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The Green Investment State:

Public Finance Leads as First Mover in Greening the Financial Sector

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ABSTRACT

The state is an underappreciated actor in closing the green funding gap via green bond issuance. By drawing on an original dataset processed using content and regression analysis, this paper finds that national and international public issuers both take climate risk seriously in their communication and, critically, 'put their money where their mouth is', by allocating funds towards green initiatives. Indeed, public development banks act as enablers and frontrunners of green finance and are actively seeking synergies with the private financial sector to address the funding gap. The findings confirm the robustness of the argument that a 'green entrepreneurial state' is a reliable first mover not just in innovation and production, but also in our generation's challenge to prevent a climate catastrophe.

Greening finance via green bonds

Facilitating a shift towards a low-carbon, sustainable economy demands vast amounts of funding towards investments and credit that closes the green funding gap. Green bonds are a way for private and public actors to finance environmentally-friendly projects and serve as a "good" financial innovation able to crowd-in mainstream finance. In technical terms, the green bond is a debt instrument first introduced in 2007, which raises capital to finance projects and activities targeting climate and environment-related projects. Upon its creation, the debt obligation was intended to innovate the funding of the public-private partnerships for strategic cooperation within the development and climate change (World Bank 2008) and a tool for tackling climate

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change and further integrating financial markets in the European Union (European Investment Bank 2007, 48).

Over the past decade, the issuance of green bonds has surged and incorporated both larger and smaller public and private actors. By the end of 2018, the outstanding value of green bonds was USD 1.45 trillion (Patzdorf 2018). Although green bonds accounted for less than 1% of the global bond market in 2018 (Berensmann, Dafe and Lindenberg 2018, 337), green bonds have been identified as the key financial instrument able of financing green investments in the transition to a low-carbon world (ibid., 335).

Their cheerleaders notwithstanding, the green bond is not some silver bullet in the fight against the threat of climate doom. They are also imperfect, with risks of greenwashing not being easy to dismiss pending clear and enforceable taxonomies. They are also insufficient to address the enormity of the climate chaos, a challenge that requires much more state investment (including direct fiscal spending) and limits on marketizing the solutions. Yet the magnitude of the crisis demands that we throw at it everything we've got and as long as green bonds do not dilute sustainability commitments, it would be unwise to wholly reject them, at least until massive state interventions kick in. In the short term, however, they have the advantage of being appealing to mainstream investors by virtue of their simplicity and similarity to traditional bonds (Berensmann, Dafe and Lindenberg 2018, 335; Ehers and Packer 2017, 89).

This paper takes a very distinctive approach to green bonds when it tries to rigorously identify the value added of the state as a green investor vis-à-vis private actors. To do so, it goes beyond the constructivist focus on how green bond issuers talk to the public about factoring in climate risks and enlarge the analytical scope to potentially costly investment decisions. By bringing the green investment state into the discussion, the paper magnifies the implications of recent scholarly attempts to reclaim the state as central to economic development. Drawing on theories of the 'entrepreneurial state' (Mazzucato 2015), the pivotal role of development banks in the financial system (Griffith-Jones et al. 2018) and the return of the 'financial activist' state (Thurbon 2016), the research bolsters the case to an increased role of public finance in responding to the climate threat.

Green bonds: A financial innovation experiencing rapid growth

Green bonds are a sub-category within the fixed income asset class. They function as a traditional fixed-income debt instrument in that (i) a set level of capital is raised on the date of issuance by the issuer, (ii) the issuer repays the initial nominal value at maturity date, and (iii) continuous coupon payments are paid according to the set payment interval until the maturity of the bond. However, green bonds encompass an additional feature – namely using the allocated funds exclusively to finance green projects, assets, and activities for areas of renewable energy, energy efficiency, pollution prevention and control, environmentally sustainable management of living, natural resources and land use, terrestrial and aquatic biodiversity conservation, clean transportation, sustainable water and water-waste management, climate change adaptation, eco-efficient and/or circular economy-adapted products, production technologies and processes, or green buildings (Broccardo and Mazzuca 2018, 187; ICMA 2018, 3).

With regards to the financial instrument technicalities, green bonds can be classified into four different types: standard green use of proceeds bonds, green revenue bonds, green project bonds, and green securitized bonds. Standard green use of proceeds bonds compare to regular debt obligations in that the capital revenue is allocated to the project or activities central to the bond and the bond repayment is retrieved from assets on the issuer's balance sheet. As such, tra-

ditional bonds and green use of proceeds bonds issued will see no price and rating divergence. Green revenue bonds are collateralized debt obligations where bond repayment is obtained from a given cash flows from e.g. revenue streams. Green project bonds are based on single or multiple green projects, with or without recourse, where the investor sees direct exposure to the project risks. Lastly, green securitized bonds are structured through securitizing green projects, including products such as asset-backed securities (ABSs), mortgage-backed securities (MBSs) and covered bonds. Given the credit exposure and volatility risk, green revenue bond, green project bond, and green securitized bond ratings are typically lower than that of green use of proceeds bonds (Broccardo and Mazzuca 2018, 189; ICMA 2018, 6). The timeframe of the hitherto issued green bonds scope short-term frames, of less than a year, to up to 20 years (Broccardo and Mazzuca 2018, 194; CBI 2016).

The first green bond was issued in 2007 by the European Investment Bank (EIB). In the following years, the range of green bond issuers was limited to supranational organizations and development banks, such as the World Bank (WB) and the International Finance Corporation (IFC). In 2012, the green bond market saw the introduction of municipalities as issuers, with several French regions issuing green municipal bonds[1] (Frandon-Martinez 2018). Several American and European municipalities, e.g. Stockholms Läns Landsting and Massachusetts (Broccardo and Mazzuca 2018, 192), have since continued to issue muni bonds to support local rail infrastructure, renewable energy, sewage systems, and recycling projects. In the same year, private commercial banks such as Credit Agricole and Bank of America started issuing their first green bonds. The fourth group of issuers to enter the green bonds market were corporations, with the first corporate green bond issue occurring in 2013. While the majority of corporate green bond issuers operate in green industries, there are corporate issuers which aren't uniquely operating or investing within the boundaries of green sectors (Berensmann, Dafe and Lindenberg 2018, 337-38; Broccardo and Mazzuca 2018, 192-196).

A central point of critique towards the green bond market is the lack of set standards (Berensmann 2017, 1; EU Technical Expert Group on Sustainable Finance 2019, 13; WWF 2016, 4) which creates disparities across market standards and complicates cross-border green capital flows. Voluntary frameworks featuring guidelines for issuers have emerged, with the two main frameworks being the 'Green Bonds Principles', developed by International Capital Market Association (ICMA) in 2013. The green bond market is, however, not regulated, and an issuer does not have to follow a set standard regarding the structure and issuance of the product. In other words, the issuer is free to advertise the bond as green, regardless of how the funds are allocated. Investors therefore run the risk of purchasing bonds that fund projects with minor or even negative contributions to the environment.

