in green activity, we examine the following Tobin's Q regression (Hall et al., 2005):

$$Tobin's\ Q_{it} = \beta_1 GR_{i,t} + \beta_2 W'_{it} + \beta_3 Div_{it} + \beta_4 Sales/Growth_{it} + SIC_{it} + \alpha_i + \epsilon_{it} \quad (6)$$

where Tobin's Q is measured as specified Table C.1 and $GR_{i,t}$ is the continuous measure of the green revenue share at time t. Based on the Efficient Market Hypothesis (Fama, 1991; Ball, 1995; Bharadwaj et al., 1999), it is assumed that all information is immediately priced into firms' stock price. Hence, there is no time lag between engaging in green activities and firms' market valuation. We include a vector of firm-specific controls W'_{it}. We again control for the number of employees, the assets-to-sales ratio, a dummy variable indicating whether a firm invests in R&D and leverage. We also add dividends per share Div_{it} which is relevant for investors' valuation of a firm. Firms' dividend pay-out policies can affect their Tobin's Q, as firms with high dividend payments may have higher market values and lower book values relative to low dividend firms (Jermias, 2008). Some papers also suggest that firms' growth opportunities, as measured by revenue-growth, can be a relevant determinant for market valuation (see e.g. King and Lenox, 2001; Rassier and Earnhart, 2015).[30] The cost of including sales-growth in a panel fixed-effects specification is that automatically one year is dropped from the analysis. We therefore present results with and without controlling for sales-growth. The vector SIC represents 3-digit industry-by-year dummies and α_i are firm-fixed effects. Finally, ϵ_{it} is an idiosyncratic error term. We cluster the standard errors at the firm level to account for correlation in unobserved components of the outcomes within a firm.

We report the pairwise correlation coefficients between the profitability indicators in Table D.1 in

financing with debt rather than equity should improve firms' overall performance. Moreover, financing with equity has substantially higher transaction costs, in large parts due to fees paid to the underwriting bank (i.e. the "spread"), as well as other legal and auditing costs (Myers, 2001; Chod and Zhou, 2014). These effects alone would point in the direction of complete debt financing, which is however not observed in reality. Counteracting effects have been identified, of which the trade-off theory suggests that higher levels of debt-financing increase the risk of bankruptcy, implying a cost of financial distress. The threat of default can impact firms' operating and investment decisions, as it may delay or deter otherwise profitable investments. Such "underinvestment" problems arising from deterring effect from high leverage-ratios can reduce firms' financial performance (Myers, 1977, 2001). Debt can also function as a tool to discourage managers from taking excessive risks or from using financial resources inefficiently through the threat of liquidation (Margaritis and Psillaki, 2010) (For a detailed review see also Modigliani, 1982; Myers, 2001; Chod and Zhou, 2014). Due to the potentially counteracting effects, the net effect of firms' leverage-ratio on their financial performance remains unclear and may be case-specific, yet it is an important control variable in models of firms' financial performance (Margaritis and Psillaki, 2010). This has not received the same level of attention in environmental economics where few papers control for firms' leverage-ratio, some exceptions including Konar and Cohen (2001) and King and Lenox (2001), which control for firms' debt or leverage in cross-sectional settings.

[30] There is no consensus on the variable's importance within Tobin's Q models. For instance it is not included in Jermias (2008), it is highly insignificant in the model of (Rassier and Earnhart, 2015) and only marginally significant in Khanna and Damon (1999).

the Appendix.[31] We see that there are high correlations between different measures of operating profitability, i.e. the EBIT-, and EBITDA-margin, and ROS while ROA and ROE are positively correlated but to a smaller degree to the operating profitability measures. This reflects the difference in operating profit margin and financial resource-based profitability indicators. Tobin's Q as well as market capitalisation have relatively low correlations with the profitability indicators. This table highlights the importance of studying accounting- and market-based firm performance separately, and suggests results for the indicators within these two groups might be relatively similar, while some heterogeneity across the groups is expected.

4.1 Propensity Score Weighting

Comparing firms that generate some green revenue with those that don't engage in any green activities can bias our estimates. The decision to engage in green activity may be driven by lagged firm characteristics and investment decisions that are correlated with expected profitability or market valuation. To better control for selection, we combine a fixed effect regression with an inverse propensity score weighting (IPSW) strategy based on pre-sample observable time-invariant characteristics of firms (Rosenbaum and Rubin, 1983). For each 3-digit industries, we estimate a propensity score $\hat{p}$ based on the pre-sample averages (2005-2008) of all our control variables except for the R&D dummy.[32] We consider firms that generate a positive green revenue share at any point in the sample as being "treated" and firms that never generate any positive green revenue share as the pool of controls. The estimated propensity scores are then used to weight firms, thus creating a sample that is similar with respect to the propensity score distribution (Lechner, 1999; Dehejia and Wahba, 2002; Guadalupe et al., 2012; Busso and McCrary, 2014). Specifically, the weight for each "green" firm is $\frac{1}{\hat{p}}$ and the weight for each control firm is $\frac{1}{(1-\hat{p})}$ (also known as inverse probability weighting (IPW)). In the subsequent results section, we compare results with and without IPW restricting the sample to firms with the common support. We winsorize the weights symmetrically at 1% following Guadalupe et al. (2012).[33]

As shown in Figures D.1 to D.7 in the Appendix, prior to the weighting, firms generating green revenues tend to be larger on average. However, there may be a selection issue based on unobservables, and a number of potential threats to identification still remain. The lag structure, the fixed effect and the inverse probability weighting only partly address the endogeneity issue. We are therefore cautious to not interpret our results as causal.[34] Additionally, the Stable-unit-treatment-value assumption (SUTVA) might be violated in this context. The most relevant SUTVA assumption here is that the observed decision (to generate green revenues) is indepen-

[31] We perform a similar exercise between the explanatory variables in Table D.2.

[32] We exclude the R&D dummy from the propensity score estimation as we are worried it might introduce additional bias. It is not precisely measured and a 0 can either mean that a firm does not have any R&D expenses, does strategically not report its R&D expenses, or that the data point is missing for other reasons.

[33] We also conducted robustness checks using entropy rebalancing methods following Hainmueller and Xu (2013) (balancing within each industry on the first moment) and found the results are very similar to those using inverse propensity score weighting.

[34] Since the green revenues data is provided at the global level of firms and linked to their 'consolidated' global accounts, we are also not able to exploit potentially exogenous variation in energy prices across countries as done for instance by Marin and Vona (2017) using an instrumental variable approach.

dent of decisions of other firms i.e. there are no general equilibrium effects across firms. This may be violated here, as firms' decision to invest in green technologies may be conditional on other firms, for instance due to the fear of falling behind in a growing market or by exploiting second-mover advantages. This is not an uncommon threat to identification in empirical economic analysis (e.g. Lechner, 1999).

5 Main results

5.1 Current Profitability

In this section, we present represent the average effects across all sectors. Starting with measures of operating profit margins in Table 2, we observe positive and significant relationships between the green revenue share and EBIT-, EBITDA-margin, and Returns-on-Sales (ROS). Columns 1 to 3 present our baseline results for our full sample without the inverse propensity score weighting.

We see that the effect of green revenue share is significant at the 5% level in each specification. To interpret the magnitude of the coefficients and to be able to compare them across models, we standardise the effects. A one standard deviation increase in the green revenue share, which is equivalent to an increase of 13 percentage points, is associated with a 0.03 standard deviation increase in return-on-sales. Hence, for the median firm, with a ROS of 0.08, a one standard deviation increase in Green Revenues is associated with a 0.039 point increase in ROS, equivalent to a 49% increase.[35] We observe that larger firms have higher profit margins. Both the coefficients on the assets-to-sales ratio and the leverage are negative. Results with the inverse propensity score weighting are shown in columns 4 to 6 of Table 2, while results without the weighting on the same smaller sample (as the regressions with weighting) are shown in Table E.1 in the Appendix. The results are somewhat sensitive to both the weighting and the sample. Overall, propensity score weighting leads to coefficients that are smaller in magnitude and similar in significance compared to the full sample without weighting. The results confirm that firms engaging in green activities are more profitable. Results suggest that firms are moving into the green space in sectors where green goods and services can be differentiated and consumers are willing to pay a premium. Green markets also tend to be less mature, which could indicate less competition resulting and higher markups. These results are consistent with Palmer and Truong (2017)'s findings using a much smaller sample. Our results derive from a much larger and more diverse sample in terms of geography and sectors.

Moving on to more comprehensive measures of current profitability that measure return on investments, we see in Table 3 that there is a significant and positive relationship between green revenue and return-on-assets (ROA) and return-on-equity (ROE), albeit small in magnitude. For ROA, we observe a coefficient of 0.03, an order of magnitude smaller than the coefficients

[35] This calculation is based on $\beta_{sROS} = \beta \cdot \frac{sd_{GR}}{sd_{ROS}}$. In our setting, $0.30 \cdot \frac{0.13}{1.12} = 0.03$. A 0.03 standard deviation increase in ROS is equivalent to 0.039 increase in ROS points based on $0.03 \cdot 1.12 = 0.039$. For the median firm, an increase in 0.039 ROS points is equivalent to 49% based on $(0.039/0.08) \cdot 100 = 49\%$

Table 2: Current profitability - Operating profit margins

	(1)	(2)	(3)	(4)	(5)	(6)
	EBIT	EBITDA	ROS	EBIT	EBITDA	ROS
Green Revenue Share	0.42**	0.36**	0.31**	0.35**	0.34**	0.29**
	(0.17)	(0.15)	(0.12)	(0.16)	(0.15)	(0.12)
Employees	0.04**	0.03**	0.03	0.07***	0.06***	0.05***
	(0.02)	(0.01)	(0.02)	(0.02)	(0.02)	(0.02)
Assets/Sales	-0.54***	-0.44***	-0.66***	-0.39***	-0.31***	-0.52***
	(0.05)	(0.04)	(0.05)	(0.07)	(0.06)	(0.07)
D(R&D>0)	0.02**	0.02**	0.02*	0.03*	0.03**	0.02
	(0.01)	(0.01)	(0.01)	(0.02)	(0.02)	(0.02)
Leverage	-0.01*	-0.01*	0.00	-0.01	-0.01	0.01
	(0.01)	(0.00)	(0.00)	(0.01)	(0.01)	(0.01)
Constant	-0.15	-0.05	-0.00	-0.41***	-0.33**	-0.16
	(0.13)	(0.12)	(0.13)	(0.15)	(0.14)	(0.14)
R^2	0.722	0.767	0.829	0.716	0.708	0.777
Nb. of obs.	51,498	51,444	52,653	35,233	35,212	35,721
Firm FE	yes	yes	yes	yes	yes	yes
Industry-by-year dummies	yes	yes	yes	yes	yes	yes
Pscore-weight	no	no	no	yes	yes	yes

Notes: *** denotes significance at 1%, ** at 5%, and * at 10%. Estimates stem from an ordinary least square estimation with robust standard errors, clustered at the level of the firms, reported in the parentheses. The dependent variables are EBIT-margin in columns 1 and 4, EBITDA-margin in columns 2 and 5 and Return-on-sales (ROS) in columns 3 and 6. Green revenue is measured as a continuous variable based on the augmented green revenue variable. Number of employees, assets over sales and leverage are all measured in logs. All models incorporate a full set of firm fixed effects and 3-digit industry-by-year dummies. In columns 4 to 6 we weight the sample by the inverse propensity score.

of the operating profit margin indicators. A one standard deviation increase in green revenue (13 percentage points), is associated with a 0.03 standard deviation increase in ROA. However, since the standard deviation of ROA is lower than for ROS, this is equivalent to a 0.004 point increase in ROA. For the median firm with ROA of 0.05, this is equivalent to an 8% increase in ROA.[36] In the case of return-on-equity, a one standard deviation increase in green revenue share is associated with a 9.6% increase in ROE for the median firm. Overall we observe a substantially larger increase in operating profit margin associated with generating revenues from producing green goods and services, compared to the more comprehensive asset- or equity-based profitability indicators. The coefficients on green revenue share are similar in size and significance with the inverse propensity score weighting.[37]

To make sense of our result, we refer to the DuPont Decomposition (Equations 2 and 3). Recall that ROA is the product of ROS and the inverse asset requirement ($Sales/Assets$). ROE has an additional term, $Assets/Equity$, the equity multiplier. Thus a positive ROS is compatible with a relatively low effect on ROA (ROE) if the sales-to-assets ratio (the equity-multiplier)

[36] The calculation is based on $\beta_{sROA} = \beta \cdot \frac{sd_{GR}}{sd_{ROA}}$. In our case $0.30 \cdot \frac{0.13}{0.14} = 0.03$. A 0.03 standard deviation increase in ROA is equivalent to a 0.004 point increase in ROA based on $0.03 \cdot 0.14 = 0.0042$. For the median firm (with a ROA of 0.05) an increase in ROA of 0.0042 points is equivalent to 8.4% based on $(0.0042/0.05)100 = 8.4\%$.

[37] Table E.2 in the Appendix presents the results with and without propensity score weighting on the same smaller sample.

Table 3: Current profitability - return on assets and equity

	(1)	(2)	(3)	(4)
	ROA	ROE	ROA	ROE
Green Revenue Share	0.03***	0.06*	0.03**	0.06*
	(0.01)	(0.03)	(0.01)	(0.03)
Employees	-0.00	0.00	0.01***	0.02***
	(0.00)	(0.00)	(0.00)	(0.01)
Assets/Sales	-0.04***	-0.08***	-0.02**	-0.05***
	(0.00)	(0.01)	(0.01)	(0.02)
D(R&D>0)	-0.00	0.00	0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.01)
Leverage	-0.01***	-0.02***	-0.01***	-0.02***
	(0.00)	(0.00)	(0.00)	(0.00)
Constant	0.04***	0.04	-0.04**	-0.15***
	(0.01)	(0.03)	(0.02)	(0.05)
R^2	0.729	0.650	0.662	0.590
Nb. of obs.	51,814	51,617	35,549	35,506
Firm FE	yes	yes	yes	yes
Industry-by-year dummies	yes	yes	yes	yes
Pscore-weight	no	no	yes	yes

Notes: *** denotes significance at 1%, ** at 5%, and * at 10%. Estimates stem from an ordinary least square estimation with robust standard errors, clustered at the level of the firms, reported in the parentheses. The dependent variables are ROA in columns 1 and 3, and ROE in columns 2 and 4. Green revenue share is measured as a continuous variable based on the augmented green revenue variable. Number of employees, assets over sales and leverage are all measured in logs. All models incorporate a full set of firm fixed effects and 3-digit industry-by-year dummies. In columns 3 and 4 we weight the sample by the inverse propensity score.

is negative. Therefore, we investigate the relationship between leads and lags of green revenue share and sales/assets. Results are reported in Appendix Tables E.4 and E.5 for sales-to-assets requirement and Tables E.6 and E.7 for the equity-multiplier. We find that sales-to-assets are significantly negatively associated to green revenues for the current and the next (green revenue) time period (the correlation remains negative up to two years, but is not significant in the second year). This implies that firms' generating green revenues require more assets (per sales) for up to two years. This might be the case if firms need to invest additional capital to be able to produce green goods. In contrast, we do not observe significant relationships with firms' equity multiplier ratios. Firms' financing decisions (between debt and equity financing) are not significantly associated with their decisions to produce green goods and services.

