The Economic Geography of Fossil Fuel Divestment, Environmental Policies and Oil and Gas Financing

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Abstract

This paper explores how fossil fuel divestment commitments and environmental policies have shaped the geography of capital flows into the oil and gas sector, based on the analysis of syndicated lending, equity and bond underwriting across 33 countries from 2000 to 2015. We find that the value of total assets pledged for divestment in a given country is negatively associated with capital flows to domestic oil and gas companies, particularly when divestment is led by regional or sovereign governments. Amongst environmental policy instruments, emissions trading schemes and renewables feed-in tariffs have been most impactful in reducing oil and gas sector capital inflows.

Keywords: fossil fuel divestment; oil and gas finance; environmental policies; environmental finance.

JEL Codes: G20; G30; Q28; Q32; Q38; Q50.

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1 Introduction

"A social movement that only moves people is merely a revolt. A movement that changes both people and institutions is a revolution." Martin Luther King, *Why We Can't Wait* (1964)

Despite the entry into force of the Paris Agreement in November 2016, global emissions have yet to peak and reached a high of 53.5 $GtCO_2e$ in 2017 (UN, 2018). So far, aggregate nationally determined contributions to GHG emission reductions are inadequate to ensure global warming stays below 2°C. One reason for this is that despite new investment in renewable energy reaching a historical high (BNEF, 2019), we have also reached historical highs in funding of fossil fuels (EY, 2014) and many countries have already committed to building fossil fuel infrastructure which would take the world past 2°C warming (Pfeiffer *et al.*, 2018). It is therefore important to understand the factors that most influence the flows of capital into fossil fuels, at a global level.

A helpful framework to analyse this problem is through the lens of economic geography. Economic geographers have framed climate change as a problem of collective action which has inherent geographical challenges, given the need to coordinate across the political, economic, financial and social landscapes (Knight, 2010), and the unevenness of climate impacts across the globe (Yohe and Schlesinger, 2002). The stabilisation of global warming under any target requires the achievement of a net-zero emissions economy (Matthews and Caldeira, 2008). For this to be plausible, scholars have suggested that new financing of fossil fuel infrastructure needs to stop and up to 20% of existing infrastructure should be stranded (Pfeiffer *et al.*, 2018). Economic geography can provide useful insights on the links between finance and fossil fuel infrastructure, as geographers have historically taken interest in both the physical geography of the natural resources sector as well as how this is interwoven with global capital flows in the energy sector, and more broadly with the political economy of states and the geographic coverage of climate agreements (Bridge, 2008; Bridge *et al.*, 2013; Le Billon and Kristoffersen, 2019).

In the past decade, the relationship between the financial industry and the fossil fuel industry has started to be shaped by the rise of anti-fossil fuel norms. Given the slow progress of government policies to adequately address climate change, and recognising the substantial influence the fossil fuel sector has on the policy-making process (Carroll *et al.*, 2018; Zietsma, Ruebottom and Slade Shantz, 2018; Le Billon and Kristoffersen, 2019), social activism has turned against the fossil fuel sector. The fossil fuel divestment movement started in 2010 with students at a small number of US universities asking their administrations to sell stocks in fossil fuel companies (Ansar, Tilsbury and Caldecott, 2013), and gained global visibility in 2012, thanks to the *Rolling Stone* article of environmental activist Bill McKibben titled "Global Warming's Terrifying New Math" (McKibben, 2012), which advocated cutting the supply of financial capital to the fossil fuel industry (Green and Denniss, 2018; Le Billon and Kristoffersen, 2019). By 2013, it was already identified as the fastest growing divestment campaign in history (Ansar, Tilsbury and Caldecott, 2013), with over US$8 trillion divested to date. The movement has been conceptualised by scholars as a nonstate governance intervention operating through symbolic political action and through the active management of anti-fossil fuel norms (Ayling and Gunningham, 2017; Green, 2018). In other words, the divestment movement has been focusing on investors in the fossil fuel sector without involving formal regulatory intervention, although the expectation has been that government action would follow social action (Gunningham, 2017b).

This paper seeks to answer several questions. First, how effective is the divestment movement at actually shifting investment away from fossil fuels? Are divestment pledges by different types of

institution equally effective? Have governments managed to achieve any net reduction in fossil fuel capital flows with environmental policies?

To answer these questions, we ground our research in the fields of economic and financial geography, as well as environmental economics. At a conceptual level, the financial geography literature proposes that capitalism can be studied through the decision-making, social practices and geographical scope of financial institutions (Clark, 2005; Martin, 2010). Financial geography also provides a framework for understanding the evolution of financial institutions as organisations, whether these are institutional investors, investment banks, stock exchanges or sovereign wealth funds, among others (Lee *et al.*, 2009; Clark, Dixon and Monk, 2013; Wójcik, Knight, *et al.*, 2018). We link these bodies of research with scholarship in environmental economics which has a long tradition in studying the effectiveness of policy instruments in reducing environmental degradation at different geographical scales, as well as how these policies impact economic outcomes such as innovation outputs, profitability of companies and competitiveness of organisations, regions or countries (Hepburn, 2006; Ambec *et al.*, 2013; Dechezleprêtre and Sato, 2017).

Using a global database of equity and bond issuance and syndicated loan transactions in 33 countries from 2000 to 2015, this paper analyses the relationships between country level oil and gas fundraising amounts, the cumulative assets pledged for fossil fuel divestment at the country level and the stringency of environmental policy instruments. We find that overall, an increase in fossil fuel divestment commitments at a country level is related to lower new total fundraising by the oil and gas sector. We also find that both domestic and foreign investment banks reduce their overall financing and underwriting of a country's oil and gas sector with the rise in divestment commitments particularly by local, regional or national governments or government-backed financial entities. On the other hand, there is no statistically significant relationship between the dollar amount of financing and underwriting to foreign oil and gas companies by domestic investment banks and divestment commitments in the banks' home countries. Finally, we show that among traditional environmental policy instruments, more stringent emissions trading schemes at the country level are related to a decrease in new fundraising levels of a country's oil and gas sector.

The paper is structured as follows: section 2 reviews the theoretical background and explains the rationale for our main hypotheses; section 3 details the data and empirical methodology; section 4 provides top level descriptive statistics followed by a synthesis of results and discussion in section 5.

2 Theoretical background and hypotheses

2.1 The fossil fuel divestment movement

Unlike the anti-Apartheid movement, which focused on destabilising a government regime in one particular country, the anti-fossil fuel movement is focused on convincing asset owners and institutional investors to divest from the fossil fuel sector globally (Hunt, Weber and Dordi, 2017). The movement has attracted attention to climate issues through stigmatising fossil fuel companies, as well as by engaging in arguments about morality, economics and justice (Ansar, Tilsbury and Caldecott, 2013; Gunningham, 2017a; Mangat, Dalby and Paterson, 2018). The economic and financial arguments are rooted in the stranded assets hypothesis, which asserts that fossil fuel related assets will likely face devaluations and write-downs as the world transitions to a low carbon economy. It has been calculated that society needs to keep more than 80% of fossil fuel reserves in the ground in order to limit climate warming to 2°C (Carbon Tracker, 2011; Caldecott *et al.*, 2016).

The appeal of the movement on university campuses meant that a large amount of attention has been placed on the endowment funds of universities, as well as public sector pension funds; neither

of which tend to directly hold large amounts of fossil fuel related equity or debt (Ansar, Tilsbury and Caldecott, 2013; Beer, 2016). As a result, most literature is focused on asset owners who invest in fossil fuels through shares or bonds traded on secondary markets. Secondary markets comprise shares or bonds that have already been issued by companies and are only traded among investors. While Ansar et al. (2013) and Richardson (2017) recognise that the financial services actors that are most likely to impact the fundraising for new fossil fuel infrastructure are investment banks, given their significant balance sheet exposure to the oil and gas sector (EY, 2014), the majority of studies rarely mention or focus on the impact of new debt issuance in the shape of syndicated bank loans or new fossil fuel bond issuance.

The emergence of global anti-fossil fuel norms has legitimised the launch of financial products related to fossil fuel divestment, including fossil fuel free indices, which are sold to institutional investors around the world (Ayling and Gunningham, 2017). Fossil fuel divestment pledges have reached $8.05 trillion from c. 1,027 institutions (as of January 2019)[1]. What difference they have made. Evidence related to the performance of fossil fuel free portfolios is very limited and so far, restricted to the equity asset class. Trinks et al. (2018) conduct a robust financial performance analysis of US investment portfolios with and without fossil fuel companies over the period 1927 – 2016. They find that portfolios without fossil fuel companies do not underperform market benchmarks, mainly because fossil fuel companies provide relatively few diversification benefits. In the Canadian context, Hunt and Weber (2018) study different fossil fuel divestment strategies applied to the Canadian stock index TSX 260 over the period 2011 – 2015. The study found that divesting from coal, energy equipment and services and consumable fuels can result in a strategy that outperforms the Canadian market index, but other divestment strategies that extend to the entire energy and utilities sector tend to underperform. So far, no study analyses whether the divestment movement has been successful in either decreasing the amount of new capital raised by fossil fuel companies or whether their cost of debt has increased because of social activism. We aim to do the former, and hence test the following hypothesis:

H.1: The stock of assets under management pledged for fossil fuel divestment in a given country is negatively related to the amount of new capital raised by the oil and gas sector in that country.