Green bonds hold great promise in their ability to mobilize private capital efficiently in order to fund climate-change related finances but remains susceptible to greenwashing due to variations in standards and issues in tracing the use of proceeds (WWF 2016, 4; Bachelet et al. 2019, 2). Allegations of greenwashing within the green bond market has been brought forward for instance following the green bond issuances of oil-producer Repsol[2] and of the coal-producing states of Poland[3] and Indonesia[4]. In fact, the first ever sovereign green bond was issued by Poland, despite the exceptionally low coverage of climate change in Polish media (Kundzewicz

[1] Also referred to as 'muni bonds'

[2] Repsol was the first company in the world within the oil and gas industry to issue a green bond for EUR500 million in 2017

[3] Poland has issued three green bonds since 2016

[4] Indonesia issued the first green Islamic bond in 2018

and Painter 2017) and previous efforts to halter the transition to a low-carbon European economy by the Polish government[5]. Meanwhile, a 'second opinion' report by CICERO established that while the use of proceeds of the Indonesian green bond "explicitly excludes fossil fuel", a possibility remains that funds may be directed towards projects that "include an element of deforestation" (CICERO 2018, 2). Thus, a central principle of the green bond is that the 'greenness' of the instrument derives from the proceeds of the particular loan, as opposed to the issuer. In this, it may be argued that the transition towards a green economy requires the inclusion of 'brown' companies in funding green assets (Whiley 2017). However, these examples point to the evident disregard of the need for wholesale business model and structural shifts.

Gaps in the research on green bonds

Regardless of the type of green bond issuer in question, the literature on green bonds has not yet explored how issuers rank on a magnified combined scale. Lacking is also an official ranking of green bond issuers in terms of total outstanding values of green bond contracts. Through empirical analysis, this research paper aims to address this gap in the literature by contributing with a systematic exploration of several of the leading issuers with a comparative perspective.

Another gap in the literature is evident in the lack of understanding of the underlying reasoning and motives for different types of issuers within the green bond market, be it public or private banks, corporations or governments. The void in the literature suggests a multitude of possibilities in how issuers perceive their role in the transition to a low-carbon economy. Cochran, Morel and Shishlov (2016, 9) argue that the issuance of green bonds may be used by banks and corporations to show a sign of commitment to the sustainability agenda, with the final goal of improving reputation but with little commitment to improving environmental impact. A main contribution of this research project is thus a thorough analysis of the perceptions of climate change risk held by the largest private and public banks within the green bonds market. Thus, analyzing the degree to which climate risk is strategically incorporated into operations is useful in arriving at a thorough understanding of the outlook of issuers in the green bond market. In other words, while the cases of potential greenwashing serve as interesting cases that have grabbed the media's attention (and sometimes used in the case against green bonds), subsequent analysis in this paper provides a quantitative projection of potential greenwashing in the current landscape.

Greening the investor state

Some scholars (Castro 2018; Griffith-Jones et al. 2018; Rezende 2015) observed that the financial system has tended to operate with excessive procyclicality and that the contribution to long-term investments in innovation and research and development, and thus the real economy, has been insufficient. Examples of projects that have been underfunded are infrastructure and renewable energies which often have high initial costs.

Given the nature of these investments, and their relation to the large transition towards a low-carbon economy, the private financial market observes higher uncertainty about returns and more difficulty managing long-term risk scenarios. This translates into private market actors offering little to no credit, particularly for those investment projects with long-term maturity (Griffith-Jones et al. 2018, 1-2; Wray 2009). It also has resulted in a market inefficiency and a financial market failure depicted as a funding gap in the green economic transition. Rezende (2018, 325) puts it as "a growing mismatch between investment expenditures (and available

[5] Poland vetoed against EU measures for carbon market reform in the Commission's 'low-carbon roadmap for 2050' in 2012

financing) and investment needs". Empirically, this may be seen in the infrastructure sector which faces insufficient funding, increasing investment needs, and structural changes to adjust for imperative sustainability changes. Consequently, with an increase in demand and a decrease in supply, a monumental infrastructure gap has emerged which is estimated to require US$57 trillion in investment by 2030, amounting to 3.8 % of global GDP, to keep up with the economic growth projections (McKinsey 2016, 1-9).

Financial market failure to address the green funding gap must be understood in light of the underlying structural economic failure of the private financial markets in advancing capital development in the economy, despite their increases in power under financialization (Rezende 2018, 305). This larger structural problem calls into question the lack of investment and innovations in the real economy, as well as who is responsible for creating and shaping existing and new markets. Mazzucato (2015) develops a set of ideas pinned to the concept of the 'entrepreneurial state' which relates to the role of the state and government in leading the funding of innovations which spur economic growth. Mazzucato (2015) sees that the neoliberal agenda pursued and taught in the contemporary only allows for government intervention to correct market failures and, as she explains further, the approach is that "once the sources of failure have been addressed [...] market forces will efficiently allocate resources, enabling the economy to follow a path to growth" (ibid., 5). As she notes, current market actors will not engage in unknown market opportunities posing too high risks and uncertainty about return rates. Furthermore, she writes that the majority of the most prominent innovations which have emerged in the past five decades have received support and funding from public bodies and that the state is indeed the true large risk-taker. The state as an investor – not simply a spender – has an incentive of not just creating economic value added, but to, through strategic policy planning, create social and environmental value added for the public. This is important for the theoretical reasoning as it emphasizes the possibility of the state to direct policy and development in a preferred direction – a direction in which private actors would go astray for the sake of minimizing the potential loss of capital. This serves as further illustration of the current green funding gap.

Addressing strategic ways to break the green funding gap cycle and correct the failure of capital markets, Mazzucato (2015) brings up the green industrial revolution as an illustration of how countries in the post-GFC era choose to stimulate economic growth *and* environmental sustainability through investment projects. For instance, Mazzucato brings forward the problematic approach of the 'fund everything' angle that American innovators have taken to with the hope to develop breakthrough innovations within the green energy sector (ibid., 121-128). Meanwhile, green innovations that inhibit the ability to lead to revolutionary changes in the economy require long-term financing – something venture capitalists aren't able or willing to shoulder. Initiatives that are able to spark the American innovation and capital development are large investment programs such as the Green New Deal[6] proposed by congresswoman Alexandria Ocasio-Cortez and senator Edward J. Markey (Friedman 2019)

In the recent decade – following the GFC – the revival of public development banks has been particularly noticeable within the issuance of green bonds, and at the time of writing, 11 public development banks are among the top 50 global green bond issuers (Appendix 1). On this account, the literature on public development banks has attempted to explain this revival as a measure to correct a possible financial market failure in the neoliberal market order. According to Griffith-Jones et al. (2018, 20), the role of the public development bank in the coming decades is to (1) counterbalance the procyclicality of private finance, (2) advance structural transforma-

[6] The Green New Deal is an American congressional financial plan presenting funding strategies and projects for combatting climate change. The aim of the deal is to reduce GHG emissions as a part of congress' efforts in mitigating and adapting infrastructure and transportations systems to more environmental-friendly options in the US (Friedman 2019).

tion and innovative efforts, (3) strengthen financial inclusion, (4) mobilize investment in infrastructure, and (5) provide public goods. With regards to the latter role of public development banks, a particular emphasis has been drawn to climate change as a public good (Griffith-Jones et al. 2018, 20). As opposed to private financial actors whose short-term investment perspective typically span a maximum of three years, public development banks' outstanding maturities principally have a duration of over five years (Luna-Martinez and Vicente 2012, 15-16). Their ability to undertake high-risk and long-term investments, avoided by private financial actors, allow them a unique position in the current market environment (Castro 2018, 231).