On the other hand, engaging in green markets is associated with additional asset and investment requirements. The cost of additional assets required imposes a downward drag on more comprehensive measures of profitability that evaluate earnings against investments, hence we observe relatively smaller associations for these profitability indicators.

5.2 Expected profitability - Tobin's Q

Our results for investors' expectations of future profitability are presented in Table 4. We find positive and significant coefficients for the green revenue share of around 0.1 across the different specifications, with the aggregate sample (columns 1-2) and when controlling additionally for revenue growth (columns 3-4). This implies that a one standard deviation (13 percentage points) increase in green revenue share is associated with a 0.02 standard deviation increase in (log) Tobin's Q.[38] For the median firm, a one standard deviation increase in green revenue share is associated with a 3.8% increase in Tobin's Q. Thus, generating a larger share of revenues from green goods and services is positively and significantly associated with firms' market valuation in the overall sample. The coefficients for revenue growth are, as expected, positive and significant, suggesting that it is an important control variable. The propensity score weights lead to coefficients on green revenue share that are slightly smaller in magnitude and have lower significance.

We observe negative and significant coefficients for assets/sales and the leverage ratio, suggesting that higher investments (per sales) and higher debt financing are negatively associated with investor valuation. The negative coefficient for leverage is in line with the theoretical prediction that higher debt increases the risk of bankruptcy, the cost of financial distress, and may result in constrained investment activities. In our sample, this effect appears to dominate any offsetting effects arising from lower cost of debt financing. We observe positive and significant coefficients for dividend payments and negative coefficients for the number of employees and our R&D indicator variable. The relationship between size and firm performance is ambiguous as it may capture larger firms, but also more labour-intensive production, which might be valued negatively by investors. The negative effect on the R&D variable suggests that innovation activity can be associated with additional costs in the current period and uncertain future benefits.

5.3 Robustness checks

We perform four robustness checks to test the sensitivity of our results. First, we control for loss-making firms because the reporting and valuation of firms with negative profitability can differ systematically from profit making firms (see e.g. Jiang and Stark, 2013; Darrough and Ye, 2007).[39] We include a dummy variable taking the value of 1 if a firm's operating profit

[38] This is based on the calculation: $0.1 \cdot \frac{0.13}{0.58} = 0.02$. This 0.02 standard deviation increase in (log) Tobin's Q is equivalent to a 0.012 point increase in (log) Tobin's Q ($0.02 \cdot 0.58 = 0.012$). In other words, a 1 standard deviation increase in green revenue share is associated with a 0.012 point increase in (log) Tobin's Q. For the median firm with a (log) Tobin's Q of 0.32, a 0.012 point increase is equivalent to a 3.8% change in (log) Tobin's Q ($\frac{0.012}{0.32} * 100 = 3.75$). This can be converted back to non-logged Tobin's Q through: $(e^{0.037} - 1) * 100 = 3.77\%$. Hence, for the median firm a 13% point increase in green revenue share is associated with a 3.77% change in (non-logged) Tobin's Q.

[39] In the particular the role of firms' assets is different for loss-making firms and their valuation. Assets tend to be valued systematically stronger for loss-making firms, as they provide an indication of the value of the firm in the case of liquidation. They have also been used as proxies for firms expected future earnings. Furthermore, the role of carry forward losses to reduce tax payments on anticipated future profits may lead to systematically different outcomes (Ohlson, 1995; Jiang and Stark, 2013)

Table 4: Expected profitability (Tobin's Q)

	(1)	(2)	(3)	(4)
	log (Tobin's Q)			
Green Revenue Share	0.07*	0.13***	0.06	0.08*
	(0.04)	(0.05)	(0.04)	(0.05)
Employees	-0.06***	-0.06***	-0.06***	-0.06***
	(0.01)	(0.01)	(0.01)	(0.01)
Assets/Sales	-0.13***	-0.14***	-0.12***	-0.12***
	(0.01)	(0.01)	(0.01)	(0.01)
D(R&D>0)	-0.06***	-0.08***	-0.02***	-0.04***
	(0.01)	(0.01)	(0.01)	(0.01)
Dividends per Share	0.11***	0.11***	0.11***	0.10***
	(0.01)	(0.01)	(0.01)	(0.01)
Leverage	-0.03***	-0.03***	-0.02***	-0.03***
	(0.00)	(0.00)	(0.00)	(0.00)
Sales-Growth	/	/	0.08***	0.07***
			(0.01)	(0.01)
Constant	0.86***	0.82***	0.81***	0.77***
	(0.06)	(0.08)	(0.06)	(0.09)
R^2	0.843	0.836	0.862	0.858
Nb. of obs.	57,354	40, 141	50,582	34,819
Firm FE	yes	yes	yes	yes
Industry-by-year dummies	yes	yes	yes	yes
Pscore-weight	no	yes	no	yes

Notes: *** denotes significance at 1%, ** at 5%, and * at 10%. Estimates stem from an ordinary least square estimation with robust standard errors, clustered at the level of the firms, reported in the parentheses. Green revenue share is measured as a continuous variable based on the augmented green revenue variable. Number of employees, assets over sales and leverage are all measured in logs. All models incorporate a full set of firm fixed effects and 3-digit industry-by-year dummies. In columns 3 and 4 we weight the sample by the inverse propensity score.

margin (measured by ROS) is negative in a given year. The magnitude and significance of the effects remain fairly stable (Tables F.1, F.2, and F.3 in the Appendix). Second, we examine the sensitivity of our results to the imputed green revenue share measure. We replicate our results using the raw FTSE Minimum Green Revenue variable, which provides the most conservative estimate. Reassuringly, the results hold in magnitude and significance (Tables F.4, F.5, and F.6). Third, we test if the results are driven by electricity generating firms, which is by far the largest 3-digit SIC sub-sector accounting for about 400 billion USD in green revenues in 2016 on its own (See Figure B.6). Renewable electricity generation has received substantial subsidies over the past decade and may therefore have experienced a unique economic performance (e.g. IEA, 2017). Hence, we exclude electricity generation as an additional robustness check to examine if results might be driven by this particular sector (Tables F.7, F.8, and F.9).[40] The results for our profitability indicators remain stable. We observe a decline in significance for the results on Tobin's Q, after controlling for revenue growth.

[40] In addition to SIC 491 (Electric Services), we also exclude SIC 493 (Combined Electric, Gas, and other Utility) to avoid that the effects might simply be driven by firm classification since primarily electricity generating firms can also be classified as SIC 493. This is a conservative approach as we exclude a larger set of firms.

Lastly, we exclude all utilities from our sample (SIC 4900-4999), which covers a broad group of sub-sectors including electricity generation, gas production and distribution, waste management, water supply and sanitary services among others. Utilities collectively account for a large amount of green revenues in the database and hence excluding them substantially restricts the variation in green revenues.[41] We observe that the positive effect on the operating profitability margins persists for non-utility firms (Table F.10). Interestingly, the effects on return on investments (ROA, ROE) and Tobin's Q are largely insignificant after applying this sample restriction (Tables F.11 and F.12). This suggest that in contrast to utilities, for the rest of the economy, diversifying into green goods and services production is generally unprofitable. This may be due to insufficient policy support, or due to other underlying differences across sectors. Utilities tend to be endowed with a degree of market power being natural monopolies and as a consequence operate in unique regulatory settings (see e.g. Filbeck and Gorman, 2004; Wolak, 2008). For non-utilities, motives for the adoption and diffusion of green technologies are different because they are more exposed to international competition. Producers can capture greater global market share by responding to changing demands with product differentiation (e.g. Robinson, 2018). For example in energy efficient appliances or electric vehicles, consumers have a different willingness to pay for green and non-green products (e.g. Jovanovic and Rob, 1987; OECD, 2011; Antonnen et al., 2013). The relationship between green revenues and financial and market performance may therefore be different across sectors hence we now explore this further in the next section.

6 Sector Heterogeneity

6.1 Utilities

Utilities (SIC 4900-4999) account for the largest quantity of green revenues in absolute terms (See Figure B.4, at the 2-digit SIC sector level). Firms classified as utilities include electricity generation, gas production and distribution, water-and waste management, and sanitary services. Utilities sectors tend to be characterised by firms that provide relatively homogeneous goods that have some degree of market power. The development and diffusion of green technologies in these sectors is largely driven by public policies. For example, as is well known, significant public investments have gone into driving down renewable energy costs, both through price based instruments such as feed in tariffs and technology support policies such as R&D tax credits or public research grants (See e.g. IRENA, IEA, and REN21, 2018; Bloom et al., 2019).

[41]By excluding all utilities from the sample, the likelihood of a type 2 error increases. This might occur as we drop the sectors with a large amount of variation in the main independent variable. In other words this may increase the likelihood of not observing an effect, even though a true effect exists. We would fail to reject the null hypothesis (of no difference) even though it is false (see e.g Ziegler, 2012). If our results on the restricted non-utility sample were due to a type 2 error, the overall policy implications would however remain largely unchanged. The negative impact of additional asset requirements on firms' comprehensive performance also exists for the sample with utilities. To meet the climate targets large-scale additional investments into low-carbon technologies are required over the next decades. To accelerate such investments our findings suggest (across non-utility and utility samples) that reducing the costs for green investments is an important factor.

Estimating using a subsample containing firms in the utilities sectors only (see Tables G.1-G.3), we see that, overall, a higher share of green revenues is associated with significantly higher levels of operating profit margins and are valued significantly higher by investors. For ROA and ROE, there is a positive correlation although small in magnitude and barely significant. We then further disaggregate the utilities sector to uncover some interesting heterogeneity. We distinguish between energy (electricity-, and gas production and distribution) and non-energy subsectors. We observe large positive coefficients for the green revenue share on the various measures of operating profits for both energy and non-energy although it is significant for the energy sector alone. The effect of green revenue share on the ROA and ROE are similar for firms operating in the non-energy and energy subsectors.

Where the real difference lies in on the market valuation. For non-energy firms there is a strong positive and significant correlation between green revenue share and Tobin's Q whereas for energy firms, the significance disappears. In short, the higher profitability of green energy-related utilities is not transmitted into a higher market valuation. In contrast, green non-energy utilities have higher market valuations despite no difference in operating profit margin or more comprehensive profitability. This suggests that investors expect growing business opportunities for non-energy related utilities. Firms in these sectors have among the highest sector-level averages of green revenue shares already (Figure B.7: Water Supply 72%, Sanitary Services 45% average green revenue shares). Yet the positive and significant relationship between green revenue share and Tobin's Q still persists after controlling for firms' revenue growth, suggesting that investors anticipate further growth from more specialisation in "green" core activities, for example, recycling of solid waste or water supply- and treatment.[42]

6.2 Manufacturing Sectors

The second largest broad sectors in terms of absolute green revenues is Manufacturing, including the sectors Manufacturing of Motor Vehicles and Equipment (SIC 371), and Manufacturing of Electronic Components and Accessories (SIC 367) (see Figure B.6). We are concerned that the sensitivity of the results might partly be due to the relatively small sample size. Therefore, we also examine the corresponding 2-digit sector SIC 36 (Manufacturing of Electronic and other Electrical Equipment and Components except Computer Equipment), which is the second largest sector at the 2-digit level (See Figure B.4). We examine these subsectors in Tables G.4 and G.5.

We first focus on manufacturing of motor vehicles and equipment (SIC 371). We observe negative coefficients for the effect of green revenue share on operating profit margin (Table G.4). Green revenues in these sectors are largely produced from manufacturing and selling hybrid- and electric vehicles. Our findings suggest that operating profit margins for such vehicles are lower compared to fossil-fuel based vehicles. This is consistent with industry reports that higher component costs, particularly of battery technologies, and limited take-up exert downward pressure on firms' operative margins (McKinsey & Company, 2019), with the average cost of production

[42]We have only shown the results of the baseline regression and not those incorporating the propensity score weighting. The results do not significantly change to the baseline results. They are available upon request.

of an electric vehicle still exceeding a comparable combustion engine car by twelve thousand US dollars on average in 2019. The car manufacturer Volvo estimates for instance that its earnings-margins for electric vehicles will only match those of its combustion engine cars by 2025 (Reuters, 2019). Similar struggles have been reported by other car manufacturers as well (Reuters, 2018).[43] Our findings suggest that car manufacturers that shift more aggressively towards hybrid- and electric vehicles production yield lower operating margins. We also do not observe large nor significant relationships between green revenue share and ROA, ROE or market valuations for manufacturers of motor vehicles. We then estimate using a subsample containing only firms in the manufacturing of electronic components and accessories (SIC 367), containing the manufacturing of electronic components for energy efficiency improvements, as well as the manufacturing of electronic components for renewable energy generation among others. The effects of green revenue share are small in magnitude and not significant in all profitability measures except for Tobin's Q. Finally, for the 2-digit sector SIC 36, we do not observe significant relationships with respect to any of the profitability indicators, but we observe marginal significance in the Tobin's Q models.

One possible interpretation of these effects is that the sector is expected to benefit from future growth in renewable energy generation by providing equipment and components (see e.g. IEA, 2018, for renewables growth forecasts). With growth in renewable energy generation the suppliers of equipment and components are also expected to benefit, potentially increasing their market valuation. Moreover, investors expect large growth potentials for energy-saving electrical equipment (e.g. McKinsey & Company, 2010). Energy-efficiency technologies are considered to be one of the most important and cost-effective components in the low-carbon transition, by reducing energy consumption. Yet, numerous well-known barriers dampen the wide-spread uptake of such technologies. These include among others split incentives, high up-front costs, uncertainty about the amortisation time (see e.g. McKinsey & Company, 2010; Du et al., 2014; Diaz-Rainey and Ashton, 2015; Nehler and Rasmussen, 2016). The data does not allow us to precisely attribute our findings to particular barriers or policy interventions. Yet, the combination of anticipated growth potentials in combination with limited uptake could help explain the positive impacts on firms' market valuation despite no effect on their current profitability.

7 Conclusion and discussion

With the growth in low carbon innovation and new green markets in recent decades, this paper aims to assess how diversifying production into green goods and services affects firms' financial and market performance - whether it's a good investment that pays off for firms, or is rewarded or punished by investors. Prior analyses on the relationship between firms' environmental and economic performance found mixed results, possibly due to poor quality or small sample data using, for example, binary environmental performance indicators, cross-sectional data, or datasets with limited sectoral and country coverage. This study makes contribution to the literature on several dimensions including data, methodology, empirical findings and policy implications.

[43] See also Forbes (2019) for comments on limited take-up of electric vehicles in Europe.

Overall, we find evidence that in the utilities sectors, orienting production towards green goods and services simultaneously enhances firms' financial and market performance, suggesting that existing policy interventions are already encouraging the provision of public goods by creating a "win-win". For other sectors, there are currently insufficient incentives to shift radically into the environmentally friendly market space.