The divestment movement has gained traction with a diverse range of organisations and institutions across the globe. These include both financial organisations (banks, insurance companies, venture capital firms, asset managers and pension funds) and non-financial organisations (NGOs, foundations, faith-based organisations, private companies and governmental institutions). This raises the questions of whether or not divestment pledges by different types of institution are equally effective, and whose divestment commitments influence oil and gas fundraising the most.

Social norms gain more legitimacy when governments act as “active norm managers” by seeking to encourage behaviours that are in line with certain expectations (Kinzig *et al.*, 2013). Law-and-norm theorists have suggested that active “norm management” by governments can be an uncoercive and inexpensive way to deal with problems that have complex solutions, such as climate change (Ela, 2009). As far as phasing out fossil fuels is concerned, a decision by sovereign, regional or local governments to divest their own assets from fossil fuels (and thereby encourage other investors to do the same) would be an example of an active norm management approach. Hence, we hypothesise that:

[1] https://gofossilfree.org/divestment/commitments/

H.2: The stock of assets under management pledged for fossil fuel divestment by sovereign, regional or local governments in a given country is negatively related to the amount of new capital raised by the oil and gas sector in that country.

2.2 The geography of oil and gas fundraising

The geography of oil and gas fundraising emerges from the intersection between the physical geography and political economy of the oil and gas sector (Bridge, 2008, 2014; Bridge *et al.*, 2013; Le Billon and Kristoffersen, 2019) and the geography of finance (Leyshon, 1998; Clark, 2005; Clark and Wójcik, 2007; Lee *et al.*, 2009).

The oil sector is a producer driven value chain in which the majority of operational control lies with the administrative headquarters of the transnational (or state owned) oil and gas company. Much of the extractives sector relies on their relationship with nation states, as fossil fuel reserves are sovereign assets, even if this sovereign right is temporarily revoked through contractual agreements with commercial domestic and foreign entities (Bridge, 2008; Le Billon and Kristoffersen, 2019). Le Billon and Kristoffersen (2019) also recognise the lobbying power of the fossil fuel industry (Zietsma, Ruebottom and Slade Shantz, 2018) – including the lack of pressure on fossil-fuel producing governments from the international community, with respect to achieving the low carbon transition.

These dynamics are closely interlinked with the geography and dynamics of global finance, which has been the focus of enquiry for financial geographers (Clark, 2000, 2017; Wójcik, 2011b; Wójcik, Knight and Pažitka, 2018) and financial intermediation theorists (Allen and Santomero, 1998; Scholtens and van Wensveen, 2000; Arner, Barberis and Buckley, 2015). Throughout history, this geography has been shaped by institutions and organisations which ultimately contributed to the achievement of four important functions of a financial system: the provision of a payment system; the matching of lenders with borrowers; the management of personal finances across individual lifetimes and inter-generationally; and the provision of risk management services to individuals and businesses (Kay, 2015; Davis, Lukomnik and Pitt-Watson, 2016). The matching of capital with those who seek capital is a service that has fallen mostly in the remit of banks and has boomed after the 1980s with the introduction of 401(k) accounts in the US and the rising amounts of pension fund assets looking for suitable investments (Clark, 2000). The rise of the investment banking sector to global power has hence been fuelled by the growth of the securities industry, which investment banks heavily underwrite and market to institutional investors (Wójcik, 2012). Modern banks undertake a range of services and functions in-house (Clark and Monk, 2017), from securities underwriting to asset management and lending. For the purpose of this paper, we focus on their functions as lenders and underwriters of equity and debt securities.

Both syndicated lending and securities underwriting rely on the "relationship banking" business model, where the decisions to lend to or underwrite a company's equity or bond issuance are based not only on objective quantitative datapoints (e.g. profitability or liquidity), but also on soft information (Hoepner *et al.*, 2016), which cannot be accurately represented by a numeric score and is therefore more subjective in nature (e.g. trustworthiness, competence, impact of social norms on license to operate and other factors) (Gropp and Guettler, 2018). Hoepner et al. (2016) show that soft information related to the environmental and social risk factors at a country level have a statistically and economically significant effect on direct financing of companies across sectors. More precisely, the higher the environmental and social risk in a country, the higher the cost of bank loans. Much of the recent literature on banking and sustainability shows that banks have started to incorporate many "soft indicators" related to the environmental and social sustainability of the companies they provide financial services to (Weber, Fenchel and Scholz, 2008; Weber, Hoque and

Ayub Islam, 2015), but the sophistication of this incorporation is unequal across different types of indicators and asset classes, depending on the knowledge, IT systems, budgets of banks and the availability of suitable methodologies and information to do so (Cojoianu *et al.*, 2015; Cojoianu and Ascui, 2018). Another salient aspect is that after the financial crisis, a lot of attention has been directed not only at the stability and decision making of the banking sector, but also to its contribution towards sustainable economic activities (Hoepner and Wilson, 2010). This literature suggests that banks may have started to consider the reputational risks associated with financing or underwriting the oil and gas sector, and potentially decrease their overall exposure to the industry, particularly in countries where doing otherwise is highly stigmatised by the fossil fuel divestment movement. This may not be true, however, for oil and gas companies in the Middle East or in countries where oil and gas extraction is organised through state-owned companies, which tend to depend less on non-state financing, including Western investment funds (Le Billon and Kristoffersen, 2019).

While the internal processes of many banks are important, the fundraising of many large companies does not rely only on the capabilities of individual banks, but rather on the strength of the syndicates that lead banks can convene towards financing or underwriting large deals such is the case in the oil and gas sector (Fight, 2004). International syndicates come in different configurations depending on the financing needs of the domestic sector of a country as well as capital availability and the expertise of domestic banks (Fight, 2004; Wójcik, 2011a; Vekshin, 2013; Wójcik, Pažitka, *et al.*, 2018), but investment banking syndicates share many organisational routines, systems and processes across their international constituent banks (Knight and Wójcik, 2017). In this respect, we hypothesise that oil and gas fundraising and underwriting from domestic and foreign investment banks are both related in a similar way to fossil fuel divestment claims:

H.3: The stock of assets under management pledged for fossil fuel divestment in a given country is negatively related to the total amount raised by the oil and gas sector with the assistance of both domestic and foreign investment banks.

The hypotheses above rely on the assumption that fossil fuel divestment commitments in a country mostly affects the fundraising of the domestic oil and gas sector. Is it also possible that banks headquartered in countries with divestment commitments export fewer financial services to foreign oil and gas companies? There is wide consensus that investment banks are specialised across sectors, hence we expect that those investment banks that finance the oil and gas sector in their home countries will be able to export this expertise abroad. Much of the divestment movement has focused on stigmatising oil and gas companies and sought to win over the investment community with economic, ethical and legal arguments rather than stigmatising investors themselves. Moreover, while climate change and the commitment to fight against it may have reached the global stage, the fossil fuel divestment movement has so far been an Anglo-American movement with splillovers across continental Europe. Indeed, many institutions choose different financial strategies for the low carbon transition, including direct engagement with oil companies or tilting their portfolios towards less carbon intensive industries, but not full divestment. Hence, we expect that:

H.4: The stock of assets under management pledged for fossil fuel divestment in the home country of a bank is not related to the bank's financing and underwriting of foreign oil and gas companies.

2.3 Environmental policy and oil and gas fundraising

In this section, we use insights from environmental economics to formulate our hypotheses regarding the potential impact of environmental policy stringency on the fundraising of the oil and gas sector. Hepburn (2006) argued that much of the economic theory employed for environmental

policy design has yet to be tested given that its design and implementation are almost always driven by political factors rather than economic theory rationales. While not focusing directly on the costs of capital or fundraising ability of regulated entities, environmental economists have been long preoccupied with the competitiveness of companies targeted by environmental regulation (Dechezleprêtre and Sato, 2017). Competitiveness has been measured through varied indicators including cost of production, profitability, employment or market share, but not cost of capital or capital fundraising ability.