A more central role of public development banks within the financial system brings about additional benefits, beyond that of providing the crucial funding for facilitating the green economic transition, in contributing to a more stabilized financial system with lower levels of structured systematic risk by diversifying the financial structure of the country or region in which it operates. A more diversified financial sector may also strengthen competition and result in a reduction of lending rates, as well as cover a larger set of financial market functions enabling financial inclusion to transpire (Griffith-Jones et al. 2018, 5).

In addition, the international community has expressed support to integrate climate finance in the agenda of public financial institutions, as for instance expressed in the Addis Ababa Action Agenda on financing the Sustainable Development agenda in 2015 (ibid.). The supposition that public development banks play a clear role in closing the green funding gap is strengthened by increased support for the idea of safe and good climate as a 'public good'. Kregel (2015) notes that long-term financing for economic development and industrialization has continually derived from public funding via public banks. Kregel (2015, 1) further establishes that the recent superiority of private financial actors and the assumption of market-driving mechanisms creating market efficiency has hindered long-term developmental finance. The private financial market failure has left a funding gap in the market which according to scholars could be filled by public development banks (Chandrasekhar 2016, 24).

The economic success story of Korea, despite the active role of the state in the Korean financial system, serves as the case for Elizabeth Thurbon's (2016) alternative to the dominant neoliberal regulatory state model, putting forward the success of Korea's so-called 'developmental state'. While Korea is conventionally regarded to have undertaken substantial financial liberalization following the 1997-98 Asian Financial Crisis, Thurbon provides a competing account based on the strategic approach to financial governance undertaken by Korean policymakers. In this, she makes the case for the revival of 'financial activism', seen through the increasingly central role taken by public financial institutions, and criticizes the declinist accounts of the state put forward by the 'Wall Street – Treasury – IMF complex' (Bhagwati 1998, 7 and Ban 2016 describes pressures to liberalize capital flows deriving from financial market interests as the Wall Street – Treasury – IMF complex), in which "constrains states and their policy room to move" (Thurbon 2016, 2).

Even in the presence of internal and external pressures for neoliberal reform, Korea's development bank remains a central actor in the country's financial system, distinguishing the country from other developed states (ibid., 143). Thurbon therefore argues for a "rebirth of the developmental state", where market liberalization caves in for "strategic interventions in economic life to promote national strength in a hostile and competitive way" (Thurbon 2016, 1). State-owned institutions such as national development banks thus serve a purpose in providing alternative investments in a heavily financialized system and bring back investments in the real, productive economy. This argument echoes Keynesian appeals for a developmental worldview, a far-reaching consensus among the policy and political elite in which began to fracture in the 1970s and -80s following the rise of neoliberalism.

Thurbon's elaboration on the Korean 'development mindset' lacks an interest in the potential of this mindset to also "go green." There are no good reasons, however, that the expansion of 'financial activism' should not cut beyond national strategic objectives and play a role in the shift towards a more sustainable mode of capitalism.

Our paper aims to fill in this gap. Furthermore, rather than stay within the boundaries of a single state, our approach is to "go transnational" and compare state and private institutions issuing bonds around the world. Specifically, we built an original dataset of green bond issuer discourse and financial decisions to explore the possible relationships between the degree to which climate change risks are incorporated into strategic considerations and the allocation of green bonds in the total loan portfolio. Based on these points of interest, two hypotheses are put forward:

> H^1: Public banks incorporate climate change risk management to a greater extent in their strategy than private banks do.
>
> H^2: The greater the share of green bonds in total loan portfolio, the greater the incorporation of climate concerns and action in strategy and risk profile.

Methods

Although the study incorporates multiple cases (20 banks), the sample is limited in its ability to represent a general observable trend over a longer duration of time. This implies that although the research project incorporates mixed methods into the research strategy, there are no expectations that the sample (of 20 cases) will apply more generally to the population (in other words, the wider range of green bond issuers). Rather than producing generalizable results, the aim of this study is to make contributions to the scarce literature on green financial instruments and the greening of the global economy by generating results which can strengthen future theoretical approaches to the topic.

The study uses content analysis and quantitative analysis. Content analysis implied gathering, processing and coding secondary data for specific words, representing the coding units. The intent of the quantitative content analysis was to find the relative weight of the coding units in the analyzed data, translating into the relative weight of the incorporation of climate risk in the banks' strategy and risk assessment. Prior to embarking on the content analysis of all the documents, an inductive coding of a sample of eight out of the twenty banks was undertaken. In this, a coding scheme was developed, identifying the words and expressions used by the banks when discussing risks and responses towards climate change. A further selection process took place after the inductive coding process, where both researchers identified the ten most relevant coding units.

A total of 132 documents were analyzed and coded for ten words which were categorized as either 'General' or 'Strategy & Risk'. The purpose of this categorization was to determine differences in the degree to which climate change is incorporated in a fundamental way into the banks' strategy and operations. While the 'General' category includes simple 'buzz-words' that have become a natural part of any corporate report due to the overall increase in focus on matters such as 'Corporate Social Responsibility' (CSR) and 'Environmental, Social and Governance' (ESG) considerations, the 'Strategy & Risk' category is diligently constructed in a manner that captures a real understanding of and commitment towards climate change risk in the banks. The 'General' words included '(de)carbon', 'climate change', 'environment(al), 'green' and 'sustainable'. Within the 'Strategy & Risk' category, the following words were included 'adapt(ion)', 'risk', 'due diligence', 'mitigation' and 'resilience', all coded in the context of climate change.

General	Strategy/risk
Carbon / Decarbon	Resilience / Resilient
Sustainable / Sustainability	(Environmental / Climate) risk
Climate Change	Adapt / Adapting / Adaption
Green	Mitigate / Mitigating / Mitigation
Environment / Environmental	(Environmental / Climate) Due Diligence
	Greening

Some of the words selected as coding units proved to represent border-line cases, in which were consulted between the two coders. Examples of such words were 'risk' and 'environment'. In the former case, mentions of 'ESG risk' were prevalent in most banks. Upon discussion, the coders decided that the mention of 'ESG risk' was too vague to qualify as a reference to climate/environmental risk. In the latter case, all banks under analysis portrayed a high number of references related to the word 'environment'. Upon examination, however, a great deal of these references were in fact discover to be in related to a context of 'investment environment', 'economic environment', or 'political environment', and were thus not included. These cases lend support to the appropriate approach taken in the content analysis, in examining the context in which the references were a part of as opposed to conducting a simple word count.