We find that in general, firms are able to obtain higher operating profit margin by moving into the environmentally friendly market space. The automobile sector is an exception, as manufacturing of hybrid- and electric vehicles is associated with lower operating profit margins. Higher operating profit margins do not necessarily increase profits per unit of investment, except in utilities, because the production of green goods and services tends to entail higher capital asset requirements. We argue that the choice of profitability measure matters when examining impacts of environmental performance, and directly comparing results of studies using different measures is problematic. Firms' decisions to move into the environmentally friendly market is valued on the stock market, again only in the utilities sector. This indicates that for our sample time period (2009-16) the global stock market anticipated growth opportunities for green goods and services in utility sectors only. For all other sectors, despite higher operating profit margins, investors do not value the diversification into green markets. This is consistent with the lack of large and significant link between green revenue share and return on assets or equity, as investors are predominantly interested in firms' return on the capital they provide. Higher operative margins are in itself insufficient to attract investors.

We draw a number of policy implications relevant for mobilising large scale private investments into green technologies. First, policies that help create clearly distinguished markets for green goods (e.g. through labelling, other information provision or green public procurement) may further encourage diversification into green markets. Second, to accelerate the development and sales of low carbon cars, additional policy measures may be justified such as R&D tax credits, research grants or cheaper access to green capital.[44] Third, in order to achieve a broader and more rapid diversification into low-carbon markets across all sectors in the economy, additional policy support is likely needed to ensure doing so is an economically viable strategy. In particular, generating green goods and services demands a higher asset requirement, hence supporting financing costs for green investments will likely play an important role in ensuring firms can convert higher operating profit margins into higher return on investments, for example through reduced interest rates, or risk sharing through public-private partnerships. Fourth, easing access to green capital to dampen the effect of additional assets (per sales) to improve firms' ROA and ROE, may also help increase green firms' market valuation and attract additional investment.[45]

[44] Carbon emissions from transportation account for about one quarter of global energy-related carbon emissions and continue to grow rapidly, even in advanced economies (IEA, 2017).

[45] Adopting the view of entirely efficient capital markets, the results can also be interpreted as meaning that there is no mispricing in the market based on firms' green revenue share. This view assumes that stocks are always and immediately priced correctly and that investors cannot find stocks that are either under- or overvalued (see e.g. Wall, 1995; Mollet and Ziegler, 2014). Empirical evidence however suggests that capital markets are not sufficiently efficient for this strict view to hold. Stocks and portfolios have been shown to experience systematic mispricing based on environmental performance and other indicators (see e.g. Hong and Kacperczyk, 2009; Edmands, 2011; Eccles et al., 2014)

Why would frontier firms move into the green space if higher operating profit margins are not yielding higher return on investments? A number of arguments can be put forward. It may be argued that while investors care about returns on assets, firm managers may instead care more about operating profits, hence engage in green activities where they see opportunities to earn higher returns per sale. González-Benito and González-Benito (2005) finds that while ecological product design has no impact on return on assets, it is at times associated with better operational performance such as quality, reliability and volume flexibility. Frontier firms moving into the production of green goods and services may also be driven by other factors such as compliance with environmental regulations (e.g. emission standards for vehicles) or because they expect green markets to grow in the future.

Overall our findings suggest potential shortcomings of current policy and investment landscape for low-carbon technologies. Large-scale investments to develop, deploy and diffuse low carbon technologies is imperative for meeting the climate targets (OECD/IEA, 2017). It appears that so far, public policies are making some head way in providing a clear investment case for making climate friendly production choices and developing new low carbon products and services, but only in utilities sectors. On one hand this is encouraging news, as it suggests that policy support can correct market failure and harness the ability of markets to allow the private sector to pursue a low carbon transition and deliver public goods. On the other hand, it highlights that much more policy intervention across a broader spectrum of the global economy is needed to align incentives such that developing new, cleaner products and services in response to changing customer preferences improves not only firms' environmental performance but also financial and market performance, through the "revenues channel" (Ambec and Lanoie, 2008).

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Appendix A FTSE Russell Low Carbon Economy Sector Classification

ENERGY GENERATION — EG

- **Bio Fuels**
  - Bio Gas
  - Bio Mass (Grown)
  - Bio Mass (Waste)
- **Cogeneration**
  - Cogeneration (Biomass)
  - Cogeneration (Renewable)
  - Cogeneration (Gas)
- **Fossil Fuels**
  - Clean Fossil Fuels
- **Geothermal**
- **Hydro (General)**
  - Large Hydro
  - Small Hydro
- **Nuclear**
- **Ocean & Tidal**
- **Solar (General)**
- **Waste to Energy**
- **Wind (General)**

ENERGY EQUIPMENT — EQ

- **Bio Fuels**
  - Bio Fuel (1st & 2nd Gen)
  - Bio Fuel (3rd Generation)
  - Bio Gas
  - Bio Mass (grown)
  - Bio Mass (waste)
- **Cogeneration Equipment**
  - Cogeneration (Biomass)
  - Cogeneration (Renewable)
  - Cogeneration (Gas)
- **Fossil Fuels (Integrated)**
  - Carbon Capture & Storage
  - Fuel Cells
- **Geothermal**
- **Hydro (General)**
  - Large Hydro
  - Small Hydro
- **Nuclear**
- **Ocean & Tidal**
- **Solar (General)**
- **Waste to Energy**
- **Wind (General)**

ENERGY MANAGEMENT AND EFFICIENCY — EM

- **Buildings & Ppty (Integrated)**
- **Controls**
- **Energy Mgmt Log & Support**
- **Industrial Processes**
- **IT Processes**
  - Cloud Computing
  - Efficient IT
- **Lighting**
- **Power Storage**
  - Power Storage (Battery)
  - Power Storage (Pumped Hydro)
- **Smart & Efficient Grids**
- **Sustainable Ppty Operator**

ENVIRONMENTAL RESOURCES — ER

- **Advanced & Light Materials**
- **Key Raw Minerals & Metals**
  - Cobalt
  - Lithium
  - Platinum & Platinum-Group
  - Rare Earths
  - Silica
  - Uranium
- **Recyclable Prods & Matls**
  - Recyclable Materials
  - Recyclable & Resusable

ENVIRONMENTAL SUPPORT SERVICES — ES

- **Environmental Consultancies**
- **Finance & Investment**
  - Carbon Credits trading
  - Sustainable Investment Funds
- **Smart City Des & Engineering**

FOOD & AGRICULTURE — FA

- **Agriculture**
  - GM Agriculture
  - Machinery
  - Meat & Dairy Alternatives
  - Non GM Advanced Seeds
  - Organic & Low-Impact Farming
- **Aquaculture**
  - Aquaculture (General)
  - Aquaculture (Sustainable)
- **Land Erosion**
- **Logistics**
- **Food Safe, Process & Pack'g**
  - FSP&P - no single use plas
  - FSP&P - with single use plas
- **Sustainable Planations**
  - Sustainable Forestry
  - Sustainable Palm Oil

TRANSPORT EQUIPMENT — TE

- **Aviation**
- **Railways**
  - Railway (Infrastructure)
  - Trains (Electric / Magnetic)
  - Trains (General)
- **Road Vehicles**
  - Advanced Vehicle Batteries
  - Bikes and Bicycles
  - Bus and Coach Manufacturers
  - Electrified Vehicles & Devices
  - Energy Use Reduction Devices
- **Shipping**

TRANSPORT SOLUTIONS — TS

- **Railways Operator**
  - General Railways
  - Electrified Railways
- **Road Vehicles**
  - Bike Sharing
  - Bus and Coach operators
  - Car Clubs
  - Ride Hailing
- **Video Conferencing**

WATER INFRASTRUCTURE & TECHNOLOGY — WI

- **Adv Irrigation Sys & Devices**
- **Desalination**
- **Flood Control**
- **Meteorological Solutions**
- **Natural Disaster Response**
- **Water Infrastructure**
- **Water Treatment**
  - Water Treatment Chemicals
  - Water Treatment Equipment
- **Water Utilities**

WASTE & POLLUTION CONTROL — WP

- **Cleaner Power**
- **Decontam Services & Devices**
  - Air Decontamination
  - Land & Soil Decontamination
  - Sea & Water Decontamination
- **Environ. Test. & Gas Sens.**
- **Particles & Emiss. Reduc. Dev.**
  - Industrial Pollution Reduction
  - Transport Pollution Reduction
- **Recycling Equipment**
- **Recycling Services**
- **Waste Management (General)**
  - Hazardous Waste Management
  - Organic Waste Process
  - General Waste Management

Table A.1: FTSE Russell Low carbon Economy Sectors and Sub-sectors

Appendix B Measuring Green Revenue

We illustrate the green revenue imputation with an example company (see Figure B.1). For this particular company, we do not know the share of hybrid- and electric vehicles that are being sold in a particular year. However, we know that the sector Road vehicles generates 60% of the company's revenues. Since the company's primary industry code (US SIC) is manufacture of transportation equipment, we take the year-specific average of that primary SIC code and multiply it by the firm-specific segment revenue share (here 60%) and use that result as the imputed value. We did this imputation once at the 2- and once at the 4-digit SIC averages and generated separate augmented green revenue values for each. Furthermore, we also generate the industry averages for (1) the entire sample of approximately 16,500 companies (full sample) and (2) the 3,500 companies which generate some green revenue (restricted 'green candidate' sample). Focusing on the potential green firms restricts the sample to more similar firms. In this specific case, the industry averages at the 2-digit SIC level are 2% for the full sample and 5% for the restricted sample. Hence, in this example for Manufacture and Sale of hybrid and electric vehicles, we would impute a green revenue share of 1.2% ($0.02 \cdot 0.6$) and 3% ($0.05 \cdot 0.6$) for cases (1) and (2) respectively. The respective value at the sub-segment level is then added to the conservative FTSE minimum green revenue value at the company level (here 8%). The same approach applies at the 4-digit level.[46]

Segment – Name	Segment- Revenue (%)	Sub-Segment Name	Sub-Segment Revenue (%)
Road vehicles	60%	Non-green conventional cars	95%
		Manufacture and Sale of hybrid- and electric vehicles	N.A.
Energy Storage Solutions	5%	Sale of energy storage solutions for PV energy	100%
Machinery Manufacturing	5%	Non-green machinery manufacturing	100%
Industrial Processes	30%	Non-green industrial process products	20%
		Sale of energy-efficiency improving technologies	10%
Overall Green Revenue Share (%)			**8.00 – 32.00%**

Figure B.1: Example of Database and Missing Values

After extensive verification and manual checking, we chose the version, which used 2-digit SIC codes from the "green candidate" sample as our preferred augmented measure. Figures B.2 and B.3 show how the imputation procedure changed the distribution in particular in the lower range between 0 and 20%. This augmented measure is our main variable for the analysis as well as in the descriptive statistics. We also refer to it as 'Green Revenue'. When using the 'raw' FTSE Russell minimum green revenue value, we refer to it as FTSE Minimum Green Revenue.

[46]Note that if for instance the revenue share on green Industrial processes had been missing, we would still use the primary SIC code average green revenue share to impute the missing share. The sub-sector industry averages cannot be used for imputation, as these values are more strongly impacted by missing values.