Two parallel lines of enquiry into this topic are referred to as the pollution haven hypothesis and the Porter hypothesis (Ambec *et al.*, 2013). The pollution haven hypothesis states that more stringent environmental policies will over time cause the shift of pollution or emission intensive production to low abatement cost regions, thereby creating pollution havens. On the other hand, the Porter hypothesis argues that a more stringent environmental policy regime can enhance competitiveness through the cost-cutting and innovation activities that companies undertake and which offset compliance costs (Porter and Linde, 1995; Lanoie *et al.*, 2011; Ambec *et al.*, 2013).

The pollution haven hypothesis has been tested by examining the links between environmental regulation and international trade, foreign direct investment (FDI) and location choices. The import of more energy and emission intensive goods has been largely found to be positively related with an increase in environmental policy stringency, although its effects tend to be very small and concentrated in a small set of industries (e.g. manufacturing, cement, iron, steel or aluminium) (Sato and Dechezleprêtre, 2015). Inward FDI has been found to be negatively related to the increase of environmental policy stringency in the US chemicals and primary metals sector (Xing and Kolstad, 2002), but the economic significance of this effect is very small compared to US FDI outflows. Overall, Dechezleprêtre and Sato (2017) state that the discrepancy between the high attention given to the issue in policy circles and the very limited evidence supporting it, may be due to either the overstatement by companies as a lobbying tool against more stringent regulations, or due to governments setting environmental policies that avoid competitive distortions.

The evidence for the Porter hypothesis, or at least for one version of it, has been to date more convincing. Scholars find the strongest evidence in showing that environmental regulation does not hamper, but rather enhance innovation (Jaffe and Palmer, 1997; Ambec *et al.*, 2013; Calel and Dechezleprêtre, 2016). This however, usually comes with a short term cost of complying with environmental regulations which ultimately is not offset by policy induced environmental innovation (Lanoie *et al.*, 2011). In some contexts, this is due to the fact that increased investment in emissions abatement technologies may be carried out to the detriment of other innovation related investment (e.g. electric car patents crowding out combustion engine related patents, Aghion et al., 2016).

In this context, we propose to study the effect of different environmental policies on primary market investment flows in the oil and gas sector. Since many environmental policies are aimed at phasing out fossil fuels (David, 2017), we expect bank financing and underwriting of fossil fuel equity and debt to be lower in countries with more stringent environmental policies. This can be interpreted as an indication that environmental policy is related to decreased competitiveness, which we proxy by the ability of the oil and gas sector to fundraise. Finally, if the pollution haven hypothesis holds, we may observe that banks decide to export financial services to foreign oil and gas companies if the domestic sector experiences increased policy induced operational costs. Hence, we hypothesise that:

H.5: More stringent environmental policies are negatively related to new fundraising levels in the domestic oil and gas sector.

H.6: More stringent environmental policies are positively related with the exports of financial services of domestic banks to foreign oil and gas companies.

3 Data and methodology

3.1 Dependent variable

Country oil and gas fundraising

The dependent variable is the total amount of capital raised ($ million) by all oil and gas companies (public and private) in a given country and year. The financial instruments through which funds are raised in the oil and gas sector are new equity and bond issuances as well as syndicated loans arranged by investment banks. Project finance is less used by the oil and gas sector compared to the power and utilities sector, mainly due to the unpredictability of oil and gas projects compared to other infrastructure projects. Hence, much of the financial risk is taken by the companies themselves (EY, 2014).

We use the Dealogic database to construct a country variable of total fundraising by oil and gas companies (across equity, bond issuance and syndicated loans) across the world. Dealogic is a global database of investment bank transactions which includes details on investment bank advisors and their clients for 673,102 fundraising deals across equity and debt issuance and syndicated loans between 2000 and 2015. We use the industry classification provided by Dealogic, which is based on the North American Industry Classification (NAICS), to identify oil and gas companies. The sample of public and private oil and gas companies come from sub-industries such as: oil and gas extraction, distribution, oil and gas equipment manufacturing, oil and gas well drilling, oil and gas pipeline construction and operation and oil and gas refinery and marketing. Hence, we identify 19,057 fundraising events across the three financial instruments for the oil and gas sector (5,718 equity issuances; 3,754 bond issuances and 9,585 syndicated loans). We use the country of incorporation of the company to aggregate the total fundraising by country, as well as the country of incorporation of the investment banks to determine whether the funding (in the case of loans) or underwriting (in the case of equity or bond issuance) was arranged by domestic banks or foreign banks. In addition, we quantify the total financing that a country's domestic investment banks finance provides to foreign oil and gas companies.

We are able to collect key independent variables and control variables over the 1999 – 2015 period for 33 countries: Australia, Austria, Belgium, Brazil, Canada, China, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, India, Indonesia, Ireland, Italy, Japan, Mexico, Netherlands, Norway, Poland, Portugal, Russia, Slovak Republic, South Africa, South Korea, Spain, Sweden, Switzerland, Turkey, the United Kingdom and the United States.

3.2 Independent variables

Country fossil fuel divestment commitments

Data to quantify the cumulative divestment commitments by financial organisations (banks, insurance companies, venture capital firms, asset managers and pension funds) and non-financial ones (NGOs, foundations, faith-based organisations, private companies and governmental institutions) was obtained from the Divest Invest initiative.[2] Divest Invest collects all the public fossil fuel divestment commitments as well as the assets pledged to be divested by these organisations and institutions, since the first public divestment commitment of the 350.org NGO in 2008, who spearheaded the divestment initiative in the US. The key independent variable is hence aggregated

[2] https://www.divestinvest.org/about/

as the cumulative assets pledged for divestment (in $ million) by country and by the type of organisation.

Country OECD environmental policy stringency

To analyse the effect of traditional environmental policy instruments on both total fundraising of oil and gas companies and the domestic vs. foreign investment banking activity in the sector, we use the environmental policy indices constructed by the OECD which cover our 33 countries between 1999 – 2012 (Botta and Koźluk, 2014). The index has not been updated by the OECD for 2013 and 2014 and hence, given the slow changing nature of policy, we assume the same index values for the years 2013 and 2014 as in the year 2012.

The environmental policy stringency (EPS) composite indices are obtained from custom weighting the values of more granular groups of indicators. First, the stringency of individual policy instruments (e.g. feed-in-tariff for wind and feed-in-tariff for solar) are assigned a value between 0 (not existing) and 6 (most stringent), which are then aggregated in an equal-weighted manner to an aggregate policy instrument value (e.g. FIT wind + FIT solar = FIT overall index; the full methodology can be found in the paper of Botta and Koźluk, 2014). The scoring procedure is designed to benchmark the stringency of an individual policy instrument across countries and time.

The term environmental policy stringency is defined as both: "a higher, explicit or implicit, cost of polluting or environmentally harmful behaviour […] for instruments like taxes"(Botta and Koźluk, 2014, pp. 14) as well as incentives for the development of environmental technologies and processes such as feed-in-tariffs or R&D subsidies. Table 1 provides an account of the different types of policy instrument indices used in the analysis.

[Insert Table 1 here]

3.3 Control variables

We outline the list of control variables we use in the full models, alongside the data sources and description for each (see Table 2).

[Insert Table 2 here]

3.4 Model specification

The analysis is carried out at the country level, with data organised in a balanced panel for 33 countries over the period 2000 – 2015. We employ a two-way log normal OLS regression model which accounts for country and year fixed effects and clusters model standard errors at both the country level and over time (Petersen, 2008; Kölbel, Busch and Jancso, 2017). Given the high correlation between GDP per capita and the composite EPS index, as well as the R&D subsidies and Standards indices, we orthogonalize the latter variables with respect to GDP per capita, to avoid multicollinearity issues. In addition, gas production at the country level is highly correlated with oil production, hence we orthogonalize this measure with respect to oil production.

All regressors are lagged by one year. We do not lose any observations since we code all independent variables from 1999 onwards. The full models we estimate can be expressed by the following equation, where μ_t and d_t are the time and country effects and $\varepsilon_{i,t}$ is the stochastic error.

$$\ln(OG.Fundraising_{\ i,t}) = \beta_1 * ln(Divest.Total_{i,t-1}) + \beta_2 * \ln(EPS_{i,t-1}) + \beta_3 * ln(GDP.Capita_{i,t-1}) +$$
$$+ \beta_4 * \ln(Env.Patents_{i,t-1}) + \beta_5 * ln(OG.Revenue_{i,t-1}) + \beta_6 * ln(Oil.Prod_{\ i,t-1}) +$$
$$+ \beta_7 * ln(Gas.Prod_{i,t-1}) + \beta_8 * ln(RE.TE_{i,t-1}) + \mu_t + d_t + \varepsilon_{i,t}$$

4 Descriptive statistics

Low cost of debt that has enabled the rise of green bonds and the funding of green infrastructure, has also benefited the funding of fossil fuel companies. Oil and gas sector fundraising has surged from $234 billion in 2000 to c. $700 billion in 2015, with an average year-on-year growth rate of 9.17% in fundraising volume across all financial instruments (bank loans, bonds and equity issuance). Bank loans were by far the preferred means of fundraising for the oil and gas sector (c. 64% of total fundraising over the 2000 – 2015 period), followed by bonds (26%) and equities (10%). The preference towards syndicated loans is often related to the advantage of speed of transaction and lower information disclosure requirements over other financial instruments such as bonds (Fight, 2004).