The results from the content analysis allowed the researchers to gain insight into differences in the incorporation of climate change risk in strategies and risk assessments and served as the basis for an overall score which was given to each bank from the percentage share of 'Strategy & Risk' word counts in total references. A final step of the content analysis was to perform an independent t-test, in order to test whether the difference in the means of the two groups in the sample (private and public banks) were statistically significant (Agresti and Franklin 2013, 481).

This data enabled a high-level comparison between public and private banks, through aggregating a total score from the individual banks. Further analysis of the results was made by way of PivotTables in Excel, where the researchers identified more detailed tendencies in the data, such as the arithmetic mean and median of the referencing of specific words. The data was then displayed by way of histograms and pie charts, making the quantitative data easy to interpret and understand (Bryman 2012, 337). The systematization of this large amount of data gathered thus contributes to the literature by presenting the weight of major private and public issuers of green bonds.

The next methodological element in the research project was to incorporate a linear regression analysis, applied to determine whether there was a correlation between the incorporation of climate change risk in strategies and the allocation of green bonds in the total loan portfolio. In this, the aim was to discover the relationship between these two variables, as opposed to a causal direction. This implies that if a relationship was found in that an incorporation of climate change risk and an allocation of green bonds in the total loan portfolio is related, the researchers acknowledge that the causality can run in any direction (ibid., 341). Pearson's *r* was used in order to examine the relationship between the two variables, yielding a coefficient between 0 and 1, where 1 indicates a perfect relationship. The coefficient is either positive or negative, indicating the direction of the relationship (Bryman 2012, 342). The relationship was illustrated through a scatter diagram, where a clear patterning to the variables appear if there is a positive or negative relationship (Agresti and Franklin 2013, 588). By squaring the value of Pearson's *r*, the coefficient of determination was derived, expressing that a certain percentage of the variation in variable x is accounted for by variable y.

Finally, a multiple regression analysis was incorporated in order to test for the presence of an intervening variable. The intention of this was to ask why there is a relationship between the two variables, and if controlling for a third variable increases the explanatory power of the relationship (Bryman 2012, 345). The researchers acknowledged that general discrepancies in the language employed in reports were present, and that these variations were especially evident when comparing the reports of Chinese and non-Chinese banks. In this, a clear linguistic pattern of conveying corporate responsibility was evident amongst the Western banks, entailing that the non-Chinese documents studied portrayed greater linguistic homogeneity vis-à-vis the rest of the sample. On this basis, the multiple linear regression included a third variable – country of origin – in the pursuit of greater explanatory power in the relationship between the dependent and independent variable. This was executed by assigning an artificial variable to the selection of twenty banks by way of a binary indicator variable – '0' indicating non-Chinese origin of the bank and '1' indicating that the bank is Chinese (Agresti and Franklin 2013, 658).

An acceptable level of statistical significance was established as a measure of the threshold for rejecting the null hypotheses (Bryman 2012, 348). In this, the conventional significance level of < 0.05 was applied, entailing that if the t-value turned out to be < 0.05 (under H^1) or whether the corresponding p-value to the correlation coefficient was < 0.05 (under H^2), we could reject the respective null hypotheses.

In sum, the content analysis provided a necessary overview of the reported incorporation of climate change risk in operations, while the quantitative data analysis explored whether this emphasis on climate risk actually materialized into a higher allocation of green financial products within the banks' portfolios.

Data

The secondary sources used were public documents created with the intent of being published and distributed, including annual and financial reports, press statements, websites and strategy documents. This choice of data allowed the researchers to analyze a large number of documents in an objective manner. Seeing as secondary data is existing data created for another purpose than our research project, considerations were given to the risk of the data falling short in measuring what the project seeks to measure. Thus, applying primary sources, such as interviews, was also considered, however, due to the risk of corporate greenwashing, the researchers deemed primary data suboptimal as the interview objects may not have given an accurate description of the extent to which climate change risk into incorporated into strategies.

The sample for the multiple case study consists of a selection of banks, which were selected through extracting data from financial market data provider Bloomberg on the largest issuers of green bonds within the timeframe of 2014-2017. The public banks analyzed were the following: Asian Development Bank (ADB), African Development Bank (AfDB), Bank of Communication (BC), Bank of China Limited (BoC), European Bank for Reconstruction and Development (EBRD), European Investment Bank (EIB), Industrial and Commercial Bank of China (ICBC), Nordic Investment Bank (NIB), NRW Bank (NRW), World Bank (WB). The private banks analyzed were the following: ABN-AMRO Group N.V., Bank of America Corporation (BAML), BNP Paribas SA, Credit Agricole Group (CA), DNB ASA, HSBC Holdings Plc, Industrial Bank (IB), ING Groep (ING), Mitsubishi UFJ Financial Group (MUFG), Société Générale SA (SG).

The divide between public and private banks was determined by the ownership structure of the bank. Banks with state, municipality or public actors as majority stakeholders (>51 percent) were categorized as public banks. In determining this classification, ambiguity arose when

categorizing some of the Chinese banks, for instance complicated by the intricate ownership structure of Bank of Communications Co. Ltd, where major shareholders have links to the state. After diligent consideration and further examination of these concerns, all Chinese banks except Industrial Bank Co Ltd were classified as public. Finally, in order to conduct the regression analyses, data on the banks' total loan portfolios was extracted from the database Bank Focus.

The main data source employed in the research project were the various banks' annual and financial reports. Seeing as such reports are standardized to a certain extent and mainly convey factual operational and financial details, the researchers deemed these documents valuable in properly identifying the banks that actively incorporate climate change risk into risk assessments and strategies. Additionally, the content of virtual documents in the form of mission statements and environmental commitment statements was analyzed, derived from the banks' websites. In regard to the latter source, most banks offer a wide range of different statements on their commitment towards climate change. Thus, the researchers consciously selected the first statement that appeared on the website, i.e. the document that was made most easily available for the reader of the website. Furthermore, awareness was given to the fact that environment strategy statements may be subject to intended manipulation in order to create a specific effect, and the coded words were thus analyzed in the setting they were in, as opposed to doing a simple word count.

As discussed, a major issue of analyzing the content of these documents is the susceptibility they have to greenwashing. Bryman (2012) points to the inherent bias of documents in that the writer is "likely to have a particular point of view that they want to get across" (Bryman 2012, 551). By interpreting and coding data from different sources that serve different intents (for instance annual reports versus environment strategy), however, the researchers believe to have offset part of the risk of biased results. Additionally, as discussed, the carefully curated selection of five highly specific coding units related to climate change risk were emphasized – representing the 'Strategy & Risk' category – controlling for the issue of representativeness.