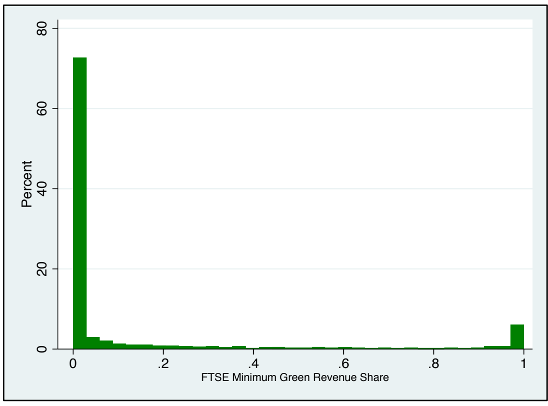

Figure B.2: Raw FTSE Minimum Green Revenue

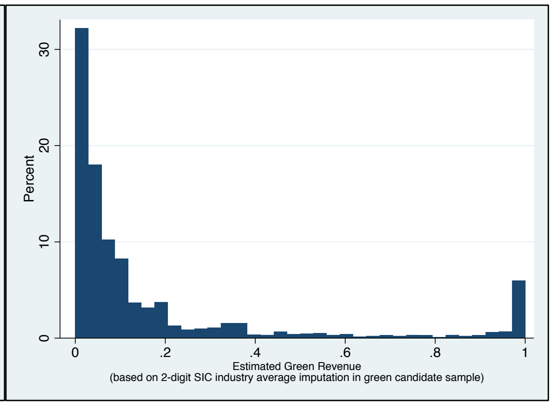

Figure B.3: Estimated Green Revenue based on imputation

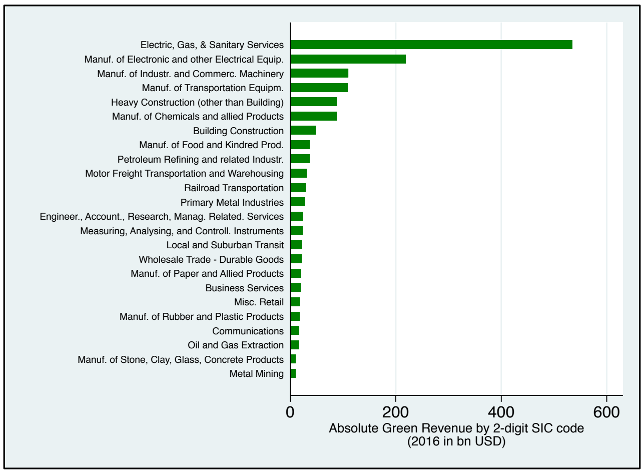

Figure B.4: Decomposition of Green Revenue (in billion USD) by 2-digit SIC code

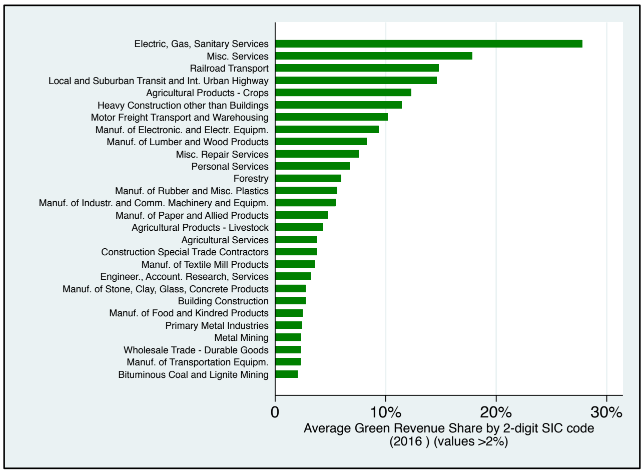

Figure B.5: Average Green Revenue Share by 2-digit SIC code

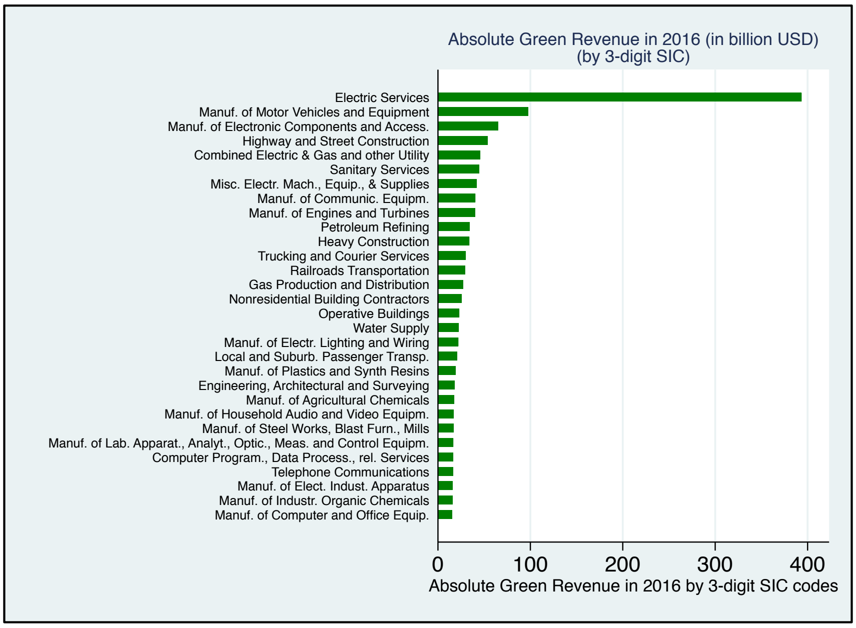

Figure B.6: Decomposition of Green Revenue (in billion USD) by 3-digit SIC code

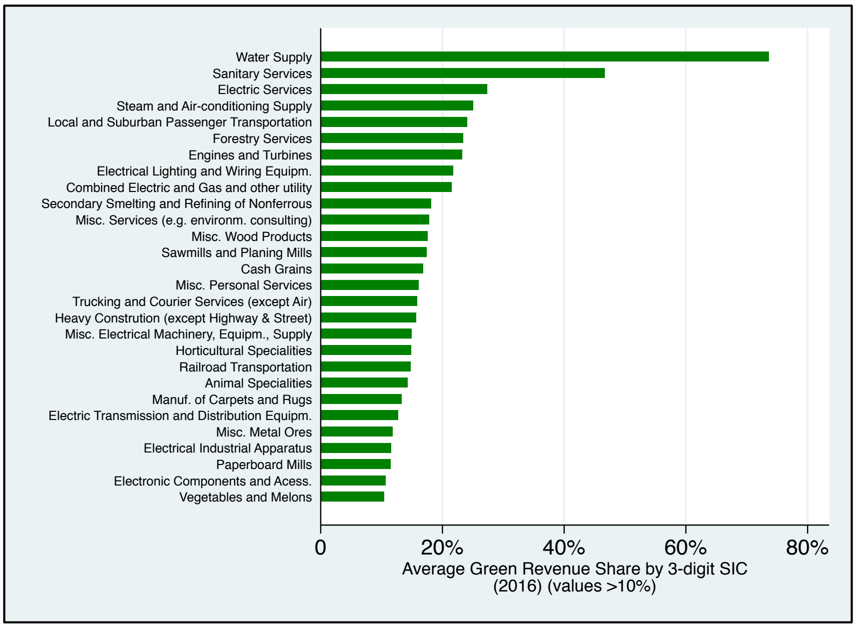

Figure B.7: Average Green Revenue Share by 3-digit SIC code

Appendix C Data Definitions

Table C.1: Variable Definitions

Variable	Definition
EBIT-margin	Earnings before Interest and Taxes (EBIT) / Sales
EBITDA-margin	Earnings before Interest, Taxes, Depreciation and Amortisation (EBITDA) / Sales
Operating Income	Gross income - total operating expenses
Return-on-Sales (ROS)	Operating Income / Sales
Return-on-Assets (ROA)	ROS · Sales/Total Assets
Return-on-Equity (ROE)	ROS · Sales/Total Assets · Total Assets/Equity
Tobin's Q	(Market Capitalisation + Total Assets - Common Equity)/Total Assets
	Since the book value of debt is unknown, it is computed as the difference
	between the book value of assets and the book value of equity.
	The book Value of common equity is the shareholders' investment in the company
Leverage	Total Debt / Total Assets
Employees	Number of employees
Log(Assets/Sales)	The natural logarithm of Total Assets / Sales
Dividends per Share	Dividends per share in USD
Sales Growth	Annual growth in Sales
Log(Sales/Asses)	The natural logarithm of Sales / Total Assets
Log(Assets/Equity)	The natural logarithm of Total Assets / Equity

Appendix D Descriptive Statistics

Table D.1: Pairwise Correlations of Profitability Indicators

	EBIT	EBITDA	ROS	ROA	ROE	TQ
EBIT-margin	1					
EBITDA-margin	0.99	1				
ROS	0.94	0.94	1			
ROA	0.62	0.63	0.56	1		
ROE	0.49	0.48	0.43	0.88	1	
log (Tobin's Q)	-0.06	-0.07	-0.08	0.07	0.06	1

Table D.2: Pairwise Correlations of Explanatory Variables

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) Minimum GR	1							
(2) Estimated GR	0.96	1						
(3) Employees(log)	-0.01	0.02	1					
(4) Assets/Sales (log)	0.09	0.09	-0.28	1				
(5) R&D>0	0.06	0.08	0.04	-0.06	1			
(6) Dividends per Share	-0.00	0.02	0.23	-0.08	0.04	1		
(7) Leverage (log)	0.04	0.04	0.08	0.11	-0.20	0.08	1	
(8) Sales Growth	0.02	0.01	-0.11	0.02	-0.01	-0.07	0.02	1

Table D.3: Descriptive Statistics of Green- and Non-Green Firms

Variable	Green Median (Mean)	Non-Green Median (Mean)
Employees	5,000	2,084
	(16,417)	(9,013)
Total Assets (thds USD)	2,101,094	604,726
	(8,340,089)	(3,284,654)
Market Capitalisation (thds USD)	1,540,340	682,350
	(5,449,818)	(3,008,581)
Return-on-Equity	0.09	0.08
	(0.08)	(0.04)
Return-on-Assets	0.05	0.05
	(0.04)	(0.03)
Return-on-Sales	0.08	0.08
	(0.05)	(-0.11)
Leverage	0.04	0.03
	(0.13)	(0.11)
Tobin's Q	1.24	1.44
	(1.57)	(1.98)

'Green Firms' are defined as generating at least some positive green revenue share over the sample period (2009-2016) (based on the augmented green revenue share).