[Insert Figure 1 here]

Given the large amounts fundraised by oil and gas companies, individual banks cannot take the full size of the loans on their balance sheet, and hence, they often form syndicates to provide companies with the required capital. Syndicated loan participation by domestic banks (located in the same country with the oil and gas company seeking capital) tends to be matched by foreign investment banks in terms of the amount provided to oil and gas companies in a given country (Figure 2). Bond issuance on the other hand, is more likely to be underwritten by foreign investment banks, which suggests that oil companies seek foreign financial market participants primarily to buy into their bonds. Equity issuance historically was underwritten more by domestic banks but in recent years foreign banks have, in aggregate, matched the amounts underwritten by domestic banks, and even surpassed them in some years.

[Insert Figure 2 here]

We can, however, observe significant heterogeneity at the country level in terms of domestic vs. foreign bank financing and underwriting of the domestic oil and gas companies. While the loans to oil and gas companies in countries such as the US, are equally financed by domestic and foreign investment banks, Russia and Norway depend more on foreign investment banks, and Japan relies mostly on its own banks for capital. Bond underwriting in China is overwhelmingly supported by domestic banks, while for companies in the UK, France and the Netherlands, it is foreign banks that mostly underwrite their debt (Figure 3). Overall, the US attracts over 43% of the global capital in the oil and gas sector, with US based companies fundraising over $3.2 trillion between 2000 and 2015. The US is followed by Canada ($958 bn – 12.7% of overall oil and gas capital), Russia ($336 bn – 4.6%), UK ($264 bn – 3.5%), Netherlands ($244 bn – 3.2%) and Japan ($236 bn – 3.1%) (see Appendix A.1).

[Insert Figure 3 here]

The fossil fuel divestment campaign has reached significant proportions across organisations from NGOs and government organisations to financial institutions. The total pledges for divestment reached over $8.05 trillion from c. 1,027 institutions between 2008 and 2018. Norway ranks highest in divestment commitments ($1.176 trillion), given the recent recommendation of Norge Bank towards the Norwegian Ministry of Finance to have the Global Pension Fund ($1 trillion assets under management) divest from fossil fuels (NBIM, 2017). Switzerland follows closely with $902 billion pledged for fossil fuel divestment, mainly driven by the re-insurance giants Zurich Insurance and Swiss Re. While the US is 4th in total divestment commitments with c. $836 billion (after France - $846 billion), the US and the UK lead in total assets committed for divestment by NGOs, academic

institutions and faith organisations with $178 million and $43 million respectively (see Appendix A.2).

5 Synthesis of results

Total oil and gas fundraising

First, we analyse the effect of the fossil fuel divestment movement as well as that of environmental policy stringency on the total oil and gas fundraising amounts by country between 2000 and 2015 (Table 3). All models are specified as log-log regressions; hence the results should be read as: A 1% increase in the independent variable leads to a β % increase in the dependent variable. Model 1.a shows the effect of our control variables, which remain robust throughout all other models. The revenues of the listed oil and gas sector are a significant determinant of total fundraising in the sector ($\beta = 0.25$, $p < 0.001$). In other words, a 1% increase in revenues of the oil and gas sector at the country level, is related to an increase of 0.25% in fundraising the following year. The gas production variable is orthogonalized with respect to oil production, given that these two variables are highly correlated. The models show that gas production which is uncorrelated with oil production negatively impacts oil and gas fundraising ($\beta = 0.68$, $p < 0.05$). On the other hand, GDP per capita, environmental innovation (measured by environmental patents) and renewable energy supply percentage do not have a significant effect on fundraising.

In models 1.c – g, we test the relationship between the cumulative assets under management committed for fossil fuel divestment by country on total oil and gas fundraising, while also including the effects of traditional environmental policy instruments. We find that a 1% increase in the assets under management committed to divestment is significantly and negatively related to a 0.11% reduction in new fundraising by oil and gas companies headquartered in that country (models 1.f and 1.g, $\beta = -0.11$, $p < 0.01$). For a country such as the UK, whose oil and gas sector fundraised on average $16.5 billion every year between 2000 and 2015, the economic significance of the relationship is sizeable. An increase of $1 billion in the cumulative assets-under-management pledged for divestment in the UK in 2015 is related to a decrease of c. $350 million in total fundraising by the UK oil and gas sector.[3]

[Insert Table 3 here]

We further investigate which types of institutions committing to fossil fuel divestment have a bigger impact on total oil and gas fundraising (models 3.a – d). We find that divestment pledges from non-financial institutions (NGOs, foundations, faith-based organisations, private companies, governmental institutions) are the strongest drivers of reductions in oil and gas fundraising ($\beta = -0.16$, $p < 0.05$), while divestment pledges from financial organisations are insignificant. Model 3.c illustrates the effect of divestment pledges by governmental organisations, which shows a negative and significant relationship ($\beta = -0.07$, $p < 0.1$). Using the same assumption as before, a $1 billion increase in divestment commitments from governmental organisations is related to a $266 million decrease in oil and gas fundraising at the country level.

As far as the environmental policy variables are concerned, we find a significant and negative effect of emissions trading schemes on oil and gas fundraising ($\beta = -0.49$, $p < 0.05$, model 2.g), while all other indices of environmental policy stringency are not significant. These initial findings are in line with our hypothesis that there is a significant and negative relationship between the rise of anti-

[3] All other variables being held constant. In this calculation we use the real values for the UK for 2015. For different countries and baseline variables specifications, economic significance is different.

fossil fuel norms and the fundraising ability of the oil and gas sector (H.1). In addition, the price signal emerging from emissions trading schemes seems to be the most influential in curbing fossil fuel finance, in line with our expectations that environmental policy stringency is a material risk to the oil and gas sector (H.5).

Domestically intermediated oil and gas fundraising

Model 4.a (Table 4) shows the control variables related to the country level oil and gas fundraising intermediated by domestic banks. We find that a 1% increase in the percentage of renewable energy supply penetration is related to a 1.17% decrease in funding to domestic oil and gas companies by domestic investment banks.

While the total amount of committed assets for divestment by all types of institutions is not related to domestic bank financing and underwriting of the domestic oil and gas sector, we find that cumulative divestment commitments from governments have a negative and significant impact on domestic bank funding and underwriting ($\beta = -0.04$, $p < 0.05$, model 5.c). In other words, a $1 billion increase in cumulative divestment commitments in the UK from its 2015 base is related to a $103 million decrease in oil and gas fundraising and underwriting by UK domestic banks. We find no significant relationship with divestment commitments of other types of institutions.

[Insert Table 4 here]

We do, however, observe a persistent effect of environmental policy stringency indices on domestically intermediated oil and gas fundraising, both for the composite indicator ($\beta = -2.55$, $p < 0.001$, see models 4.b and 4.c) and at the individual policy instrument level (models 4.d and 5.a-d). Domestic bank financing of the oil and gas sector is negatively and significantly related to a country's stringency of both trading schemes ($\beta = -0.82$, $p < 0.01$) and feed-in-tariffs ($\beta = -0.32$, $p < 0.1$, model 4.d).

In line with our hypothesis (H.2), we find that the signal coming from divestment commitments by governments still holds when the statistical test looks more granularly at oil and gas financing from domestic vs. foreign investment banks. We do not find support for H.3, that the total amount of divestment pledges across all organisation types affects domestically intermediated oil and gas fundraising.

Export of fundraising services to the foreign oil and gas sector

In this section we investigate whether the home country characteristics related to the oil and gas sector (including environmental policy and divestment commitments) are related to the amount of finance and underwriting that domestic banks export to foreign oil and gas companies (see Table 5). We find no evidence that the fossil fuel divestment campaign in the home country of banks has any influence on the total amount of financing and underwriting that these banks conduct outside the country (models 6.a – d and 7.a – d). Model 6.d provides the full results across both control and independent variables. This confirms H.4, which suggests that given that fossil fuel divestment stigma is targeted at companies rather than their investors, the export of financial services by banks is unlikely to be affected by the fossil fuel divestment commitments in the banks home country, unless banks specifically choose to deny services to fossil fuel companies.