By increasing the number of coders in the analysis, the subjective bias of coding is limited. Applying the intercoder reliability measure thus ensures an increased degree of objectivity and ability to reproduce the analysis. The intercoder reliability measure is given by:

$$Percentage\ agreement = \frac{Sum\ of agreements}{Sum\ of\ observations}\ x\ 100$$

The percentage agreement method is appealing in its simplicity but has a major weakness in its inability to account for agreements occurring by chance (Lombard, Bracken and Snyder-Duch 2016, 590). In order to account for this potential source of unreliability, the two coders have thoroughly discussed and agreed on coding guidelines prior to initiating the coding process. This has allowed for a limiting of inconsistencies.

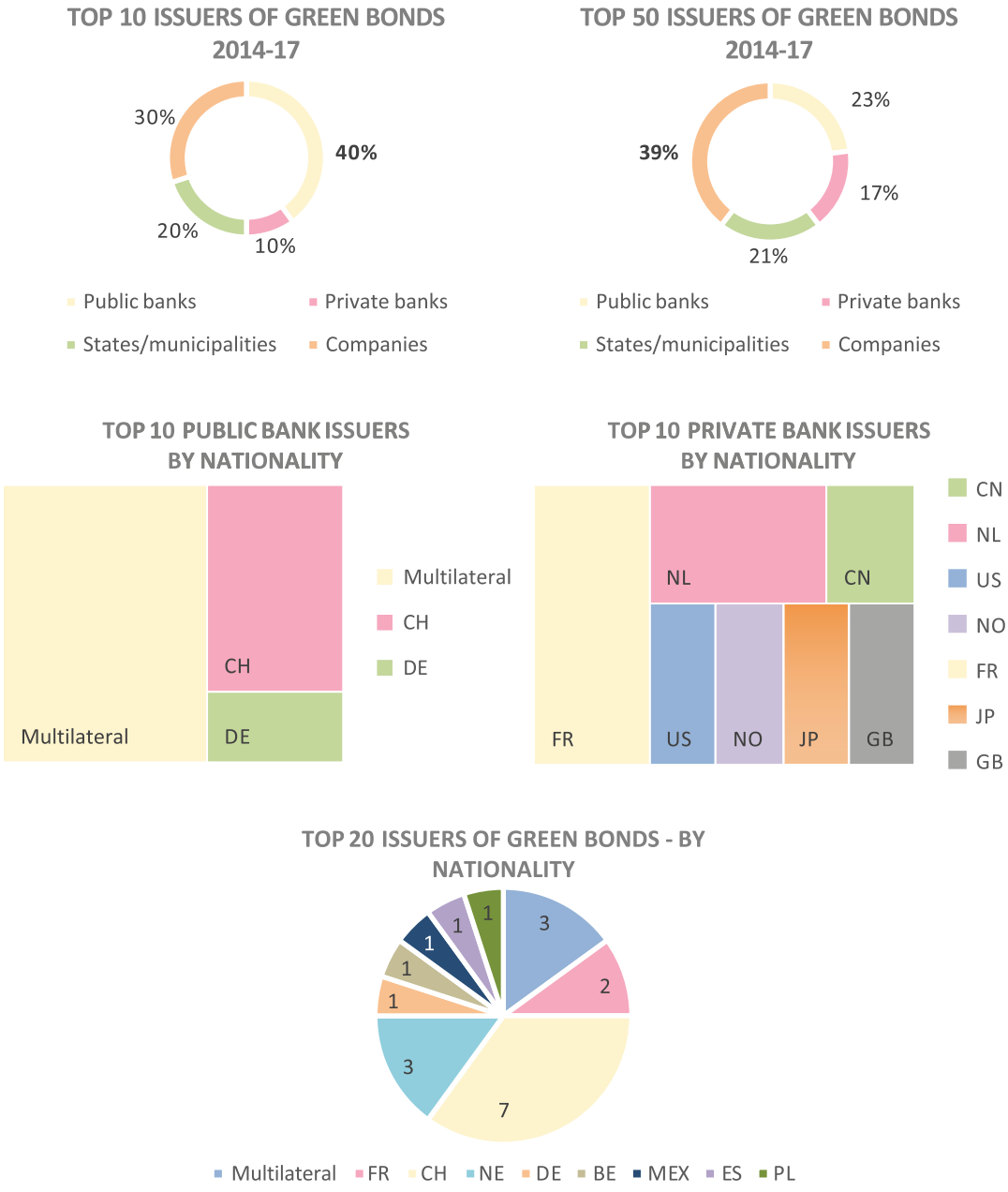
The results show a robust coherence of intercoder reliability, with a 94.286% interceding reliability rate (Appendix 3) constituting a total of 11 mismatches out of 140 coded words on all bank documents. The 'General' category represented a 92.143% intercoder reliability rate, whereas the 'Strategy & Risk' category brought about a rate of 96.429%. Ambiguity occurred for example in the case of 'environmental risk' where there was two instances of mistakenly including 'ESG' (Environmental, Social and Governance) risk' which the researchers had agreed to exclude from the coding prior to the coding process begun. Another mismatch occurred when coding the term 'sustainable'; as the term is highly contextual and can refer both to environmental sustainability and financial stability, confusion about its applicability arose twice. The

inference from the coherent intercoder reliability result is that the coding rules and journal were detailed and specific enough to produce significant results.

A structural exploration of the world of green bonds

While the analysis yields descriptive and not causal explanations for the role of public finance in climate mitigation, the findings epitomized below have clear implications for the theories outlined.

Figure 1: A visualization of the underlying data



Public bank domination and Chinese prevalence

From the underlying data on top issuers within the green bond market[7], we observe a dominance of public banks, accounting for 40% of the top ten issuers. China is as a central part of the green bond market, with Chinese banks and corporations accounting for 35% of the group of the twenty largest issuers of green bonds. Moreover, it is evident that European issuers make up a large part of the green bond market. Underrepresented are private bank issuances from developing countries, as well as from large emerging economies such as the BRICS nations (with the exception of China). This raises questions as to why the green bond market is not utilized by private banks in developing and emerging countries which are confronted by pressing needs for mitigative and adaptive efforts in the face of climate change. This gap has been acknowledged by the International Finance Corporation (a member of the World Bank Group) and European asset manager Amundi, in which has established the 'Amundi Planet Emerging Green One (EGO)', a green bond fund aimed at emerging markets (Amundi 2018).

In support of the green investment state theory, we found that the percentage of green bonds in the total loan portfolio of public banks was significantly higher than in private banks, with a median value in the top ten public banks and top ten private banks of 1.81% and 0.09%, respectively. This discrepancy indicates an effort by states to address the green funding gap.