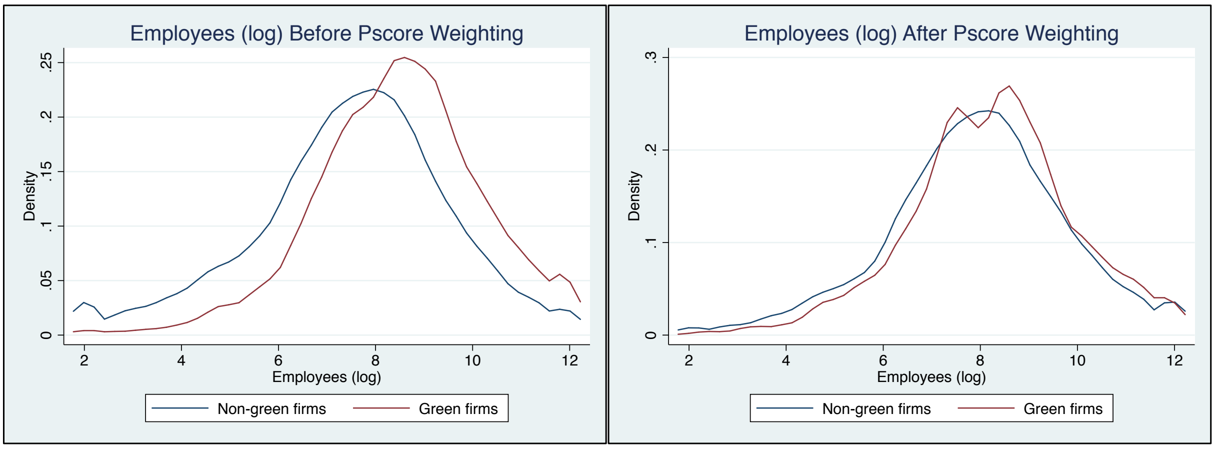

Figure D.1: Number of employees

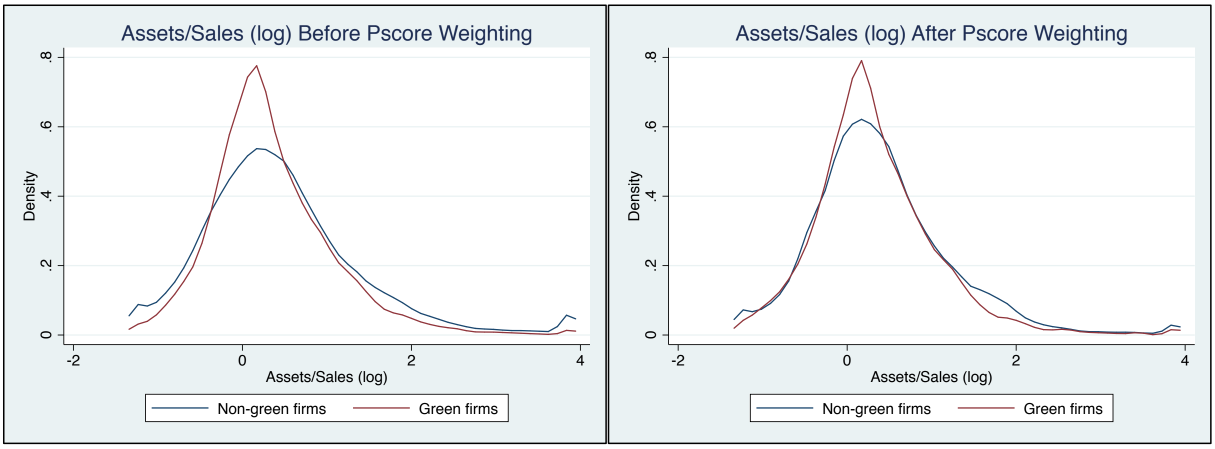

Figure D.2: Assets/Sales

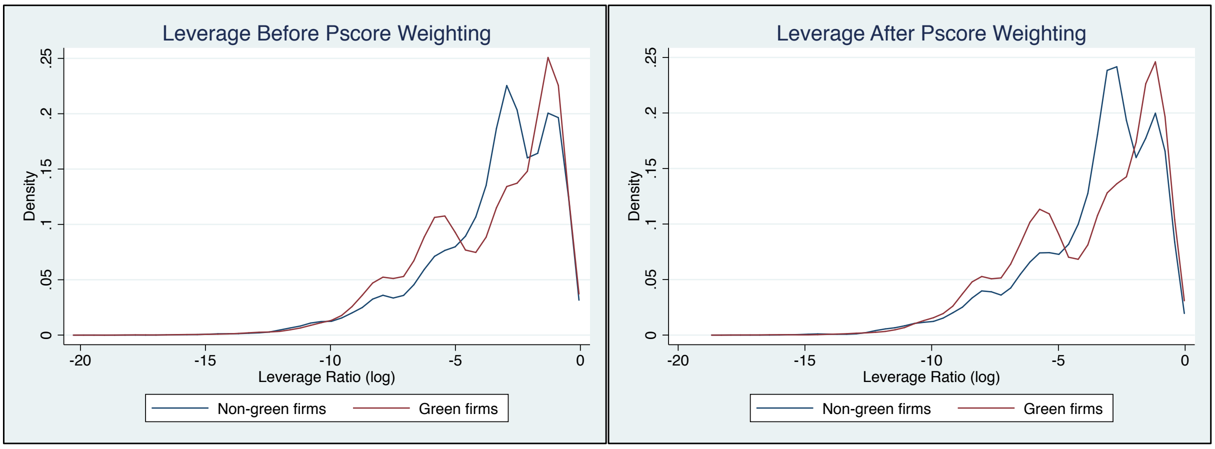

Figure D.3: Leverage

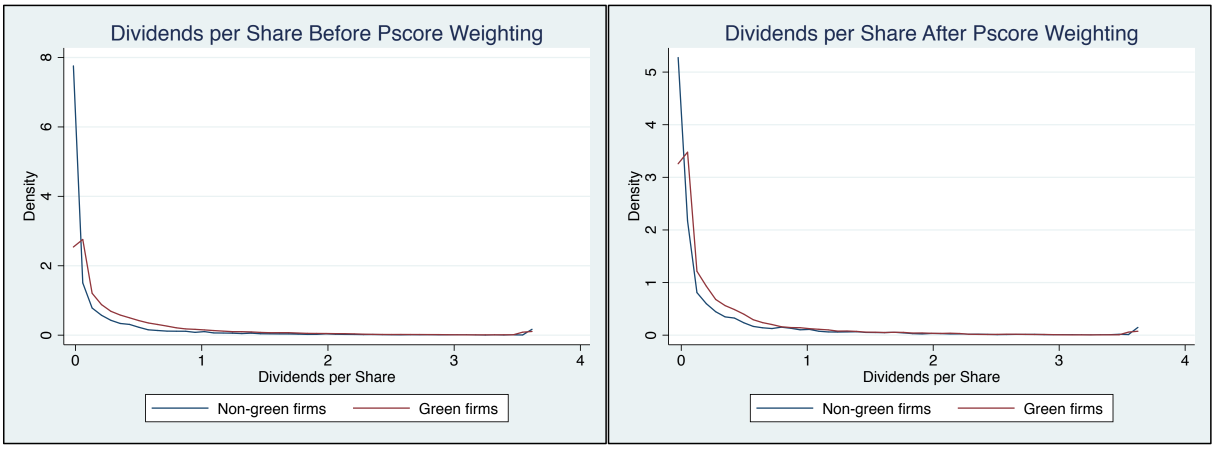

Figure D.4: Dividends per Share

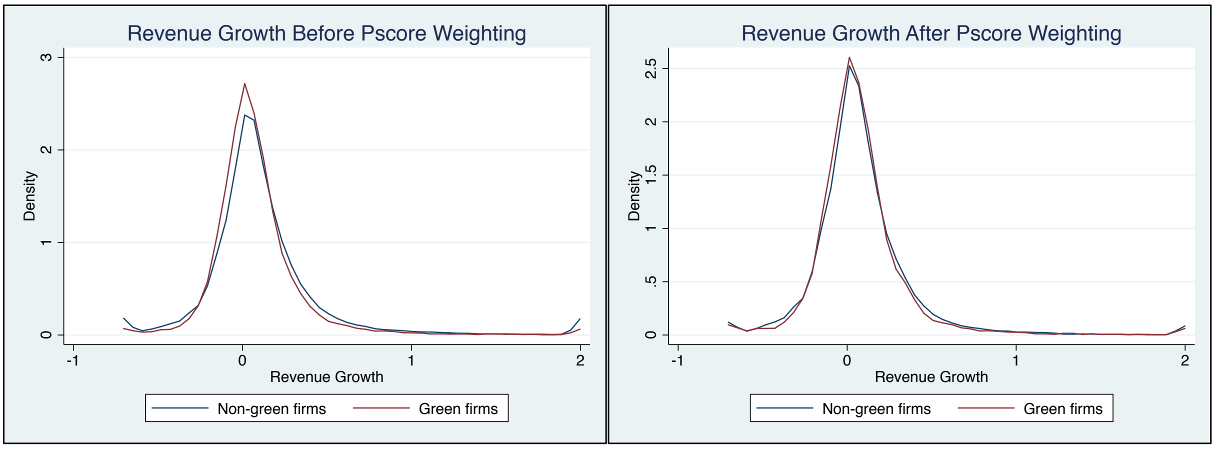

Figure D.5: Revenue Growth

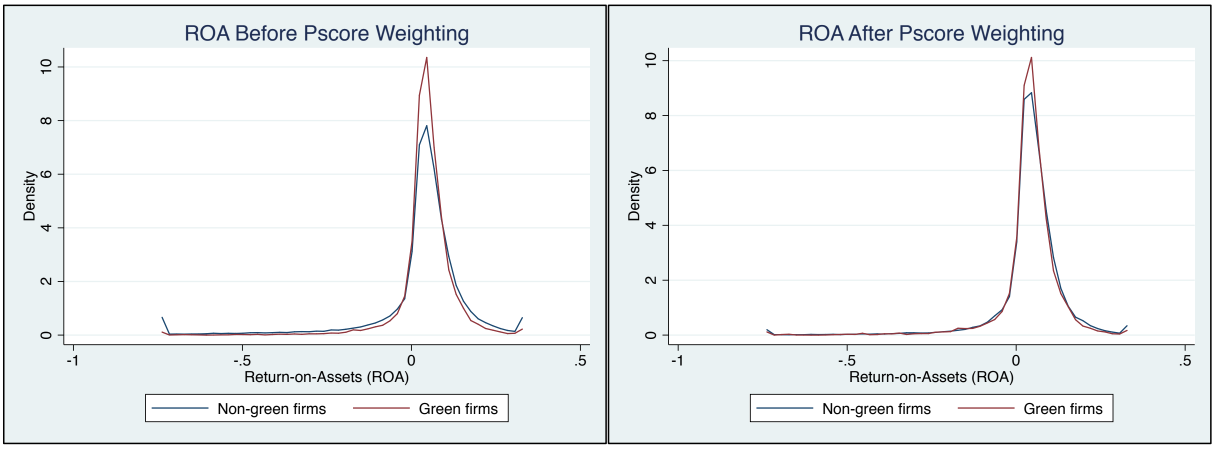

Figure D.6: Return-on-Assets (ROA)

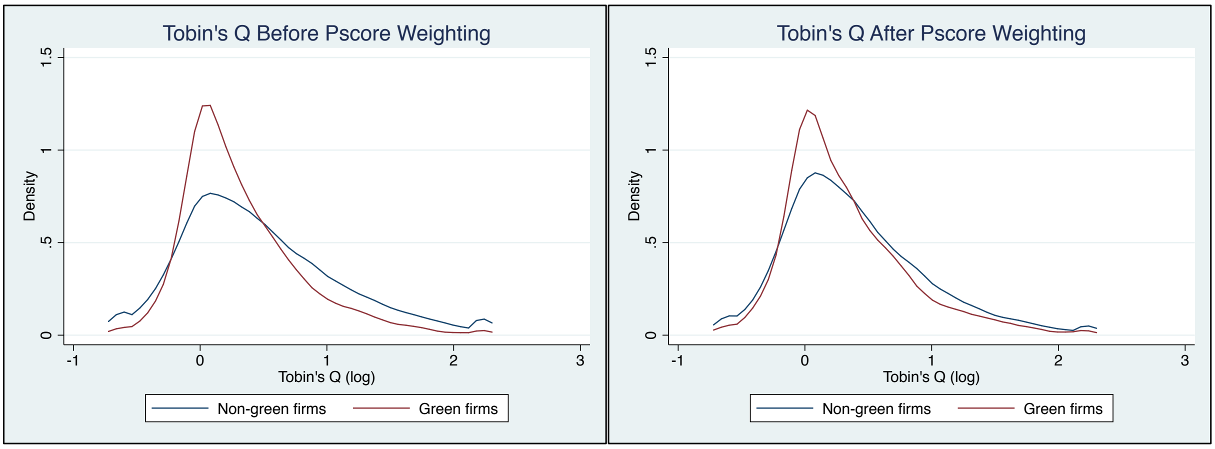

Figure D.7: Tobin's Q

Appendix E Additional Results

E.1 With and without weighting on same sample

Table E.1: Current profitability - Operating profit margins

	(1)	(2)	(3)	(4)	(5)	(6)
	EBIT	EBITDA	ROS	EBIT	EBITDA	ROS
Green Revenue Share	0.34*	0.35*	0.21	0.35**	0.34**	0.29**
	(0.20)	(0.19)	(0.14)	(0.16)	(0.15)	(0.12)
Employees	0.06***	0.06***	0.04**	0.07***	0.06***	0.05***
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Assets/Sales	-0.38***	-0.30***	-0.51***	-0.39***	-0.31***	-0.52***
	(0.05)	(0.05)	(0.06)	(0.07)	(0.06)	(0.07)
D(R&D>0)	0.02**	0.02**	0.02*	0.03*	0.03**	0.02
	(0.01)	(0.01)	(0.01)	(0.02)	(0.02)	(0.02)
Leverage	-0.02***	-0.02***	0.00	-0.01	-0.01	0.01
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Constant	-0.41***	-0.32***	-0.12	-0.41***	-0.33**	-0.16
	(0.15)	(0.14)	(0.15)	(0.15)	(0.14)	(0.14)
R^2	0.753	0.744	0.825	0.716	0.708	0.777
Nb. of obs.	35,233	35,212	35,721	35,233	35,212	35,721
Firm FE	yes	yes	yes	yes	yes	yes
Industry-by-year dummies	yes	yes	yes	yes	yes	yes
Pscore-weight	no	no	no	yes	yes	yes
Weighting Sample	yes	yes	yes	yes	yes	yes

Notes: *** denotes significance at 1%, ** at 5%, and * at 10%. Estimates stem from an ordinary least square estimation with robust standard errors, clustered at the level of the firms, reported in the parentheses. The dependent variables are EBIT-margin in columns 1 and 4, EBITDA-margin in columns 2 and 5, and Return-on-sales (ROS) in columns 3 and 6. Green revenue is measured as a continuous variable based on the augmented green revenue variable. Number of employees, assets over sales and leverage are all measured in logs. All models incorporate a full set of firm fixed effects and 3-digit industry-by-year dummies. In columns 1 to 3 we estimate the model on the common support sample without any weighting. In columns 4 to 6 we weight the sample by the inverse propensity score.

Table E.2: Current profitability - return on assets and equity

	(1)	(2)	(3)	(4)
	ROA	ROE	ROA	ROE
Green Revenue Share	0.04***	0.07**	0.03**	0.06*
	(0.01)	(0.03)	(0.01)	(0.03)
Employees	0.00	0.01**	0.01***	0.02***
	(0.00)	(0.00)	(0.00)	(0.01)
Assets/Sales	-0.03***	-0.06***	-0.02**	-0.05***
	(0.00)	(0.01)	(0.01)	(0.02)
D(R&D>0)	0.00	0.01	0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.01)
Leverage	-0.01***	-0.02***	-0.01***	-0.02***
	(0.00)	(0.00)	(0.00)	(0.00)
Constant	-0.01	-0.08*	-0.04**	-0.15***
	(0.02)	(0.04)	(0.02)	(0.05)
R^2	0.691	0.606	0.662	0.590
Nb. of obs.	35,549	35,506	35,549	35,506
Firm FE	yes	yes	yes	yes
Industry-by-year dummies	yes	yes	yes	yes
Pscore-weight	no	no	yes	yes
Weighting Sample	yes	yes	yes	yes

Notes: *** denotes significance at 1%, ** at 5%, and * at 10%. Estimates stem from an ordinary least square estimation with robust standard errors, clustered at the level of the firms, reported in the parentheses. The dependent variables are ROA in columns 1 and 3, and ROE in columns 2 and 4. Green revenue is measured as a continuous variable based on the augmented green revenue variable. Number of employees, assets over sales and leverage are all measured in logs. All models incorporate a full set of firm fixed effects and 3-digit industry-by-year dummies. In columns 1 and 2 we estimate the model on the common support sample without any weighting. In columns 3 and 4 we weight the sample by the inverse propensity score.

Table E.3: Expected profitability (Tobin's Q)

	(1)	(2)	(3)	(4)
	log (Tobin's Q)			
Green Revenue Share	0.11**	0.13***	0.10**	0.08*
	(0.05)	(0.05)	(0.04)	(0.05)
Employees	-0.06***	-0.06***	-0.06***	-0.06***
	(0.01)	(0.01)	(0.01)	(0.01)
Assets/Sales	-0.14***	-0.14***	-0.12***	-0.12***
	(0.01)	(0.01)	(0.01)	(0.01)
D(R&D>0)	-0.08***	-0.08***	-0.03***	-0.04***
	(0.01)	(0.01)	(0.01)	(0.01)
Dividends per Share	0.11***	0.11***	0.10***	0.10***
	(0.01)	(0.01)	(0.01)	(0.01)
Leverage	-0.03***	-0.03***	-0.03***	-0.03***
	(0.00)	(0.00)	(0.00)	(0.00)
Sales-Growth	/	/	0.07***	0.07***
			(0.01)	(0.01)
Constant	0.81***	0.82***	0.75***	0.77***
	(0.07)	(0.08)	(0.08)	(0.09)
R^2	0.839	0.836	0.859	0.858
Nb. of obs.	40,141	40, 141	34,819	34,819
Firm FE	yes	yes	yes	yes
Industry-by-year dummies	yes	yes	yes	yes
Pscore-weight	no	yes	no	yes
Weighting Sample	yes	yes	yes	yes

Notes: *** denotes significance at 1%, ** at 5%, and * at 10%. Estimates stem from an ordinary least square estimation with robust standard errors, clustered at the level of the firms, reported in the parentheses. Green revenue is measured as a continuous variable based on the augmented green revenue variable. Number of employees, assets over sales and leverage are all measured in logs. All models incorporate a full set of firm fixed effects and 3-digit industry-by-year dummies. In columns 1 and 2 we estimate the model on the common support sample without any weighting. In columns 3 and 4 we weight the sample by the inverse propensity score.

E.2 Green Revenues and Sales/Assets

Table E.4: Green Revenues (lead) and Sales/Assets

	(1)	(2)	(3)	(4)	(5)	(6)
	$\frac{Sales}{Assets}$	$\frac{Sales}{Assets}$	$\frac{Sales}{Assets}$	$\frac{Sales}{Assets}$	$\frac{Sales}{Assets}$	$\frac{Sales}{Assets}$
Green Revenue (current period)	-0.82***					
	(0.31)					
Green Revenue (1-year lead)		-0.30***				
		(0.11)				
Green Revenue (2-year lead)			-0.07			
			(0.08)			
Green Revenue (3-year lead)				0.06		
				(0.13)		
Green Revenue (4-year lead)					-0.24	
					(0.26)	
Green Revenue (5-year lead)						-0.05
						(0.14)
Constant	-0.33***	-0.34***	-0.34***	-0.34***	-0.32***	-0.33***
	(0.02)	(0.01)	(0.00)	(0.01)	(0.02)	(0.01)
R^2	0.868	0.880	0.894	0.908	0.922	0.947
Nb. of obs.	48,754	42,820	36,780	30,704	24,586	18,418
Firm FE	yes	yes	yes	yes	yes	yes
Industry-by-year dummies	yes	yes	yes	yes	yes	yes
Pscore-weight	yes	yes	yes	yes	yes	yes
Weighting Sample	yes	yes	yes	yes	yes	yes

Notes: *** denotes significance at 1%, ** at 5%, and * at 10%. Estimates stem from an ordinary least square estimation with robust standard errors, clustered at the level of the firms, reported in the parentheses. All models incorporate a full set of firm fixed effects and 3-digit industry-by-year dummies.

Table E.5: Green Revenues (lag) and Sales/Assets

	(1)	(2)	(3)	(4)	(5)	(6)
	$\frac{Sales}{Assets}$	$\frac{Sales}{Assets}$	$\frac{Sales}{Assets}$	$\frac{Sales}{Assets}$	$\frac{Sales}{Assets}$	$\frac{Sales}{Assets}$
Green Revenue (current period)	-0.82***					
	(0.31)					
Green Revenue (1-year lag)		-0.08				
		(0.16)				
Green Revenue (2-year lag)			0.28			
			(0.23)			
Green Revenue (3-year lag)				0.11		
				(0.23)		
Green Revenue (4-year lag)					-0.83	
					(0.77)	
Green Revenue (5-year lag)						0.03
						(0.08)
Constant	-0.33***	-0.37***	-0.40***	-0.41***	-0.37***	-0.43***
	(0.02)	(0.01)	(0.01)	(0.01)	(0.04)	(0.00)
R^2	0.868	0.879	0.895	0.908	0.920	0.940
Nb. of obs.	48,754	42,460	36,360	30,266	24,100	17,931
Firm FE	yes	yes	yes	yes	yes	yes
Industry-by-year dummies	yes	yes	yes	yes	yes	yes
Pscore-weight	yes	yes	yes	yes	yes	yes
Weighting Sample	yes	yes	yes	yes	yes	yes

Notes: *** denotes significance at 1%, ** at 5%, and * at 10%. Estimates stem from an ordinary least square estimation with robust standard errors, clustered at the level of the firms, reported in the parentheses. All models incorporate a full set of firm fixed effects and 3-digit industry-by-year dummies.

Table E.6: Green Revenues (lead) and Assets/Equity (equity multiplier)

	(1)	(2)	(3)	(4)	(5)	(6)
	$\frac{Assets}{Equity}$	$\frac{Assets}{Equity}$	$\frac{Assets}{Equity}$	$\frac{Assets}{Equity}$	$\frac{Assets}{Equity}$	$\frac{Assets}{Equity}$
Green Revenue (current period)	-0.08					
	(0.07)					
Green Revenue (1-year lead)		-0.08				
		(0.06)				
Green Revenue (2-year lead)			-0.10			
			(0.06)			
Green Revenue (3-year lead)				-0.10**		
				(0.05)		
Green Revenue (4-year lead)					-0.07	
					(0.06)	
Green Revenue (5-year lead)						-0.08
						(0.06)
Constant	-0.84***	-0.84***	-0.84***	-0.84***	-0.83***	-0.83***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
R^2	0.805	0.826	0.850	0.872	0.895	0.922
Nb. of obs.	48,940	42,982	36,918	30,814	24,676	18,486
Firm FE	yes	yes	yes	yes	yes	yes
Industry-by-year dummies	yes	yes	yes	yes	yes	yes
Pscore-weight	yes	yes	yes	yes	yes	yes
Weighting Sample	yes	yes	yes	yes	yes	yes

Notes: *** denotes significance at 1%, ** at 5%, and * at 10%. Estimates stem from an ordinary least square estimation with robust standard errors, clustered at the level of the firms, reported in the parentheses. All models incorporate a full set of firm fixed effects and 3-digit industry-by-year dummies.