[Insert Table 5 here]

The main drivers of financing and underwriting of the foreign oil and gas sector by domestic banks are: the revenue of the listed oil and gas sector ($\beta = 0.13$, $p < 0.05$), the annual volume of oil

production (β = 0.46, p < 0.05), the variation in the annual volume of gas production which is uncorrelated with gas production (β = 0.60, p < 0.05) and the percentage of renewable energy in total energy supply of the home country of the investment bank (β = - 1.20, p < 0.05). This suggests that the more developed the domestic oil and gas sector is, the more investment banks export financial services to oil and gas companies outside their home country. On the other hand, the greater the renewable energy penetration and the more stringent the feed-in-tariffs policies are in the home country of investment banks, the less banks export financial services to foreign oil and gas companies (β = - 0.62, p < 0.01). Hence, we do not find any support for H.6, or the pollution haven hypothesis, which implied that banks would finance foreign oil and gas companies if the domestic oil and gas sector faces more stringent environmental regulation.

Import of fundraising services for the domestic oil and gas sector

Here we outline the relationship between the domestic country characteristics and the total amount the oil and gas sector fundraises from foreign investment banks (Table 6). We find that only the divestment commitments of governmental organisations are a significant and negative driver of domestic oil and gas financing and underwriting by foreign banks (β = -0.09, p < 0.05, model 9.c). The stringency of a home country's trading scheme(s) is also negatively and significantly related to new financing by foreign banks (β = - 0.48, p < 0.05). As far as the control variables are concerned, only the revenues of the listed oil and gas sector (β = 0.29, p < 0.01) and the volume of gas production uncorrelated with oil production (β=- 0.82, p < 0.05) are significantly related with the amount fundraised by domestic oil and gas companies from foreign banks.

[Insert Table 6 here]

6 Conclusions

This paper finds that the total assets pledged for divestment in a given country is negatively associated with capital flows to domestic oil and gas companies, particularly when divestment is led by governments. The study also shows that emissions trading schemes and renewables feed-in tariffs have been most effective in reducing oil and gas sector capital inflows. While this is encouraging, the fact that the oil and gas sector has been able to fundraise increasing amounts almost every year is sobering. For global warming to stabilise, society needs to achieve a net-zero economy (Matthews and Caldeira, 2008). This is unlikely to be achieved while new fossil fuel infrastructure is financed by investment banks and bond investors alike.

Our findings have wide ranging implications. For economic geographers and environmental economists interested in the impact of social norms on economic and environmental outcomes, the study shows that both place and the geographical boundaries of social norms are highly relevant in understanding the complexities of the low carbon economy transition. Furthermore, for financial geographers investigating the state-finance nexus, these results demonstrate both the power of the state to nudge financial markets, but also its limits, as the market for investment banking services is a global one.

For policymakers looking to become more sophisticated in their approach to accelerate the low carbon transition and the phasing out of fossil fuels, this study suggests that this is also possible by understanding how governments can become active norm managers in addition to regulators. Policymakers should also consider how incentives for climate responsibility can be set through central bank monetary and fiscal policies. One rationale for why that may be advisable is outlined in the recent report of the Bank of England, which shows that climate change can be a serious threat to financial stability (Bank of England, 2018). As the study has shown, it is debt, rather than equity, that

constitutes the overwhelming majority of new fossil fuel fundraising. Hence, for investors and social activists seeking to impact fossil fuel investment, engaging with the banks that heavily finance and underwrite fossil fuel debt may provide greater opportunities for impact than engaging with the fossil fuel sector itself. Last but not least, for social activists looking to accelerate the low carbon transition, understanding the role of norm manager of different tiers of government could enhance the effectiveness of the fossil fuel divestment campaign.

Our study is not without its limitations. First of all, it presents the financing dynamics solely in the oil and gas sector. Secondly, it does not propose to analyse whether more stringent environmental policies affect the cost of capital of oil and gas companies, which is related to the amount of capital that the sector can fundraise. Finally, the study cannot discern whether lower oil and gas financing translates into more investment in low carbon technologies. These are all important areas for further research.

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Tables

Table 1: OECD Environmental Policy Stringency (EPS) index construction. EPS policy instrument weights used for aggregation at country overall policy stringency are specified in parentheses. Adapted from Botta and Koźluk (2014).

EPS Composite	EPS Policy Instrument	EPS Individual Policy
EPS Aggregate	Taxes (0.16)	CO_2, NO_x, SO_x,
	Trading Schemes (0.16)	CO_2, Renewable Energy Certificates, Energy Efficiency Certificates.
	Feed-in-Tariffs (FITs) (0.16)	Solar, Wind
	Standards (0.25)	Emission Limit Values: NO_x, SO_x and PM_x
	R&D Subsidies (0.25)	Government R&D Expenditure on Renewable Energy

Note: In parentheses we included the weights that the OECD uses to aggregate the policy instrument level indices to obtain the EPS composite index.

Table 2: Dependent, independent and control variables description and data sources.

Variable Name	Variable Description	Data source
OG.Fundraising	Total oil and gas sector fundraising by country (equity issuances, bond issuances and syndicated loans to oil and gas companies)	Dealogic
Divest.Total	Total cumulative assets of institutions and organisations pledging to divest from fossil fuels by country from year of divestment pledge announcement.	Divest Invest Initiative
Divest.Financial	Total cumulative assets of financial organisations pledging to divest from fossil fuels from year of announcement (banks, insurance companies, venture capital firms, asset managers and pension funds)	Divest Invest Initiative
Divest.Non.Financial	Total cumulative assets of non-financial organisations pledging to divest from fossil fuels from year of announcement (NGOs, foundations, faith-based organisations, private companies, governmental institutions)	Divest Invest Initiative
Divest.Non.Financial.Ex.Gov	Total cumulative assets of non-financial organisations, excluding governmental organisations, pledging to divest from fossil fuels from year of announcement (NGOs, foundations, faith-based organisations, private companies)	Divest Invest Initiative
Divest.Gov	Total cumulative assets of governmental organisations pledging to divest from fossil fuels from year of announcement (sovereign wealth funds and government financial institutions, city councils and regional governments)	Divest Invest Initiative
Environmental Policy Stringency (EPS)	Country level annual indices of environmental policy stringency.	OECD iLibrary.
GDP.Capita	GDP per capita	OECD iLibrary.
Env.Patents	Fractional green patent counts per year.	OECD REGPAT, OECD iLibrary.
RE.TE	Country renewable energy as percentage of primary energy supply.	OECD Statistics.
OG.Revenue	Revenues of listed oil and gas companies by country.	Sustainability Accounting Standards Board SICS Classification and Bloomberg.
Oil.Prod	Oi production – ktoe annually by country.	OECD Statistics.
Gas.Prod	Gas production- bcf annually by country.	International Energy Agency (IEA)

Table 3: Determinants of total oil and gas fundraising (2000 – 2015).

Dependent Variable: Total O&G Fundraising	Controls	EPS	Divest EPS	Taxes & Divest	Trading Schemes & Divest	FIT & Divest	Standards & Divest	R&D Subsidies & Divest	Divest & All Policy (1)	Divest & All Policy (2)	Non Financial	Non Financial Ex. Gov	Gov	Financial
Models	**1.a**	**1.b**	**1.c**	**2.a**	**2.b**	**2.c**	**2.d**	**2.e**	**2.f**	**2.g**	**3.a**	**3.b**	**3.c**	**3.d**
GDP.Capita	-0.74	-0.94	-1.07	-1.02	-0.90	-0.91	-0.99	-0.74	-0.73	-0.73	-0.74	-0.74	-0.63	-0.57
	(1.12)	(1.21)	(1.19)	(1.13)	(1.16)	(1.13)	(1.18)	(1.22)	(0.88)	(1.34)	(1.33)	(1.33)	(1.33)	(1.34)
Env.Patents	0.17	0.15	0.14	0.15	0.15	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.16	0.17
	(0.38)	(0.38)	(0.38)	(0.38)	(0.39)	(0.38)	(0.38)	(0.38)	(0.27)	(0.39)	(0.39)	(0.39)	(0.39)	(0.39)
OG.Revenue	0.25***	0.25***	0.25***	0.25***	0.25***	0.25***	0.25***	0.25***	0.25**	0.25***	0.25***	0.25***	0.25***	0.25***
	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.07)	(0.09)	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)
Oil.Prod	0.04	0.07	0.06	0.04	0.02	0.06	0.05	0.02	-0.00	-0.00	-0.00	-0.00	-0.01	-0.02
	(0.12)	(0.11)	(0.10)	(0.11)	(0.11)	(0.11)	(0.11)	(0.13)	(0.13)	(0.16)	(0.15)	(0.16)	(0.16)	(0.16)
Gas.Prod	-0.68*	-0.67*	-0.67*	-0.67*	-0.70*	-0.67*	-0.69*	-0.74*	-0.75**	-0.75*	-0.77*	-0.76*	-0.76*	-0.77*
	(0.30)	(0.30)	(0.29)	(0.29)	(0.29)	(0.30)	(0.29)	(0.32)	(0.28)	(0.36)	(0.33)	(0.34)	(0.35)	(0.36)
RE.TE	-0.54	-0.48	-0.53	-0.60	-0.46	-0.63	-0.57	-0.73	-0.64	-0.64	-0.63	-0.63	-0.59	-0.56
	(0.64)	(0.62)	(0.62)	(0.64)	(0.63)	(0.64)	(0.63)	(0.66)	(0.39)	(0.66)	(0.65)	(0.65)	(0.66)	(0.66)
EPS		-0.73	-0.61											
		(0.64)	(0.65)											
Taxes				0.31					0.15	0.15	0.09	0.10	0.14	0.18
				(0.44)					(0.39)	(0.36)	(0.35)	(0.35)	(0.36)	(0.36)
Trading.Schemes					-0.36				-0.49*	-0.49*	-0.49*	-0.48*	-0.54**	-0.58**
					(0.22)				(0.24)	(0.21)	(0.20)	(0.21)	(0.18)	(0.20)
FIT						-0.17			-0.22	-0.22	-0.21	-0.21	-0.23	-0.24
						(0.21)			(0.16)	(0.20)	(0.21)	(0.21)	(0.20)	(0.21)
Standards							-0.16		0.04	0.04	0.07	0.06	0.03	0.00
							(0.45)		(0.44)	(0.41)	(0.41)	(0.41)	(0.41)	(0.41)
RDsubsidies								0.67	0.73^	0.73	0.72	0.71	0.72	0.72
								(0.67)	(0.38)	(0.64)	(0.65)	(0.65)	(0.64)	(0.63)
Divest.Total			-0.12*	-0.13**	-0.11*	-0.13**	-0.13**	-0.14**	-0.11**	-0.11^				
			(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.04)	(0.03)	(0.06)				
Divest.Non.Financial											-0.16*			
											(0.08)			
Divest.Non.Financial.Ex.Gov												-0.18*		
												(0.08)		
Divest.Gov													-0.07^	
													(0.04)	
Divest.Financial														0.08
														(0.07)
Num. obs.	528	528	528	528	528	528	528	528	528	528	528	528	528	528
Adj. R^2 (full model)	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68
Country Fixed Effects	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year Fixed Effects	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
2-Way Standard Error Clustering	YES	YES	YES	YES	YES	YES	YES	YES	Year Only	YES	YES	YES	YES	YES