Development banks are a prominent feature on the list of top issuers of green bonds in the selected time frame. The origin of the top development banks is mainly centered in Europe and Asia. This lends support to Griffith-Jones et al. (2018) proposition of the central role played by development banks.

In regard to Thurbon's (2016) case of Korean 'financial activism' and the state effort towards green growth, it is surprising to discover that no Korean banks, corporations or municipalities appear as significant actors in the green bond market. In fact, in our projection of the top issuers of green bonds (by value) in the period 2014-2017, the first Korean entry is public bank Export-Import Bank of Korea ranking number 104. Similar to Mazzacuto's thesis, however, Thurbon's account of the increasing role of public finance within green finance is accurate based on the current data.

Evidence for the pioneering role of public finance in closing the green funding gap

The aim of the content analysis is to explore whether there are differences in the way public banks and private banks incorporate climate change in strategy and risk approaches. The hypothesis guiding this analysis is formulated by:

> H^1: Public banks incorporate climate change risk management to a greater extent in their strategy than private banks do

By way of the two categories 'General' and 'Strategy & Risk', the results show the banks' general awareness of climate change and environmental degradation (through the 'General' category) as well as banks' strategic attention towards the incorporation of mitigation, adaption, and resilience to climate change ('Strategy & Risk' category). The results from the 'Strategy & Risk' coding results control for potential greenwashing in references of words in the 'General' category. The hypotheses being tested with the results of the content analysis are:

[7] Data from the period of 2014-2017

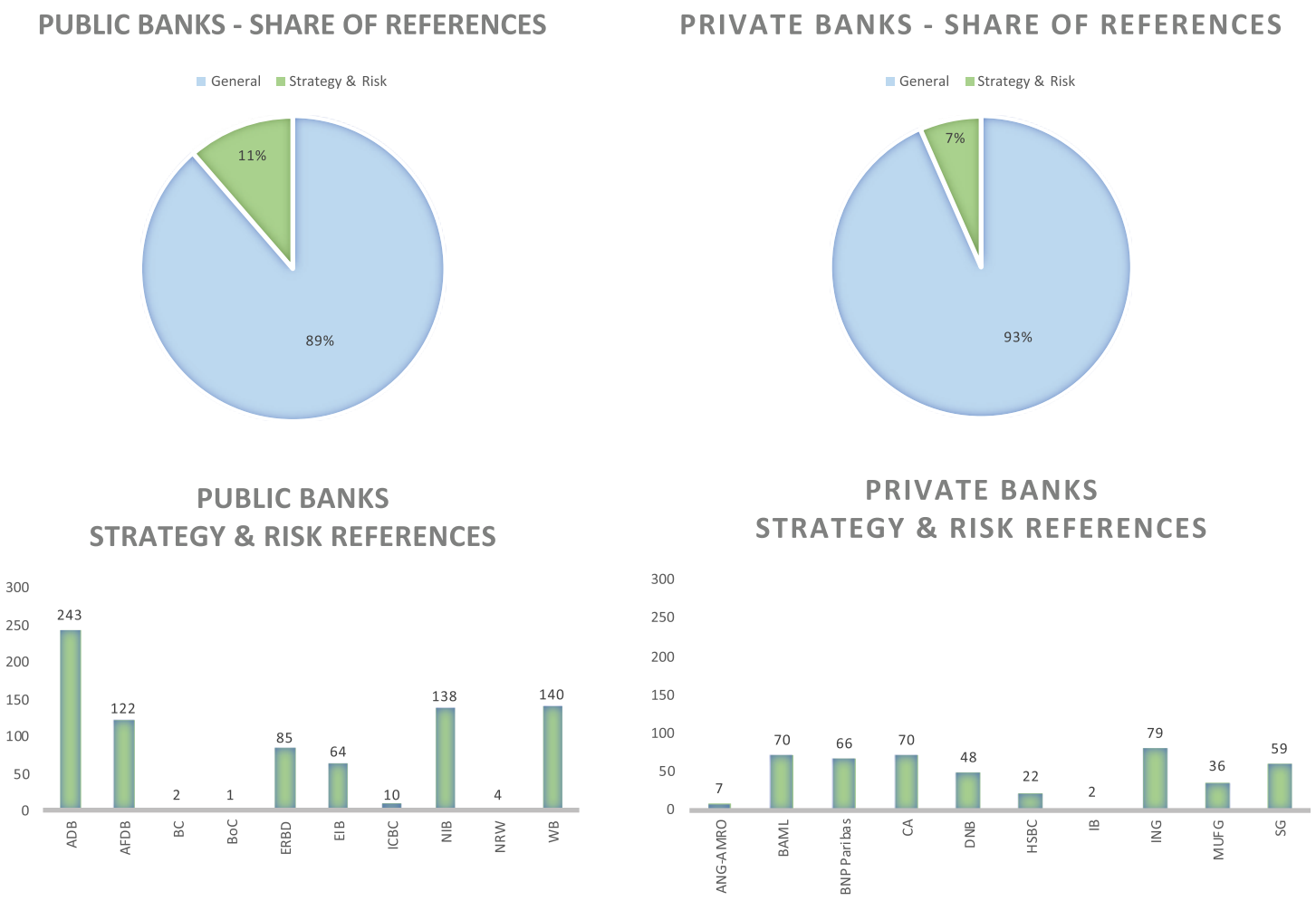
$H_0^1: \mu_1 = \mu_2$

$H_A^1: \mu_1 \neq \mu_2$

The alternative hypothesis (H_A^1) states that the population means are not the same, while the null hypothesis (H_0^1) represents that the population means are the same.

The results indicate that public banks, overall, have a higher representation of words from the 'Strategy & Risk' category than private banks do. Public banks had 11.4 % of the total mention of references from both categories deriving from the 'Strategy & Risk' category, as opposed to private banks for which the part represented 6.6 %. The output of the content analysis also showed that public banks, in absolute terms, had a higher number of references within the 'Strategy & Risk' category than private banks did with 553 reference counts against 390. Additionally, public banks had fewer mentions in the 'General' category, with 4319 compared to 5510. The analysis shows that public banks mentioned words such as 'resilience' approximately eleven times more and 'mitigate' three times more than private banks. These results support our hypothesis (H^1) in that public banks incorporate climate change risk management in greater extent than private banks.

Figure 2: Reference shares by category



Private banks yield a significantly lower number of references within the 'Strategy & Risk' category (approximately 31% lower than public banks) in spite of having more references in total (approximately 18 % more than public banks). This inverse relationship portrayed by the private banks and the greater share of 'General' references points to a greater susceptibility to greenwashing within private banks. In essence, this signals an acknowledgement of climate change but a lower commitment to committing strategies to reach concrete results.