Table E.7: Green Revenues (lag) and Assets/Equity (equity multiplier)

	(1)	(2)	(3)	(4)	(5)	(6)
	$\frac{Assets}{Equity}$	$\frac{Assets}{Equity}$	$\frac{Assets}{Equity}$	$\frac{Assets}{Equity}$	$\frac{Assets}{Equity}$	$\frac{Assets}{Equity}$
Green Revenue (current period)	-0.08					
	(0.07)					
Green Revenue (1-year lead)		-0.05				
		(0.07)				
Green Revenue (2-year lead)			0.01			
			(0.07)			
Green Revenue (3-year lead)				-0.02		
				(0.06)		
Green Revenue (4-year lead)					-0.01	
					(0.06)	
Green Revenue (5-year lead)						0.01
						(0.05)
Constant	-0.84***	-0.84***	-0.84***	-0.84***	-0.84***	-0.84***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
R^2	0.805	0.830	0.851	0.872	0.895	0.925
Nb. of obs.	48,940	42,631	36,512	30,398	24,216	18,021
Firm FE	yes	yes	yes	yes	yes	yes
Industry-by-year dummies	yes	yes	yes	yes	yes	yes
Pscore-weight	yes	yes	yes	yes	yes	yes
Weighting Sample	yes	yes	yes	yes	yes	yes

Notes: *** denotes significance at 1%, ** at 5%, and * at 10%. Estimates stem from an ordinary least square estimation with robust standard errors, clustered at the level of the firms, reported in the parentheses. All models incorporate a full set of firm fixed effects and 3-digit industry-by-year dummies.

Appendix F Robustness Checks

F.1 Controlling for negative ROS

Table F.1: Operating profit margins

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	EBIT	EBITDA	ROS	EBIT	EBITDA	ROS	EBIT	EBITDA	ROS
Green Revenue Share	0.41**	0.35**	0.30**	0.33*	0.34*	0.20	0.34**	0.33**	0.28**
	(0.17)	(0.15)	(0.12)	(0.20)	(0.19)	(0.14)	(0.16)	(0.15)	(0.12)
Employees	0.03**	0.03*	0.03*	0.05***	0.05***	0.03**	0.06***	0.05***	0.04***
	(0.02)	(0.01)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Assets/Sales	-0.51***	-0.41***	-0.63***	-0.35***	-0.28***	-0.48***	-0.36***	-0.29***	-0.49***
	(0.05)	(0.04)	(0.05)	(0.05)	(0.05)	(0.06)	(0.07)	(0.06)	(0.07)
D(R&D>0)	0.03**	0.03***	0.02**	0.03**	0.03***	0.02**	0.03**	0.03**	0.03
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)	(0.02)	(0.02)
Leverage	-0.01	-0.01	0.00	-0.02***	-0.02***	0.00	-0.01	-0.01	0.01
	(0.00)	(0.00)	(0.00)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
D($ROS < 0$)	-0.19***	-0.16***	-0.16***	-0.19***	-0.16***	-0.15***	-0.17***	-0.15***	-0.14***
	(0.01)	(0.01)	(0.01)	(0.02)	(0.01)	(0.01)	(0.02)	(0.02)	(0.02)
Constant	-0.09	-0.01	0.05	-0.34**	-0.26*	-0.06	-0.33***	-0.26*	-0.09
	(0.13)	(0.12)	(0.13)	(0.15)	(0.14)	(0.14)	(0.14)	(0.14)	(0.14)
R^2	0.774	0.769	0.831	0.757	0.748	0.827	0.721	0.712	0.780
Nb. of obs.	51,498	51,444	52,653	35,233	35,212	35,721	35,233	35,212	35,721
Firm FE	yes	yes	yes	yes	yes	yes	yes	yes	yes
Industry-by-year dummies	yes	yes	yes	yes	yes	yes	yes	yes	yes
Pscore-weight	no	no	no	no	no	no	yes	yes	yes
Weighting Sample	no	no	no	yes	yes	yes	yes	yes	yes

Notes: *** denotes significance at 1%, ** at 5%, and * at 10%. Estimates stem from an ordinary least square estimation with robust standard errors, clustered at the level of the firms, reported in the parentheses. The dependent variables are EBIT-margin (winsorized at 1%) in columns 1 and 4, EBITDA-margin (winsorized at 1%) in columns 2 and 5 and Return-on-sales (ROS) (winsorized at 1%) in columns 3 and 6. Green revenue is measured as a continuous variable based on the augmented minimum green revenue variable. Number of employees, assets over sales and leverage are all measured in logs. All models incorporate a full set of firm fixed effects and 3-digit industry-by-year dummies. In columns 7 to 9 we weight the sample by the inverse propensity score.

Table F.2: Return on Assets and Equity

	(1)	(2)	(3)	(4)	(5)	(6)
	ROA	ROE	ROA	ROE	ROA	ROE
Green Revenue Share	0.03**	0.04	0.03**	0.05*	0.02*	0.05
	(0.01)	(0.03)	(0.01)	(0.03)	(0.01)	(0.03)
Employees	-0.00***	-0.01*	0.00	0.00	0.00	0.01
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.01)
Assets/Sales	-0.03***	-0.04***	-0.02***	-0.02**	-0.01	-0.01
	(0.00)	(0.01)	(0.00)	(0.01)	(0.01)	(0.01)
D(R&D>0)	0.00	0.00	0.00**	0.01**	0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Leverage	-0.01***	-0.02***	-0.01***	-0.02***	-0.01***	-0.02***
	(0.00)	0(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
D($ROS < 0$)	-0.08***	-0.23***	-0.08***	-0.22***	-0.08***	-0.22***
	(0.00)	(0.01)	(0.00)	(0.01)	(0.00)	(0.01)
Constant	0.07***	0.11***	0.02	0.01	-0.00	-0.05
	(0.01)	(0.03)	(0.01)	(0.04)	(0.02)	(0.05)
R^2	0.756	0.684	0.723	0.649	0.698	0.633
Nb. of obs.	51,814	51,617	35,549	35,506	35,549	35,506
Firm FE	yes	yes	yes	yes	yes	yes
Industry-year	yes	yes	yes	yes	yes	yes
Pscore-weight	no	no	no	no	yes	yes
Weighting Sample	no	no	yes	yes	yes	yes

Notes: *** denotes significance at 1%, ** at 5%, and * at 10%. Estimates stem from an ordinary least square estimation with robust standard errors, clustered at the level of the firms, reported in the parentheses. The dependent variables are ROA (winsorized at 1%) in columns 1 and 3, and ROE (winsorized at 1%) in columns 2 and 4. Green revenue is measured as a continuous variable based on the augmented minimum green revenue variable. Number of employees, assets over sales and leverage are all measured in logs. All models incorporate a full set of firm fixed effects and 3-digit industry-by-year dummies. In columns 5 and 6 we weight the sample by the inverse propensity score.

Table F.3: Tobin's Q

	(1)	(2)	(3)	(4)	(5)	(6)
			log (Tobin's Q)			
Green Revenue Share	0.06	0.10**	0.12**	0.05	0.10**	0.08*
	(0.04)	(0.05)	(0.05)	(0.04)	(0.04)	(0.05)
Employees	-0.06***	-0.06***	-0.07***	-0.06***	-0.06***	-0.06***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Assets/Sales	-0.12***	-0.13***	-0.13***	-0.11***	-0.12***	-0.12***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
D(R&D>0)	-0.06***	-0.07***	-0.08***	-0.02***	-0.03***	-0.04***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Dividends per Share	0.11***	0.11***	0.10***	0.10***	0.10***	0.10***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Leverage	-0.03***	-0.03***	-0.03***	-0.02***	-0.03***	-0.03***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
D($ROS < 0$)	-0.06***	-0.05***	-0.05***	-0.04***	-0.03***	-0.03***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Sales-Growth	/	/	/	0.07***	0.07***	0.07***
				(0.01)	(0.01)	(0.01)
Constant	0.87***	0.82***	0.84***	0.83***	0.76***	0.79***
	(0.06)	(0.07)	(0.08)	(0.06)	(0.08)	(0.09)
R^2	0.844	0.839	0.837	0.862	0.860	0.858
Nb. of obs.	57,354	40,141	40, 141	50,582	34,819	34,819
Firm FE	yes	yes	yes	yes	yes	yes
Industry-by-year dummies	yes	yes	yes	yes	yes	yes
Pscore-weight	no	no	yes	no	no	yes
Weighting Sample	no	yes	yes	no	yes	yes

Notes: *** denotes significance at 1%, ** at 5%, and * at 10%. Estimates stem from an ordinary least square estimation with robust standard errors, clustered at the level of the firms, reported in the parentheses. The dependent variable is the log of Tobin's Q, defined as (total assets - common equity + market capitalisation) / total assets. Green revenue is measured as a continuous variable based on the augmented minimum green revenue variable. Number of employees, assets over sales and leverage are all measured in logs. Dividends per share is winsorised at 1%. All models incorporate a full set of firm fixed effects and 3-digit industry-by-year dummies. Columns 3 and 6 weight the sample by the inverse propensity score.

F.2 Minimum Green Revenue Measure

Table F.4: Operating profit margins

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	EBIT	EBITDA	ROS	EBIT	EBITDA	ROS	EBIT	EBITDA	ROS
FTSE Min Green Revenue	0.41**	0.34**	0.28**	0.33*	0.33*	0.21	0.22**	0.22**	0.17**
	(0.16)	(0.15)	(0.12)	(0.18)	(0.18)	(0.13)	(0.11)	(0.10)	(0.08)
Employees	0.04**	0.03**	0.03**	0.07***	0.06***	0.04**	0.06***	0.06***	0.05***
	(0.02)	(0.01)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Assets/Sales	-0.54***	-0.44***	-0.66***	-0.41***	-0.32***	-0.54***	-0.36***	-0.28***	-0.50***
	(0.05)	(0.04)	(0.05)	(0.06)	(0.05)	(0.06)	(0.06)	(0.05)	(0.06)
D(R&D>0)	0.02**	0.02**	0.02*	0.02*	0.02**	0.02	0.04**	0.03**	0.03*
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)	(0.01)	(0.02)
Leverage	-0.01*	-0.01*	0.00	-0.02**	-0.01**	0.00	-0.02*	-0.01*	0.00
	(0.01)	(0.00)	(0.00)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Constant	-0.15	-0.05	-0.00	-0.41**	-0.31**	-0.13	-0.43***	-0.33**	-0.19
	(0.13)	(0.12)	(0.13)	(0.17)	(0.15)	(0.16)	(0.15)	(0.14)	(0.14)
R^2	0.722	0.767	0.829	0.749	0.741	0.822	0.722	0.715	0.786
Nb. of obs.	51,498	51,444	52,653	32,696	32,676	33,131	32,696	32,676	33,131
Firm FE	yes	yes	yes	yes	yes	yes	yes	yes	yes
Industry-by-year dummies	yes	yes	yes	yes	yes	yes	yes	yes	yes
Pscore-weight	no	no	no	no	no	no	yes	yes	yes
Weighting Sample	no	no	no	yes	yes	yes	yes	yes	yes

Notes: *** denotes significance at 1%, ** at 5%, and * at 10%. Estimates stem from an ordinary least square estimation with robust standard errors, clustered at the level of the firms, reported in the parentheses. The dependent variables are EBIT-margin (winsorized at 1%) in columns 1 and 4, EBITDA-margin (winsorized at 1%) in columns 2 and 5 and Return-on-sales (ROS) (winsorized at 1%) in columns 3 and 6. Green revenue is measured as a continuous variable based on the augmented minimum green revenue variable. Number of employees, assets over sales and leverage are all measured in logs. All models incorporate a full set of firm fixed effects and 3-digit industry-by-year dummies. In columns 7 to 9 we weight the sample by the inverse propensity score.

Table F.5: Return on Assets and Equity

	(1)	(2)	(3)	(4)	(5)	(6)
	ROA	ROE	ROA	ROE	ROA	ROE
FTSE Min Green Revenue	0.03***	0.06**	0.03***	0.07**	0.02**	0.05*
	(0.01)	(0.03)	(0.01)	(0.03)	(0.01)	(0.03)
Employees	-0.00	0.00	0.00	0.01**	0.00***	0.01***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.01)
Assets/Sales	-0.04***	-0.08***	-0.03***	-0.06***	-0.02*	-0.05**
	(0.00)	(0.01)	(0.00)	(0.01)	(0.01)	(0.02)
D(R&D>0)	-0.00	0.00	0.00*	0.01	0.00	0.01
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.01)
Leverage	-0.01***	-0.02***	-0.01***	-0.02***	-0.01***	-0.03***
	(0.00)	0(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Constant	0.04***	0.04	-0.01	-0.09**	-0.03*	-0.13***
	(0.01)	(0.03)	(0.02)	(0.04)	(0.02)	(0.05)
R^2	0.729	0.650	0.676	0.594	0.666	0.595
Nb. of obs.	51,814	51,617	32,973	32,931	32,973	32,931
Firm FE	yes	yes	yes	yes	yes	yes
Industry-by-year dummies	yes	yes	yes	yes	yes	yes
Pscore-weight	no	no	no	no	yes	yes
Weighting Sample	no	no	yes	yes	yes	yes

Notes: *** denotes significance at 1%, ** at 5%, and * at 10%. Estimates stem from an ordinary least square estimation with robust standard errors, clustered at the level of the firms, reported in the parentheses. The dependent variables are ROA (winsorized at 1%) in columns 1 and 3, and ROE (winsorized at 1%) in columns 2 and 4. Green revenue is measured as a continuous variable based on the augmented minimum green revenue variable. Number of employees, assets over sales and leverage are all measured in logs. All models incorporate a full set of firm fixed effects and 3-digit industry-by-year dummies. In columns 5 and 6 we weight the sample by the inverse propensity score.