***p < 0.001, **p < 0.01, *p < 0.05, ^p < 0.1 – Robust clustered standard errors in parentheses.

Table 4: Determinants of total oil and gas fundraising from domestic banks (2000 – 2015).

Dependent Variable: **Total O&G Fundraising from Domestic Banks**	**Controls**	**EPS**	**Divest EPS**	**Divest & All Policy**	**Non Financial**	**Non-Financial ex. Gov**	**Gov**	**Financial**
Model	**4.a**	**4.b**	**4.c**	**4.d**	**5.a**	**5.b**	**5.c**	**5.d**
GDP.Capita	-0.13	-0.83	-1.01	-0.57	-0.55	-0.57	-0.43	-0.43
	(0.81)	(0.98)	(0.92)	(1.18)	(1.18)	(1.18)	(1.23)	(1.23)
Env.Patents	0.28	0.23	0.20	0.22	0.23	0.22	0.24	0.24
	(0.32)	(0.30)	(0.30)	(0.30)	(0.30)	(0.30)	(0.30)	(0.30)
OG.Revenue	0.04	0.05	0.05	0.04	0.04	0.04	0.04	0.04
	(0.05)	(0.05)	(0.05)	(0.07)	(0.06)	(0.06)	(0.07)	(0.07)
Oil.Prod	0.06	0.14	0.14	0.05	0.04	0.05	0.04	0.05
	(0.14)	(0.11)	(0.11)	(0.13)	(0.13)	(0.13)	(0.13)	(0.13)
Gas.Prod	-0.21	-0.15	-0.16	-0.25	-0.27	-0.26	-0.26	-0.24
	(0.17)	(0.17)	(0.16)	(0.19)	(0.19)	(0.19)	(0.19)	(0.20)
RE.TE	-1.17*	-0.97*	-1.04**	-0.93*	-0.91*	-0.91*	-0.86*	-0.86*
	(0.48)	(0.38)	(0.38)	(0.36)	(0.37)	(0.37)	(0.36)	(0.36)
EPS		-2.55***	-2.39**					
		(0.73)	(0.77)					
Taxes				-0.39	-0.44	-0.43	-0.37	-0.35
				(0.70)	(0.71)	(0.71)	(0.68)	(0.67)
Trading.Schemes				-0.82**	-0.84**	-0.83**	-0.90***	-0.90***
				(0.27)	(0.27)	(0.28)	(0.26)	(0.26)
FIT				-0.32^	-0.32^	-0.31^	-0.34*	-0.34*
				(0.17)	(0.17)	(0.17)	(0.17)	(0.17)
Standards				-0.65	-0.63	-0.63	-0.68	-0.69
				(0.52)	(0.54)	(0.54)	(0.51)	(0.51)
RDsubsidies				-0.14	-0.15	-0.16	-0.16	-0.16
				(0.74)	(0.75)	(0.75)	(0.74)	(0.74)
Divest.Total			-0.17^	-0.15				
			(0.09)	(0.10)				
Divest.Non.Financial					-0.17			
					(0.13)			
Divest.Non.Financial.Ex.Gov						-0.20		
						(0.15)		
Divest.Gov							-0.04*	
							(0.02)	
Divest.Financial								-0.02
								(0.03)
Num. obs.	528	528	528	528	528	528	528	528
Adj. R^2 (full model)	0.78	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Country Fixed Effects	YES	YES	YES	YES	YES	YES	YES	YES
Year Fixed Effects	YES	YES	YES	YES	YES	YES	YES	YES
2-Way Standard Error Clustering	YES	YES	YES	YES	YES	YES	YES	YES

***p < 0.001, **p < 0.01, *p < 0.05, ^p < 0.1– Robust clustered standard errors in parentheses.

Table 5: Determinants of total foreign oil and gas financing and underwriting by domestic banks (2000 – 2015).

Dependent Variable: Total O&G Amount Funded by Domestic Banks Abroad	Controls	EPS	Divest EPS	Divest & All Policy	Non Financial	Non-Financial ex. Gov	Gov	Financial
Model	**6.a**	**6.b**	**6.c**	**6.d**	**7.a**	**7.b**	**7.c**	**7.d**
GDP.Capita	0.28	-0.17	-0.13	0.35	0.35	0.35	0.33	0.30
	(1.38)	(1.20)	(1.20)	(1.12)	(1.11)	(1.11)	(1.10)	(1.13)
Env.Patents	0.02	-0.01	-0.01	-0.02	-0.03	-0.02	-0.03	-0.03
	(0.29)	(0.25)	(0.25)	(0.25)	(0.25)	(0.25)	(0.25)	(0.25)
OG.Revenue	0.13*	0.13*	0.14*	0.13*	0.13*	0.13*	0.13*	0.13*
	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)
Oil.Prod	0.38*	0.43*	0.43*	0.46*	0.46*	0.46*	0.46*	0.47*
	(0.18)	(0.20)	(0.20)	(0.21)	(0.21)	(0.21)	(0.21)	(0.21)
Gas.Prod	0.51*	0.55*	0.55*	0.60*	0.60*	0.60*	0.61*	0.61*
	(0.25)	(0.25)	(0.25)	(0.27)	(0.27)	(0.27)	(0.27)	(0.27)
RE.TE	-1.17*	-1.03^	-1.02^	-1.20*	-1.20*	-1.20*	-1.21*	-1.22*
	(0.52)	(0.54)	(0.55)	(0.57)	(0.57)	(0.57)	(0.56)	(0.57)
EPS		-1.64^	-1.68^					
		(0.95)	(0.95)					
Divest.Total			0.04	0.03				
			(0.06)	(0.07)				
Taxes				-0.47	-0.46	-0.46	-0.46	-0.48
				(0.62)	(0.63)	(0.63)	(0.63)	(0.63)
Trading.Schemes				0.03	0.04	0.03	0.04	0.06
				(0.34)	(0.33)	(0.33)	(0.33)	(0.35)
FIT				-0.62**	-0.62**	-0.62**	-0.62**	-0.62**
				(0.23)	(0.23)	(0.23)	(0.23)	(0.23)
Standards				-0.04	-0.04	-0.04	-0.04	-0.03
				(0.44)	(0.44)	(0.44)	(0.44)	(0.44)
RDsubsidies				-0.47	-0.47	-0.47	-0.47	-0.47
				(0.40)	(0.40)	(0.40)	(0.40)	(0.40)
Divest.Non.Financial					0.03			
					(0.08)			
Divest.Non.Financial.Ex.Gov						0.04		
						(0.08)		
Divest.Gov							0.04	
							(0.11)	
Divest.Financial								-0.03
								(0.05)
Num. obs.	528	528	528	528	528	528	528	528
Adj. R^2 (full model)	0.86	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Country Fixed Effects	YES	YES	YES	YES	YES	YES	YES	YES
Year Fixed Effects	YES	YES	YES	YES	YES	YES	YES	YES
2-Way Standard Error Clustering	YES	YES	YES	YES	YES	YES	YES	YES

***p < 0.001, **p < 0.01, *p < 0.05, ^p < 0.1 – Robust clustered standard errors in parentheses.

Table 6: Determinants of total domestic oil and gas financing and underwriting of oil and gas companies by foreign banks (2000 – 2015).