In order to evaluate this observed difference in the strategic incorporation of climate risk between public and private banks, an independent t-test is used to compare the means of the two groups of samples in order to test whether the difference in the means are statistically significant (Agresti and Franklin 2013, 481). The calculation is given by:

$$t = \frac{(m_1 - m_2)}{se} = \frac{78 - 110.2}{50.66} = -0.64$$

$$se = \sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}$$

The t-value is used to find a p-value, in which is compared to the significance level of < 0.05. In this case, the t-test corresponds to a p-value of 0.543, entailing that the result is not significant at $p < 0.05$. Moreover, given the sample data, the null hypothesis cannot be rejected stating that the population means are the same. However, given that the green bond market is young, the given sample size in this research paper remains representative of the current market actors. Seeing as the aim of this research paper is not to make statistical inferences concerning the wider population, the results are hold descriptive explanatory power for answering the research question.

Despite the dominance of Chinese issuers in the green bond market (Figure 1), from our findings it is evident that little attention is given to expressing awareness regarding climate change risk. All four Chinese banks – both public and private – in our sample (IB, ICBC, BoC, and BC) score low in the 'Strategy & Risk' category, whilst accounting for a staggering ¼ of the value of green bond issuances in all the top 20 bank issuers (Figure 3). Chin and Gallagher (2019) point to the important differences in the governance structure within Chinese and non-Chinese development financial institutions (DFIs) with Chinese national DFIs having "a single shareholder governance structure" (Chin and Gallagher 2019, 249), translating into a single constituent in which the DFI is accountable to. On the contrary, publicly listed banks feature a more complex ownership structure, with multiple shareholders of which they are held accountable. Considering the close link between the major Chinese banks and the Chinese state and the high focus ascribed to green growth initiatives by the Chinese government in the 12th 5-year plan (Mazzucato 2015, 132), the expectation is to see a significant Chinese market share in the green bond market. The observation supports this differing sense of accountability, in that Chinese banks' reporting allocate less focus to the importance of incorporating climate change risk into operations, although the allocation of the loan portfolio and the Chinese market share indicate an acknowledgement of the need for green funding. This finding is deemed a result of a combination of government focus on green growth (ibid., 128) and the major expansions in Chinese debt over the last decade (Armstrong-Taylor 2016, 19).

Interestingly, however, it appears that private banks have higher mentions of the word 'Risk' (in relation to the climate) within the 'Strategy & Risk' category, despite having a lower score than public banks within the overall category (390 reference counts against 553). This implies an awareness of climate change risk, but a lacking implementation of active measures to cater for this risk, once again feeding into the idea of private banks being more susceptible to engage in greenwashing. The belief is that an active responsiveness towards climate change risk would be

Figure 3: Breakdown of references within 'Strategy & Risk' category

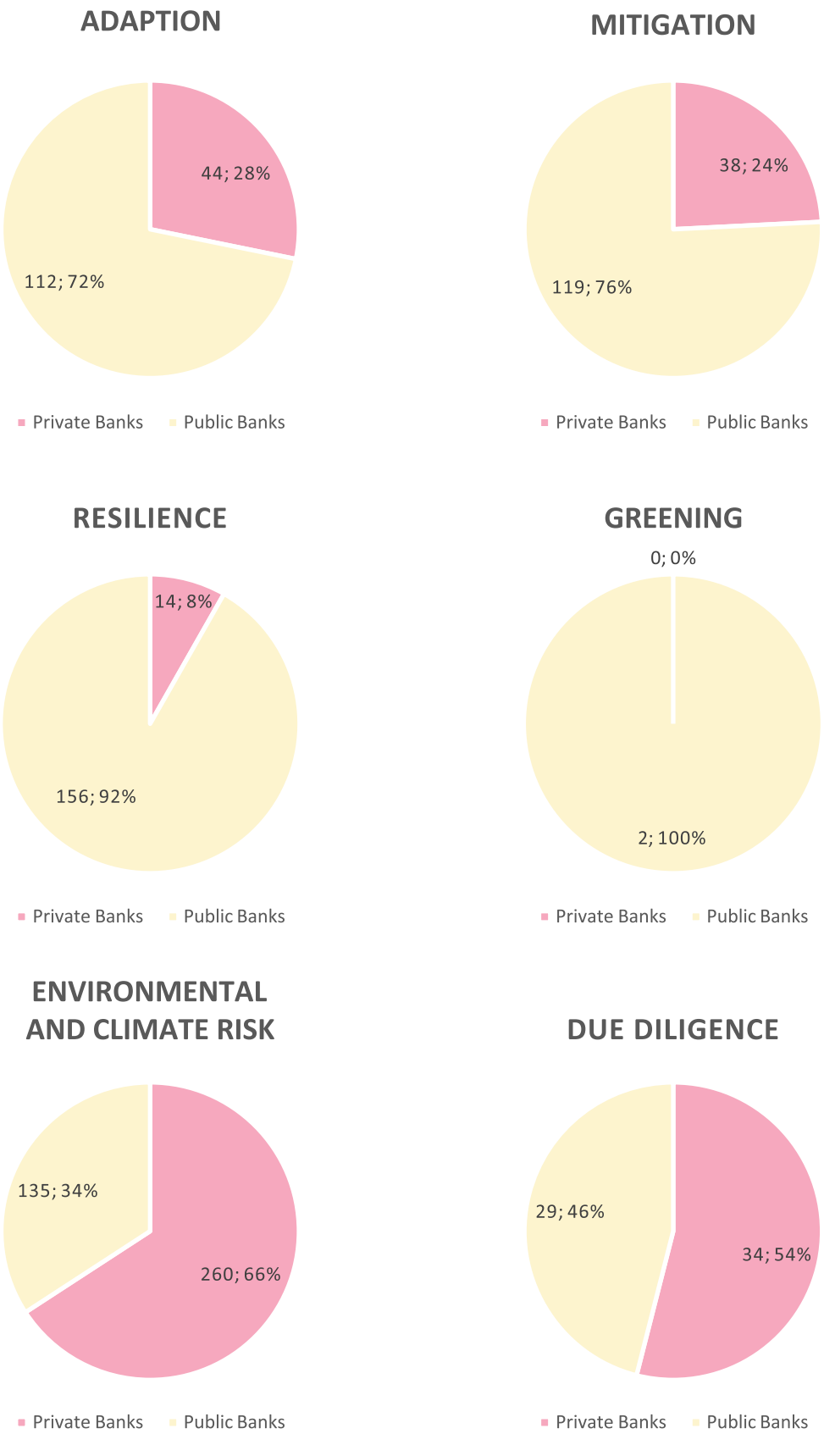
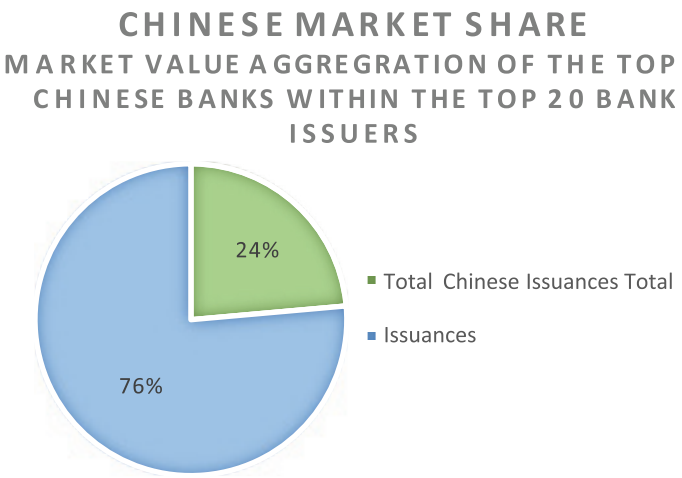