Table F.6: Tobin's Q

	(1)	(2)	(3)	(4)	(5)	(6)
			log (Tobin's Q)			
FTSE Min Green Revenue	0.09**	0.10**	0.15***	0.09**	0.11**	0.11*
	(0.04)	(0.04)	(0.05)	(0.04)	(0.04)	(0.05)
Employees	-0.06***	-0.07***	-0.07***	-0.06***	-0.06***	-0.06***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Assets/Sales	-0.13***	-0.13***	-0.14***	-0.12***	-0.11***	-0.11***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
D(R&D>0)	-0.06***	-0.07***	-0.07***	-0.02***	-0.03***	-0.03***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Dividends per Share	0.11***	0.11***	0.11***	0.11***	0.10***	0.11***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Leverage	-0.03***	-0.03***	-0.03***	-0.02***	-0.03***	-0.03***
	(0.00)	(0.00)	(0.01)	(0.00)	(0.00)	(0.00)
Sales-Growth	/	/	/	0.08***	0.07***	0.08***
				(0.01)	(0.01)	(0.01)
Constant	0.86***	0.84***	0.83***	0.81***	0.77***	0.71***
	(0.06)	(0.07)	(0.09)	(0.06)	(0.08)	(0.10)
R^2	0.843	0.836	0.833	0.862	0.857	0.857
Nb. of obs.	57,354	37,058	37,058	50,582	32,140	32,140
Firm FE	yes	yes	yes	yes	yes	yes
Industry-by-year dummies	yes	yes	yes	yes	yes	yes
Pscore-weight	no	no	yes	no	no	yes
Weighting Sample	no	yes	yes	no	yes	yes

Notes: *** denotes significance at 1%, ** at 5%, and * at 10%. Estimates stem from an ordinary least square estimation with robust standard errors, clustered at the level of the firms, reported in the parentheses. The dependent variable is the log of Tobin's Q, defined as (total assets - common equity + market capitalisation) / total assets. Green revenue is measured as a continuous variable based on the augmented minimum green revenue variable. Number of employees, assets over sales and leverage are all measured in logs. Dividends per share is winsorised at 1%. All models incorporate a full set of firm fixed effects and 3-digit industry-by-year dummies. Columns 3 and 6 weight the sample by the inverse propensity score.

F.3 Excluding Electricity Generation

Table F.7: Operating profit margins

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	EBIT	EBITDA	ROS	EBIT	EBITDA	ROS	EBIT	EBITDA	ROS
Green Revenue Share	0.41**	0.34*	0.26*	0.31	0.32	0.15	0.33**	0.32**	0.26**
	(0.19)	(0.17)	(0.14)	(0.23)	(0.23)	(0.16)	(0.17)	(0.16)	(0.13)
Employees	0.04***	0.03**	0.03**	0.06***	0.06***	0.04**	0.06***	0.06***	0.04***
	(0.02)	(0.01)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Assets/Sales	-0.54***	-0.44***	-0.65***	-0.37***	-0.30***	-0.49***	-0.37***	-0.30***	-0.49***
	(0.05)	(0.04)	(0.05)	(0.05)	(0.05)	(0.06)	(0.06)	(0.06)	(0.07)
D(R&D>0)	0.02**	0.02**	0.02*	0.02*	0.02**	0.02	0.03*	0.03*	0.02
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)	(0.02)	(0.02)
Leverage	-0.01*	-0.01*	-0.00	-0.02***	-0.02***	0.00	-0.01	-0.01	0.00
	(0.01)	(0.00)	(0.00)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Constant	-0.18	-0.07	-0.03	-0.44***	-0.34**	-0.15	-0.42***	-0.34*	-0.17
	(0.14)	(0.13)	(0.14)	(0.16)	(0.15)	(0.15)	(0.15)	(0.14)	(0.14)
R^2	0.776	0.771	0.835	0.761	0.751	0.836	0.729	0.720	0.797
Nb. of obs.	49,878	49,826	51,022	33,831	33,810	34,313	33,831	33,810	34,313
Firm FE	yes	yes	yes	yes	yes	yes	yes	yes	yes
Industry-by-year dummies	yes	yes	yes	yes	yes	yes	yes	yes	yes
Pscore-weight	no	no	no	no	no	no	yes	yes	yes
Weighting Sample	no	no	no	yes	yes	yes	yes	yes	yes

Notes: *** denotes significance at 1%, ** at 5%, and * at 10%. Estimates stem from an ordinary least square estimation with robust standard errors, clustered at the level of the firms, reported in the parentheses. The dependent variables are EBIT-margin (winsorized at 1%) in columns 1 and 4, EBITDA-margin (winsorized at 1%) in columns 2 and 5 and Return-on-sales (ROS) (winsorized at 1%) in columns 3 and 6. Green revenue is measured as a continuous variable based on the augmented minimum green revenue variable. Number of employees, assets over sales and leverage are all measured in logs. All models incorporate a full set of firm fixed effects and 3-digit industry-by-year dummies. In columns 7 to 9 we weight the sample by the inverse propensity score.

Table F.8: Return on Assets and Equity excluding Electricity Generation

	(1)	(2)	(3)	(4)	(5)	(6)
	ROA	ROE	ROA	ROE	ROA	ROE
Green Revenue Share	0.03**	0.06*	0.03**	0.07*	0.03*	0.06*
	(0.01)	(0.03)	(0.02)	(0.04)	(0.02)	(0.03)
Employees	-0.00	0.00	0.00*	0.01**	0.01***	0.02***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.01)
Assets/Sales	-0.04***	-0.08***	-0.03***	-0.06***	-0.02**	-0.05***
	(0.00)	(0.01)	(0.00)	(0.01)	(0.01)	(0.02)
D(R&D>0)	-0.00	0.00	0.00	0.01	0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.01)
Leverage	-0.01***	-0.02***	-0.01***	-0.02***	-0.01***	-0.02***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Constant	0.04***	0.03	-0.01	-0.09**	-0.04**	-0.16***
	(0.01)	(0.04)	(0.02)	(0.04)	(0.02)	(0.06)
R^2	0.729	0.653	0.690	0.609	0.661	0.593
Nb. of obs.	50,202	50,007	34,148	34,105	34,148	34,105
Firm FE	yes	yes	yes	yes	yes	yes
Industry-by-year dummies	yes	yes	yes	yes	yes	yes
Pscore-weight	no	no	no	no	yes	yes
Weighting Sample	no	no	yes	yes	yes	yes

Notes: *** denotes significance at 1%, ** at 5%, and * at 10%. Estimates stem from an ordinary least square estimation with robust standard errors, clustered at the level of the firms, reported in the parentheses. The dependent variables are ROA (winsorized at 1%) in columns 1 and 3, and ROE (winsorized at 1%) in columns 2 and 4. Green revenue is measured as a continuous variable based on the augmented minimum green revenue variable. Number of employees, assets over sales and leverage are all measured in logs. All models incorporate a full set of firm fixed effects and 3-digit industry-by-year dummies. In columns 5 and 6 we weight the sample by the inverse propensity score.

Table F.9: Tobin's Q excluding Electricity Generation

	(1)	(2)	(3)	(4)	(5)	(6)
				log (Tobin's Q)		
Green Revenue Share	0.07	0.11**	0.13**	0.05	0.09*	0.08
	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)
Employees	-0.06***	-0.06***	-0.06***	-0.06***	-0.06***	-0.06***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Assets/Sales	-0.14***	-0.14***	-0.14***	-0.12***	-0.12***	-0.12***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
D(R&D>0)	-0.07***	-0.08***	-0.08***	-0.02***	-0.03***	-0.04***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Dividends per Share	0.12***	0.11***	0.11***	0.11***	0.11***	0.10***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Leverage	-0.03***	-0.03***	-0.03***	-0.02***	-0.03***	-0.03***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Sales-Growth	/	/	/	0.08***	0.07***	0.07***
				(0.01)	(0.01)	(0.01)
Constant	0.87***	0.82***	0.82***	0.82***	0.76***	0.77***
	(0.06)	(0.07)	(0.08)	(0.07)	(0.08)	(0.09)
R^2	0.842	0.838	0.836	0.861	0.858	0.857
Nb. of obs.	55,569	38,574	38,574	49,007	33,452	33,452
Firm FE	yes	yes	yes	yes	yes	yes
Industry-by-year dummies	yes	yes	yes	yes	yes	yes
Pscore-weight	no	no	yes	no	no	yes
Weighting Sample	no	yes	yes	no	yes	yes

Notes: *** denotes significance at 1%, ** at 5%, and * at 10%. Estimates stem from an ordinary least square estimation with robust standard errors, clustered at the level of the firms, reported in the parentheses. The dependent variable is the log of Tobin's Q, defined as (total assets - common equity + market capitalisation) / total assets. Green revenue is measured as a continuous variable based on the augmented minimum green revenue variable. Number of employees, assets over sales and leverage are all measured in logs. Dividends per share is winsorised at 1%. All models incorporate a full set of firm fixed effects and 3-digit industry-by-year dummies. Columns 3 and 6 weight the sample by the inverse propensity score.

F.4 Excluding all Utilities

Table F.10: Operating profit margins

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	EBIT	EBITDA	ROS	EBIT	EBITDA	ROS	EBIT	EBITDA	ROS
Green Revenue Share	0.28**	0.19*	0.25**	0.08	0.08	0.12	0.22*	0.20*	0.26**
	(0.14)	(0.11)	(0.11)	(0.09)	(0.09)	(0.08)	(0.13)	(0.12)	(0.12)
Employees	0.04**	0.03**	0.03*	0.06***	0.06***	0.04**	0.06***	0.06***	0.04**
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Assets/Sales	-0.54***	-0.44***	-0.65***	-0.37***	-0.30***	-0.50***	-0.37***	-0.30***	-0.49***
	(0.05)	(0.04)	(0.05)	(0.05)	(0.05)	(0.06)	(0.07)	(0.06)	(0.07)
D(R&D>0)	0.02**	0.02**	0.02*	0.02*	0.02**	0.02*	0.03*	0.03*	0.03
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)	(0.02)	(0.02)
Leverage	-0.01*	-0.01	0.00	-0.02***	-0.01***	0.00	-0.01	-0.01	0.01
	(0.01)	(0.00)	(0.00)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Constant	-0.18	-0.07	-0.03	-0.43***	-0.33**	-0.13	-0.43***	-0.35*	-0.17
	(0.14)	(0.13)	(0.14)	(0.16)	(0.15)	(0.15)	(0.16)	(0.15)	(0.15)
R^2	0.778	0.773	0.836	0.764	0.754	0.839	0.731	0.721	0.798
Nb. of obs.	48,943	48,891	50,081	33,097	33,076	33,573	33,097	33,076	33,573
Firm FE	yes	yes	yes	yes	yes	yes	yes	yes	yes
Industry-by-year dummies	yes	yes	yes	yes	yes	yes	yes	yes	yes
Pscore-weight	no	no	no	no	no	no	yes	yes	yes
Weighting Sample	no	no	no	yes	yes	yes	yes	yes	yes

Notes: *** denotes significance at 1%, ** at 5%, and * at 10%. Estimates stem from an ordinary least square estimation with robust standard errors, clustered at the level of the firms, reported in the parentheses. The dependent variables are EBIT-margin (winsorized at 1%) in columns 1 and 4, EBITDA-margin (winsorized at 1%) in columns 2 and 5 and Return-on-sales (ROS) (winsorized at 1%) in columns 3 and 6. Green revenue is measured as a continuous variable based on the augmented minimum green revenue variable. Number of employees, assets over sales and leverage are all measured in logs. All models incorporate a full set of firm fixed effects and 3-digit industry-by-year dummies. In columns 7 to 9 we weight the sample by the inverse propensity score.

Table F.11: Return on Assets and Equity excluding Utilities

	(1)	(2)	(3)	(4)	(5)	(6)
	ROA	ROE	ROA	ROE	ROA	ROE
Green Revenue Share	0.03*	0.05	0.02	0.05	0.02	0.05
	(0.01)	(0.03)	(0.01)	(0.03)	(0.02)	(0.03)
Employees	-0.00	0.00	0.00*	0.01**	0.01***	0.02***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.01)
Assets/Sales	-0.04***	-0.08***	-0.03***	-0.06***	-0.02**	-0.05***
	(0.00)	(0.01)	(0.00)	(0.01)	(0.01)	(0.02)
D(R&D>0)	-0.00	0.00	0.00	0.01	0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.01)
Leverage	-0.01***	-0.02***	-0.01***	-0.02***	-0.01***	-0.02***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Constant	0.04***	0.03	-0.01	-0.09**	-0.05**	-0.17***
	(0.01)	(0.04)	(0.02)	(0.04)	(0.02)	(0.06)
R^2	0.729	0.654	0.690	0.609	0.661	0.593
Nb. of obs.	49,277	49,083	33,416	33,372	33,416	33,372
Firm FE	yes	yes	yes	yes	yes	yes
Industry-by-year dummies	yes	yes	yes	yes	yes	yes
Pscore-weight	no	no	no	no	yes	yes
Weighting Sample	no	no	yes	yes	yes	yes

Notes: *** denotes significance at 1%, ** at 5%, and * at 10%. Estimates stem from an ordinary least square estimation with robust standard errors, clustered at the level of the firms, reported in the parentheses. The dependent variables are ROA (winsorized at 1%) in columns 1 and 3, and ROE (winsorized at 1%) in columns 2 and 4. Green revenue is measured as a continuous variable based on the augmented minimum green revenue variable. Number of employees, assets over sales and leverage are all measured in logs. All models incorporate a full set of firm fixed effects and 3-digit industry-by-year dummies. In columns 5 and 6 we weight the sample by the inverse propensity score.

Table F.12: Tobin's Q excluding Utilities

	(1)	(2)	(3)	(4)	(5)	(6)
			log (Tobin's Q)			
Green Revenue Share	0.05	0.09	0.12**	0.03	0.07	0.07
	(0.05)	(0.06)	(0.05)	(0.05)	(0.05)	(0.05)
Employees	-0.06***	-0.06***	-0.07***	-0.06***	-0.06***	-0.06***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Assets/Sales	-0.14***	-0.14***	-0.14***	-0.12***	-0.12***	-0.12***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
D(R&D>0)	-0.06***	-0.08***	-0.08***	-0.02***	-0.03***	-0.04***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Dividends per Share	0.12***	0.11***	0.11***	0.11***	0.11***	0.10***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Leverage	-0.03***	-0.03***	-0.03***	-0.02***	-0.03***	-0.03***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Sales-Growth	/	/	/	0.08***	0.07***	0.07***
				(0.01)	(0.01)	(0.01)
Constant	0.87***	0.83***	0.84***	0.83***	0.78***	0.79***
	(0.06)	(0.07)	(0.09)	(0.07)	(0.08)	(0.10)
R^2	0.842	0.838	0.836	0.861	0.859	0.858
Nb. of obs.	54,541	37,730	37,730	48,098	32,720	32,720
Firm FE	yes	yes	yes	yes	yes	yes
Industry-by-year dummies	yes	yes	yes	yes	yes	yes
Pscore-weight	no	no	yes	no	no	yes
Weighting Sample	no	yes	yes	no	yes	yes

Notes: *** denotes significance at 1%, ** at 5%, and * at 10%. Estimates stem from an ordinary least square estimation with robust standard errors, clustered at the level of the firms, reported in the parentheses. The dependent variable is the log of Tobin's Q, defined as (total assets - common equity + market capitalisation) / total assets. Green revenue is measured as a continuous variable based on the augmented minimum green revenue variable. Number of employees, assets over sales and leverage are all measured in logs. Dividends per share is winsorised at 1%. All models incorporate a full set of firm fixed effects and 3-digit industry-by-year dummies. Columns 3 and 6 weight the sample by the inverse propensity score.