Total O&G Fundraising from Foreign Banks	**Controls**	**EPS**	**Divest EPS**	**Divest & All Policy**	**Non Financial**	**Non-Financial ex. Gov**	**Gov**	**Financial**
Model	**8.a**	**8.b**	**8.c**	**8.d**	**9.a**	**9.b**	**9.c**	**9.d**
GDP.Capita	-0.97	-1.01	-1.12	-0.85	-0.87	-0.87	-0.78	-0.71
	(1.20)	(1.30)	(1.30)	(1.49)	(1.49)	(1.49)	(1.46)	(1.46)
Env.Patents	0.13	0.12	0.11	0.11	0.11	0.11	0.12	0.14
	(0.37)	(0.37)	(0.37)	(0.37)	(0.37)	(0.37)	(0.37)	(0.37)
OG.Revenue	0.29***	0.29***	0.29***	0.29**	0.29**	0.29**	0.29**	0.29**
	(0.08)	(0.09)	(0.09)	(0.09)	(0.09)	(0.09)	(0.09)	(0.09)
Oil.Prod	0.03	0.04	0.04	-0.03	-0.03	-0.03	-0.04	-0.05
	(0.10)	(0.10)	(0.09)	(0.14)	(0.14)	(0.14)	(0.14)	(0.14)
Gas.Prod	-0.70*	-0.70*	-0.70*	-0.80*	-0.82*	-0.81*	-0.82*	-0.83*
	(0.33)	(0.33)	(0.32)	(0.37)	(0.35)	(0.35)	(0.36)	(0.37)
RE.TE	-0.14	-0.13	-0.17	-0.26	-0.26	-0.26	-0.23	-0.19
	(0.68)	(0.66)	(0.66)	(0.67)	(0.67)	(0.67)	(0.67)	(0.68)
EPS		-0.15	-0.06					
		(0.71)	(0.71)					
Divest.Total			-0.10**	-0.08				
			(0.04)	(0.07)				
Taxes				0.14	0.09	0.11	0.12	0.17
				(0.40)	(0.39)	(0.38)	(0.40)	(0.40)
Trading.Schemes				-0.45^	-0.44^	-0.44	-0.48*	-0.53*
				(0.27)	(0.27)	(0.27)	(0.24)	(0.26)
FIT				-0.09	-0.08	-0.09	-0.10	-0.11
				(0.21)	(0.21)	(0.21)	(0.21)	(0.21)
Standards				0.06	0.09	0.08	0.06	0.03
				(0.53)	(0.53)	(0.53)	(0.54)	(0.54)
RDsubsidies				0.96	0.96	0.95	0.96	0.97
				(0.76)	(0.77)	(0.77)	(0.76)	(0.76)
Divest.Non.Financial					-0.14			
					(0.10)			
Divest.Non.Financial.Ex.Gov						-0.14		
						(0.11)		
Divest.Gov							-0.09*	
							(0.04)	
Divest.Financial								0.09
								(0.07)
Num. obs.	528	528	528	528	528	528	528	528
Adj. R^2 (full model)	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61
Country Fixed Effects	YES	YES	YES	YES	YES	YES	YES	YES
Year Fixed Effects	YES	YES	YES	YES	YES	YES	YES	YES
2-Way Standard Error Clustering	YES	YES	YES	YES	YES	YES	YES	YES

***p < 0.001, **p < 0.01, *p < 0.05, ^p < 0.1 – Robust clustered standard errors in parentheses.

Figures

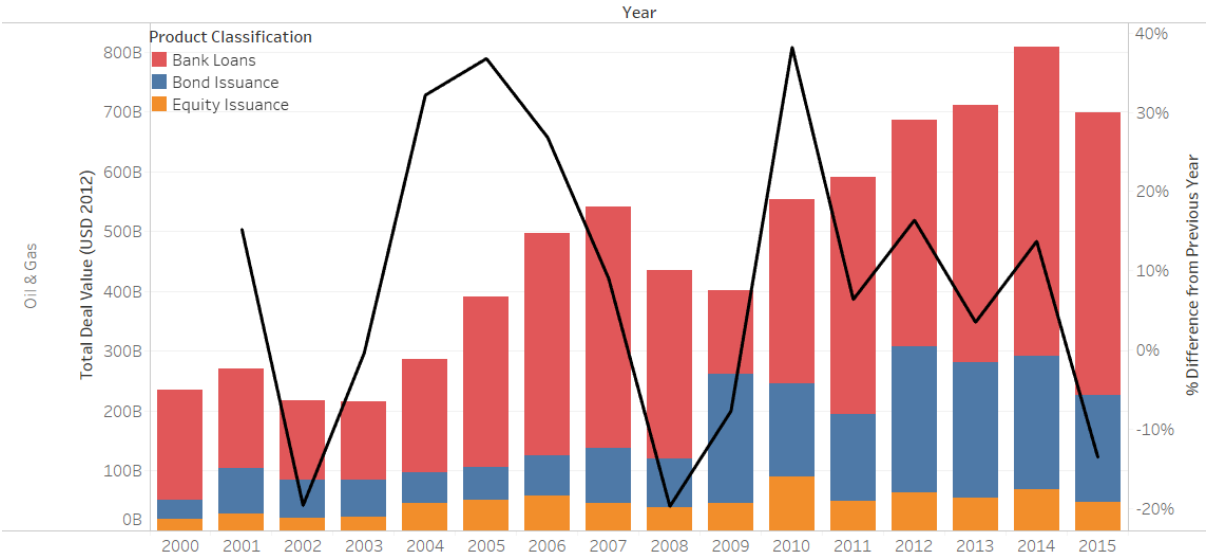

Figure 1: Global oil and gas bank loan financing, equity and bond issuance / underwriting amount. Data from Dealogic.

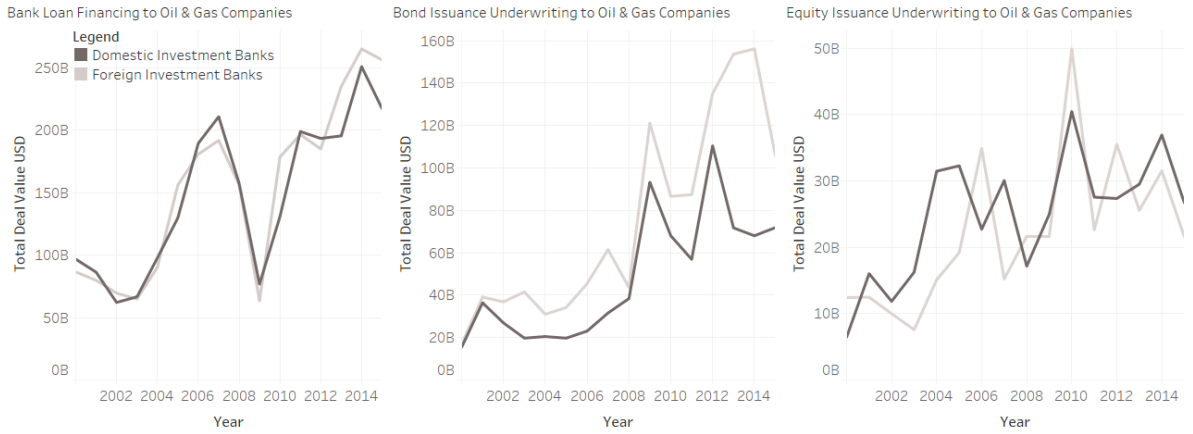

Figure 2: Global oil and gas bank loan financing, equity and bond issuance / underwriting amount by domestic banks vs. foreign bank, given the home country of oil and gas companies. Data from Dealogic.