Appendix G Sector-specific Effects

Table G.1: Operating profit margins - Utilities

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	All Utilities			Non-Energy			Energy		
	EBIT	EBITDA	ROS	EBIT	EBITDA	ROS	EBIT	EBITDA	ROS
Green Revenue Share	1.40*	1.42*	0.63	2.30	2.40	0.39	0.80*	0.77**	0.81*
	(0.73)	(0.73)	(0.60)	(1.60)	(1.57)	(1.35)	(0.42)	(0.39)	(0.41)
Employees	0.05	0.05	0.05	0.19	0.18	0.34	0.03	0.03	0.01
	(0.05)	(0.04)	(0.06)	(0.13)	(0.14)	(0.21)	(0.05)	(0.04)	(0.06)
Assets/Sales	-0.81	-0.68	-1.05*	-0.83***	-0.74**	-0.43***	-0.79	-0.64	-1.14
	(0.55)	(0.50)	(0.62)	(0.35)	(0.35)	(0.13)	(0.62)	(0.57)	(0.69)
D(R&D>0)	0.05	0.04	-0.01	0.10	0.08	0.02	0.06	0.05	-0.01
	(0.05)	(0.05)	(0.06)	(0.14)	(0.13)	(0.11)	(0.06)	(0.05)	(0.07)
Leverage	-0.01	-0.00	0.05	-0.19	-0.17	-0.26	0.07	0.07	0.17
	(0.09)	(0.08)	(0.12)	(0.25)	(0.22)	(0.25)	(0.09)	(0.08)	(0.12)
Constant	0.33	0.30	0.86	-1.60	-1.47	-2.64	0.78	0.72	1.51
	(0.83)	(0.77)	(1.02)	(1.27)	(1.27)	(2.10)	(0.81)	(0.75)	(0.99)
R^2	0.620	0.625	0.652	0.744	0.738	0.787	0.562	0.576	0.609
Nb. of obs.	2,136	2,136	2,148	346	346	352	1,790	1,790	1,796
Firm FE	yes	yes	yes	yes	yes	yes	yes	yes	yes
Industry-by-year dummies	yes	yes	yes	yes	yes	yes	yes	yes	yes
Pscore-weight	yes	yes	yes	yes	yes	yes	yes	yes	yes

Notes: *** denotes significance at 1%, ** at 5%, and * at 10%. Estimates stem from an ordinary least square estimation with robust standard errors, clustered at the level of the firms, reported in the parentheses. The dependent variables are EBIT-margin (winsorized at 1%) in columns 1, 4 and 7, EBITDA-margin (winsorized at 1%) in columns 2, 5 and 8, and Return-on-sales (ROS) (winsorized at 1%) in columns 3, 6 and 9. Green revenue is measured as a continuous variable based on the augmented minimum green revenue variable. Number of employees, assets over sales and leverage are all measured in logs. All models incorporate a full set of firm fixed effects and 3-digit industry-by-year dummies.

Table G.2: Return on Assets and Equity - Utilities

	(1)	(2)	(3)	(4)	(5)	(6)
	All Utilities		Non-Energy		Energy	
	ROA	ROE	ROA	ROE	ROA	ROE
Green Revenue Share	0.09**	0.15	0.11	0.22	0.07*	0.09
	(0.04)	(0.11)	(0.07)	(0.22)	(0.04)	(0.10)
Employees	0.00	0.01	0.00	0.02	0.00	0.00
	(0.00)	(0.01)	(0.01)	(0.05)	(0.00)	(0.01)
Assets/Sales	-0.01	-0.02	-0.05***	-0.14**	-0.00	-0.00
	(0.01)	(0.03)	(0.01)	(0.06)	(0.01)	(0.03)
D(R&D>0)	0.00	-0.01	0.00	-0.01	0.00	-0.01
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Leverage	-0.01***	-0.03***	-0.01	-0.02	-0.01***	-0.03**
	(0.00)	(0.01)	(0.01)	(0.03)	(0.00)	(0.01)
Constant	-0.01	-0.04	0.02	-0.07	-0.01	-0.01
	(0.03)	(0.10)	(0.14)	(0.46)	(0.03)	(0.08)
R^2	0.709	0.516	0.651	0.657	0.722	0.469
Nb. of obs.	2,133	2,134	350	350	1,783	1,784
Firm FE	yes	yes	yes	yes	yes	yes
Industry-by-year dummies	yes	yes	yes	yes	yes	yes
Pscore-weight	yes	yes	yes	yes	yes	yes

Notes: *** denotes significance at 1%, ** at 5%, and * at 10%. Estimates stem from an ordinary least square estimation with robust standard errors, clustered at the level of the firms, reported in the parentheses. The dependent variables are ROA (winsorized at 1%) in columns 1, 3 and 5, and ROE (winsorized at 1%) in columns 2, 4 and 6. Green revenue is measured as a continuous variable based on the augmented minimum green revenue variable. Number of employees, assets over sales and leverage are all measured in logs. All models incorporate a full set of firm fixed effects and 3-digit industry-by-year dummies.

Table G.3: Tobin's Q - Utilities

	(1)	(2)	(3)	(4)	(5)	(6)
	All Utilities		Non-Energy		Energy	
			log (Tobin's Q)			
Green Revenue Share	0.15*	0.19**	0.25	0.35*	0.07	0.10*
	(0.08)	(0.08)	(0.16)	(0.18)	(0.07)	(0.05)
Employees	-0.05**	-0.04*	-0.05	-0.05	-0.05**	-0.04
	(0.02)	(0.02)	(0.05)	(0.06)	(0.02)	(0.02)
Assets/Sales	-0.10***	-0.06*	-0.11	-0.01	-0.09***	-0.06
	(0.03)	(0.04)	(0.08)	(0.09)	(0.04)	(0.04)
D(R&D>0)	-0.10*	-0.10*	-0.29***	-0.20***	-0.06	-0.08
	(0.05)	(0.06)	(0.11)	(0.07)	(0.06)	(0.07)
Dividends per Share	0.06***	0.06***	0.42***	0.46***	0.06***	0.06***
	(0.01)	(0.01)	(0.08)	(0.10)	(0.01)	(0.01)
Leverage	-0.04*	-0.05*	-0.02	-0.03	-0.05	-0.05
	(0.02)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
Sales-Growth	/	0.09***	/	0.12**	/	0.07***
		(0.02)		(0.06)		(0.03)
Constant	0.60***	0.44**	0.76*	0.47	0.54***	0.39*
	(0.18)	(0.19)	(0.43)	(0.52)	(0.19)	(0.20)
R^2	0.822	0.844	0.862	0.873	0.797	0.822
Nb. of obs.	2,411	2,099	406	351	2,005	1,748
Firm FE	yes	yes	yes	yes	yes	yes
Industry-by-year dummies	yes	yes	yes	yes	yes	yes
Pscore-weight	yes	yes	yes	yes	yes	yes

Notes: *** denotes significance at 1%, ** at 5%, and * at 10%. Estimates stem from an ordinary least square estimation with robust standard errors, clustered at the level of the firms, reported in the parentheses. The dependent variable is the log of Tobin's Q, defined as (total assets - common equity + market capitalisation) / total assets. Green revenue is measured as a continuous variable based on the augmented minimum green revenue variable. Number of employees, assets over sales and leverage are all measured in logs. Dividends per share is winsorised at 1%. All models incorporate a full set of firm fixed effects and 3-digit industry-by-year dummies.

Table G.4: Operating Profit Margin - Manufacturing

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Manufacturing of Motor Vehicles and Equipment (SIC 371)			Electronic and other Electrical Equipment (SIC 367)			Electronic and other Electrical Equipment and Components except Computer Equipment (SIC 36)		
	EBIT	EBITDA	ROS	EBIT	EBITDA	ROS	EBIT	EBITDA	ROS
Green Revenue Share	-0.10**	-0.18***	-0.21***	0.01	0.04	0.11	0.28	0.29	0.36
	(0.05)	(0.06)	(0.07)	(0.33)	(0.29)	(0.21)	(0.36)	(0.33)	(0.31)
Employees	0.07	0.08	0.08	-0.21	-0.22	-0.13	-0.09	-0.09	-0.03
	(0.07)	(0.08)	(0.07)	(0.18)	(0.17)	(0.18)	(0.10)	(0.09)	(0.10)
Assets/Sales	-0.40	-0.37	-0.30***	-0.75*	-0.59	-0.87**	-0.62**	-0.50**	-0.73***
	(0.26)	(0.26)	(0.12)	(0.41)	(0.38)	(0.43)	(0.27)	(0.24)	(0.28)
D(R&D>0)	0.03	0.03	0.01	0.07	0.06	0.05	0.04	0.03	0.04
	(0.03)	(0.03)	(0.02)	(0.06)	(0.06)	(0.06)	(0.04)	(0.04)	(0.04)
Leverage	0.01	0.01	0.01	0.07	0.07	0.06	0.04	0.04	0.03
	(0.01)	(0.01)	(0.01)	(0.06)	(0.05)	(0.06)	(0.03)	(0.03)	(0.03)
Constant	-0.58	-0.57	-0.64	2.19	2.34	1.58	1.02	1.12	0.55
	(0.71)	(0.73)	(0.68)	(1.78)	(1.65)	(1.79)	(0.95)	(0.87)	(0.94)
R^2	0.791	0.782	0.838	0.688	0.666	0.756	0.681	0.662	0.737
Nb. of obs.	1,083	1,083	1,087	1,351	1,347	1,381	3,138	3,134	3,212
Firm FE	yes	yes	yes	yes	yes	yes	yes	yes	yes
Industry-by-year dummies	yes	yes	yes	yes	yes	yes	yes	yes	yes
Pscore-weight	yes	yes	yes	yes	yes	yes	yes	yes	yes

Notes: *** denotes significance at 1%, ** at 5%, and * at 10%. Estimates stem from an ordinary least square estimation with robust standard errors, clustered at the level of the firms, reported in the parentheses. The dependent variables are EBIT-margin (winsorized at 1%) in columns 1, 4 and 7, EBITDA-margin (winsorized at 1%) in columns 2, 5 and 8, and Return-on-sales (ROS) (winsorized at 1%) in columns 3, 6 and 9. Green revenue is measured as a continuous variable based on the augmented minimum green revenue variable. Number of employees, assets over sales and leverage are all measured in logs. All models incorporate a full set of firm fixed effects and 3-digit industry-by-year dummies.

Table G.5: Returns on Assets and Equity - Manufacturing

	(1)	(2)	(3)	(4)	(5)	(6)
	Manufacturing of Motor Vehicles and Equipment (SIC 371)		Electronic and other Electrical Equipment (SIC 367)		Electronic and other Electrical Equipment and Components except Computer Equipment (SIC 36)	
	ROA	ROE	ROA	ROE	ROA	ROE
Green Revenue Share	0.03	0.14	0.02	0.03	0.03	0.02
	(0.07)	(0.17)	(0.08)	(0.16)	(0.05)	(0.10)
Employees	0.04*	0.03	-0.00	0.00	0.00	0.02
	(0.02)	(0.03)	(0.01)	(0.03)	(0.01)	(0.02)
Assets/Sales	-0.05***	-0.12**	-0.06***	-0.12***	-0.04***	-0.06**
	(0.02)	(0.05)	(0.02)	(0.04)	(0.01)	(0.03)
D(R&D>0)	-0.01	-0.03	0.01	0.04	-0.00	0.00
	(0.01)	(0.03)	(0.01)	(0.03)	(0.01)	(0.02)
Leverage	-0.00	-0.01	-0.01	-0.01	-0.01***	-0.02***
	(0.01)	(0.01)	(0.00)	(0.01)	(0.00)	(0.01)
Constant	-0.34	-0.17	0.05	-0.04	-0.01	-0.22
	(0.22)	(0.26)	(0.10)	(0.22)	(0.06)	(0.15)
R^2	0.816	0.746	0.680	0.553	0.649	0.583
Nb. of obs.	1,082	1,082	1,377	1,377	3,202	3,202
Firm FE	yes	yes	yes	yes	yes	yes
Industry-by-year dummies	yes	yes	yes	yes	yes	yes
Pscore-weight	yes	yes	yes	yes	yes	yes
Weighting Sample	yes	yes	yes	yes	yes	yes

Notes: *** denotes significance at 1%, ** at 5%, and * at 10%. Estimates stem from an ordinary least square estimation with robust standard errors, clustered at the level of the firms, reported in the parentheses. The dependent variables are ROA (winsorized at 1%) in columns 1, 3 and 5, and ROE (winsorized at 1%) in columns 2, 4 and 6. Green revenue is measured as a continuous variable based on the augmented minimum green revenue variable. Number of employees, assets over sales and leverage are all measured in logs. All models incorporate a full set of firm fixed effects and 3-digit industry-by-year dummies.

Table G.6: Tobin's Q - Manufacturing

	(1)	(2)	(3)	(4)	(5)	(6)
	Manufacturing of Motor Vehicles and Equipment (SIC 371)		Electronic and other Electrical Equipment (SIC 367)		Electronic and other Electrical Equipment and Components except Computer Equipment (SIC 36)	
	log (Tobin's Q)					
Green Revenue Share	0.00	0.05	0.49**	0.28	0.33*	0.26*
	(0.16)	(0.15)	(0.20)	(0.19)	(0.16)	(0.13)
Employees	-0.04	-0.08**	-0.16***	-0.14***	-0.13***	-0.11***
	(0.03)	(0.04)	(0.03)	(0.04)	(0.02)	(0.03)
Assets/Sales	-0.22***	-0.12	-0.13***	-0.08*	-0.12***	-0.09**
	(0.08)	(0.07)	(0.03)	(0.04)	(0.03)	(0.03)
D(R&D>0)	-0.11**	-0.06	-0.11**	-0.07	-0.12***	-0.07**
	(0.04)	(0.05)	(0.05)	(0.05)	(0.03)	(0.03)
Dividends per Share	0.04*	0.03	0.28***	0.31***	0.21***	0.20***
	(0.02)	(0.02)	(0.08)	(0.10)	(0.04)	(0.05)
Leverage	-0.01	-0.00	-0.01	-0.00	-0.02**	-0.01
	(0.04)	(0.03)	(0.01)	(0.01)	(0.01)	(0.01)
Sales-Growth	/	0.02	/	0.11***	/	0.10***
		(0.07)		(0.04)		(0.03)
Constant	0.73**	1.06***	1.69***	1.51***	1.44***	1.30***
	(0.36)	(0.35)	(0.27)	(0.32)	(0.20)	(0.22)
R^2	0.767	0.808	0.827	0.850	0.823	0.843
Nb. of obs.	1,231	1,069	1,560	1,350	3,639	3,159
Firm FE	yes	yes	yes	yes	yes	yes
Industry-by-year dummies	yes	yes	yes	yes	yes	yes
Pscore-weight	yes	yes	yes	yes	yes	yes
Weighting Sample	yes	yes	yes	yes	yes	yes

Notes: *** denotes significance at 1%, ** at 5%, and * at 10%. Estimates stem from an ordinary least square estimation with robust standard errors, clustered at the level of the firms, reported in the parentheses. The dependent variable is the log of Tobin's Q, defined as (total assets - common equity + market capitalisation) / total assets. Green revenue is measured as a continuous variable based on the augmented minimum green revenue variable. Number of employees, assets over sales and leverage are all measured in logs. Dividends per share is winsorised at 1%. All models incorporate a full set of firm fixed effects and 3-digit industry-by-year dummies.