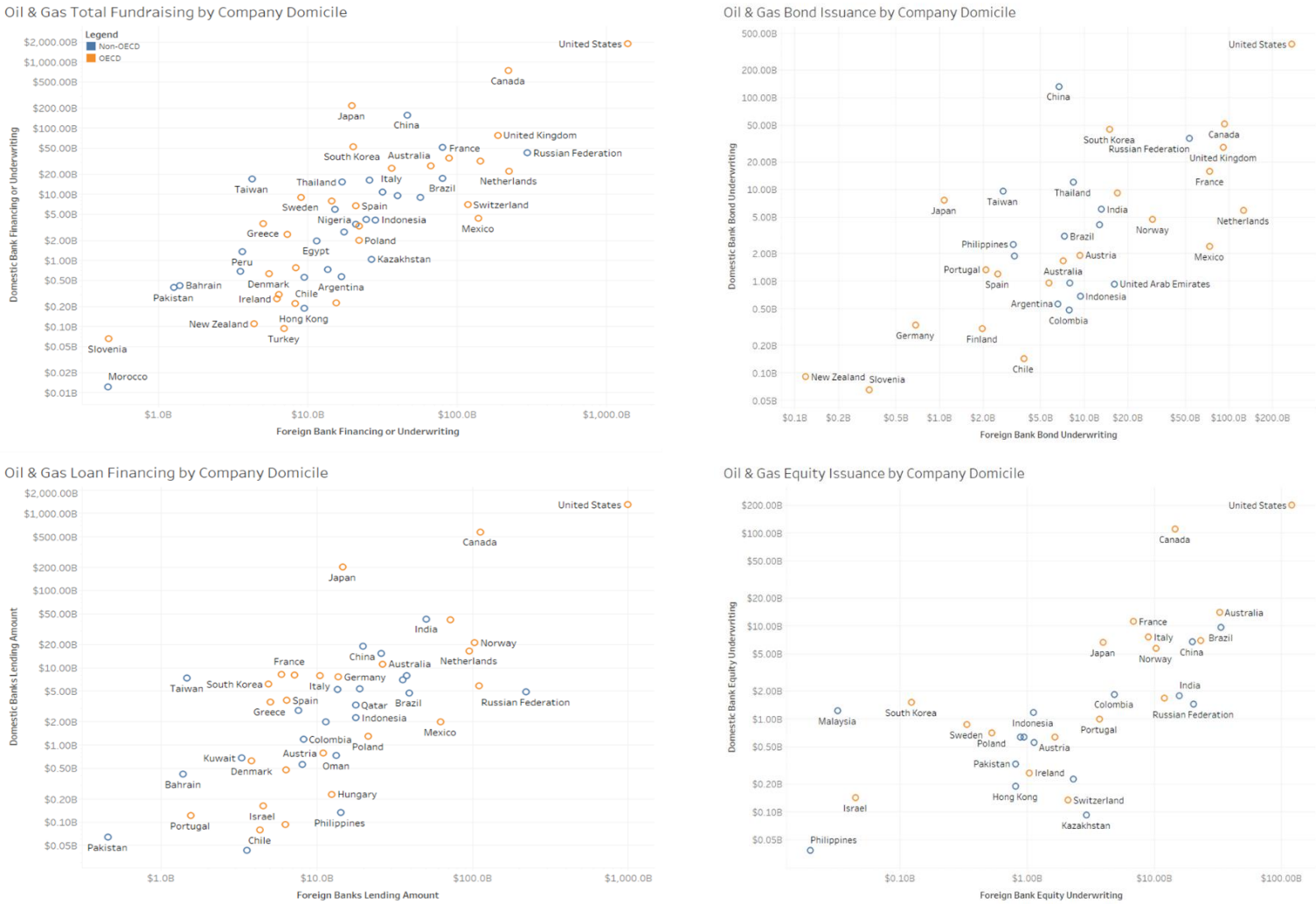

Figure 3: Domestic vs. foreign bank financing and underwriting of oil and gas across countries and asset classes. Data from Dealogic.

Appendices

Appendix A.1: Top 30 countries in total oil and gas financing by country (2000 – 2015). Data from Dealogic.

Oil & Gas Company Fundraising by Country (2000 – 2015)	Total Fundraising ($bn)	Bank Loans ($bn)	Bond Issuance ($bn)	Equity Issuance ($bn)
United States	3258.84	2286.49	652.35	320.01
Canada	958.19	688.11	144.98	125.10
Russian Federation	336.14	225.06	89.37	21.71
United Kingdom	264.17	114.05	120.09	30.03
Netherlands	244.01	112.19	131.73	0.09
Japan	236.10	216.78	8.68	10.64
China	204.45	38.96	138.89	26.60
Norway	174.89	124.35	34.45	16.08
Mexico	142.33	64.09	76.01	2.22
India	130.36	93.63	19.21	17.52
Switzerland	124.49	115.59	6.67	2.23
France	122.91	15.24	89.64	18.03
Brazil	97.58	43.98	10.41	43.19
Australia	93.00	37.70	8.85	46.45
South Korea	72.61	11.06	59.91	1.64
United Arab Emirates	65.44	45.73	17.19	2.53
Cayman Islands	61.17	1.50	59.67	0.00
Italy	61.12	18.42	26.10	16.60
Singapore	49.41	42.55	5.16	1.69
Virgin Islands (British)	47.85	1.28	46.57	0.00
Malaysia	42.38	24.22	16.90	1.26
Saudi Arabia	42.23	41.34	0.00	0.89
Angola	36.01	36.01	0.00	0.00
Venezuela	32.83	11.93	20.90	0.00
Indonesia	32.46	20.10	10.08	2.29
Thailand	32.27	10.45	20.30	1.52
Qatar	28.90	21.03	6.97	0.89
Kazakhstan	27.75	15.85	8.88	3.02
Spain	27.56	10.18	3.71	13.66

Appendix A.2: Country fossil fuel divestment pledges by type of organisation (2008 -2018). Data from DivestInvest Initiative.

Country	Total Divestment Commitments ($bn)	Financial Organisations Divestment Commitments ($bn)	Governmental Organization Divestment Commitments ($bn)	NGOs, Academic Institutions and Faith Organisations Divestment Commitments ($bn)
Norway	1176.40	85.81	1090.56	0.02
Switzerland	902.29	902.24	0.00	0.05
France	846.13	845.11	0.62	0.40
United States	836.48	647.53	10.85	178.10
Netherlands	807.51	807.51	0.00	0.00
Germany	795.26	790.49	1.38	3.40
Italy	628.72	628.72	0.00	0.00
Sweden	328.33	299.02	27.98	1.33
Australia	150.04	137.60	8.30	4.06
Luxembourg	131.09	131.09	0.00	0.00
UK	66.00	19.10	3.87	43.02
New Zealand	60.96	30.83	29.47	0.66
Denmark	54.97	51.65	1.40	1.92
Austria	18.70	18.20	0.00	0.50
Canada	14.67	14.30	0.00	0.37
Ireland	8.73	0.00	8.48	0.25

Appendix A.2: Correlation matrix.

	Mean	Sd.	Min	Max.	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9].	[10]	[11]	[12]	[13]
[1] Total.OG.Fundraising.	12784.65	38285.28	0	343128.2													
[2] EPS	1.94	0.98	0.375	4.13	-0.08												
[3] Taxes.	1.44	0.81	0	4	-0.04	0.29***											
[4] Trading.Schemes.	0.88	1.20	0	5.2	0.01	0.45***	0.22***										
[5] FIT.	1.68	1.97	0	6	0.01	0.57***	0.12**	0.13**									
[6] Standards	3	1.66	0	6	-0.03	0.79***	0.12**	0.43***	0.31***								
[7] RDsubsidies	2.11	1.39	0	6	0.01	0.48***	0.16***	0.13**	0.01	0.13**							
[8] OG.Revenue.	134480.3	256336.3	0	1743056	0.34***	0.05	0.15***	0.09*	0.15***	-0.07	0.07						
[9] Env.Patents.	4548.3	11499.7	0.33	82247	0.46***	0.13**	0.36***	0.28***	0.19***	0.09*	0.17***	0.41***					
[10] GDP.Capita.	27620	13592	1895	67056	0.08	0.00	0.44***	0.47***	0.29***	0.00	0.00	0.15***	0.53***				
[11] Oil.Prod.	49072	97841	0	505603	0.46***	-0.15***	-0.17***	-0.14**	-0.14**	-0.12**	-0.07	0.18***	0.11*	-0.31***			
[12] Gas.Prod	2373	5746	0	31405	0.23***	-0.17***	-0.04	0.07	-0.15***	-0.11*	0.09*	0.06	0.27***	0.22***	0.00		
[13] RE.TE.	13.2	11.9	0.4	51.54	-0.02	0.13**	-0.23***	0.04	-0.02	0.07	0.25***	0.01	-0.22***	-0.17***	0.14**	-0.27***	
[14] FF.Divest. Total.	293.7	4263.2	0	88678.4	0.15***	0.05	0.03	0.21***	0.06	0.07	0.01	0.13**	0.18***	0.18***	0.10*	0.07	0.03

Note: The correlation values are given for the orthogonalized variables: Standards, RDsubsidies and Gas.Prod.