Figure 4: Chinese dominance in the green bond market



detected by words of action, such as 'Greening' (the economy) which had no mentions in any of the private banks, as well as 'Adaption', 'Mitigation' and 'Resilience', which were all used less by private than public banks. This resonates with the previously discussed discrepancy between the allocation of green bonds in the total loan portfolio of public and private banks of 1.81% and 0.09%, respectively.

A high degree of variance is evident in the incorporation of climate risk (seen through the 'Strategy & Risk' category) within the public banks, with the highest and lowest percentage share of 26 % and 0.5%. This result is largely affected by the low scores of the Chinese banks, discussed above. Compared to public banks, private banks show a lower degree of variance, with the highest and lowest percentage share incorporation of climate risk concerns being 13% and 0.7%, respectively.

Given these variances, the data shows outliers with regards to 'Strategy & Risk' category references. Taken into considerations the abovementioned statements about Chinese banks, it is not surprising that the two worst-performing banks in terms of strategy and risk incorporation, BoC (a private bank with a 0.45% share of 'Strategy & Risk' category references) and IB (a public bank with a 0.0692% share of 'Strategy & Risk' category references) are both Chinese.

Public Banks	Percentage Share S&R
ADB	25.445%
EIB	24.242%
WB	22.951%
AFDB	16.245%
EBRD	13.776%
NIB	10.815%
ICBC	6.670%
NRW	2.484%
BC	1.333%
BoC	0.450%

Private Banks	Percentage Share S&R
DNB	12.766%
MUFG	10.375%
BNP Paribas	9.807%
CA	8.294%
SG	5.865%
HSBC	5.729%
ING	5.631%
ANG-AMRO	1.499%
BAML	0.901%
IB	0.692%

These findings strengthen the case for public banks and their role in the financial system and are in line with the theories outlined in chapter 4.

First, based in Mazzucato's (2015) theory on the 'entrepreneurial state' it was expected to find a greater share of public banks when reviewing the major issuers of green bonds in recent time. The very inception of the green bond market led by public bank EIB showcases the innovative abilities of the state. Moreover, the continuous dominance of public banks in our data over green bond issuances lends support to the idea of the state as the true large 'risk-taker' in this young market. The prominence of Chinese banks as a green bond issuer strongly supports the relevance of the 'entrepreneurial state' where the dominance must be seen in relation to the explicit green policy course set out by the Chinese state.

The dominance of Chinese public banks in the top issuers of green bonds supports Thurbon's account on the success of states able of setting a policy course to be followed by actors in the financial system, through so-called 'capital steering'. The revival of 'financial activism' is thus seen in the channeling of efforts towards green economic growth, as a response to the external pressure of climate change.

Second, the analysis presents a key finding in that a greater incorporation of climate change concerns is found in public banks' strategy and risk projections, lending support to Griffith-Jones et al. (2018) argument of the role of development banks in closing the green funding gap. We believe that this greater incorporation of climate change risk translates into taking responsibility for the funding gap evident in the current financial system.

Controlling for greenwashing – are banks 'putting their money where their mouth is'?

Due to the nature of discussions regarding climate change and its susceptibility to greenwashing, a linear regression analysis was incorporated in order to test for whether bank statements on climate change (analyzed through the content analysis) were supported by actions (in allocating a share of the total loan portfolio to green bonds). The corresponding hypothesis is:

> H^2: The greater the share of green bonds in total loan portfolio, the greater the incorporation of climate concerns and action in strategy and risk profile

The intention of this additional test was to control the results yielded under the first hypothesis, where a correlation between x (the allocation of green bonds in total loan portfolio) and y (the level of strategic incorporation of climate risk) would indicate that the results under hypothesis 1 were not subject to greenwashing. A positive relationship between these two variables would indicate that the 'Strategy & Risk' category accurately controlled for greenwashing and that the findings in the content analysis – essentially the ranking of banks by their focus on climate risk – are robust. In this, the hypotheses were given by:

> H_0^2: $\varrho = 0$
>
> H_A^2: $\varrho \neq 0$

The null hypothesis proposes that the population correlation coefficient (ϱ) is not significantly different form zero, implying that there is not a significant linear relationship (i.e. correlation) between x (the allocation of green bonds in total loan portfolio) and y (the incorporation of climate risk in strategy and risk assessment) in the population. The alternative hypothesis indicates that the population correlation coefficient is significantly different from zero, indicating a significant linear relationship between x and y in the population.

The correlation coefficient, *r,* indicates the strength and direction of the linear relationship between the independent (x) and dependent (y) variable. The reliability of the linear model, however, is also determined by the number of observed data points in the sample (n). In other words, the correlation coefficient of our sample (*r*) is used to estimate the unknown population correlation coefficient (ϱ). In order to draw a conclusion on the statistical significance of the correlation coefficient, the p-value was compared to the established significance level of $\alpha = 0.05$.

Overall, a positive relationship is observable between the strategic incorporation of climate risk (y) and the weight of green bonds in the loan portfolio (x) (figure 5).

In regard to public banks, the results of the linear regression analysis (figure 6) reveal a positive relationship between the share of green bonds in the total loan portfolio and their incorporation of climate risk in strategy and risk assessments.

A negative relationship is evident within the private banks (figure 7), indicating that the emphasis on climate risk decreases as the share of green bonds in the total loan portfolio increases. Based on this sample, the results imply that private banks are more likely to engage in greenwashing, in that a high strategic incorporation of climate risk does not translate into action (i.e. a higher allocation of green bonds in the total loan portfolio). This relationship, however, is influenced by the Chinese Industrial Bank (IB), proving to be an outlier and affecting the correlation coefficient. Figure 8 shows the weak, yet positive relationship that emerges – in line with the findings on all banks and public banks – once this outlier was controlled for a linear regression on private banks was produced, excluding Industrial Bank.

Thus, while the linear regressions show a weak positive (figures 5, 6 and 8) and a weak negative (figure 7) relationship, the p-value of the linear regression of private and public banks combined (figure 5) is less than the significance level ($\alpha = 0.05$), and the linear relationship in the sample

Figure 5: Linear regression – public and private banks

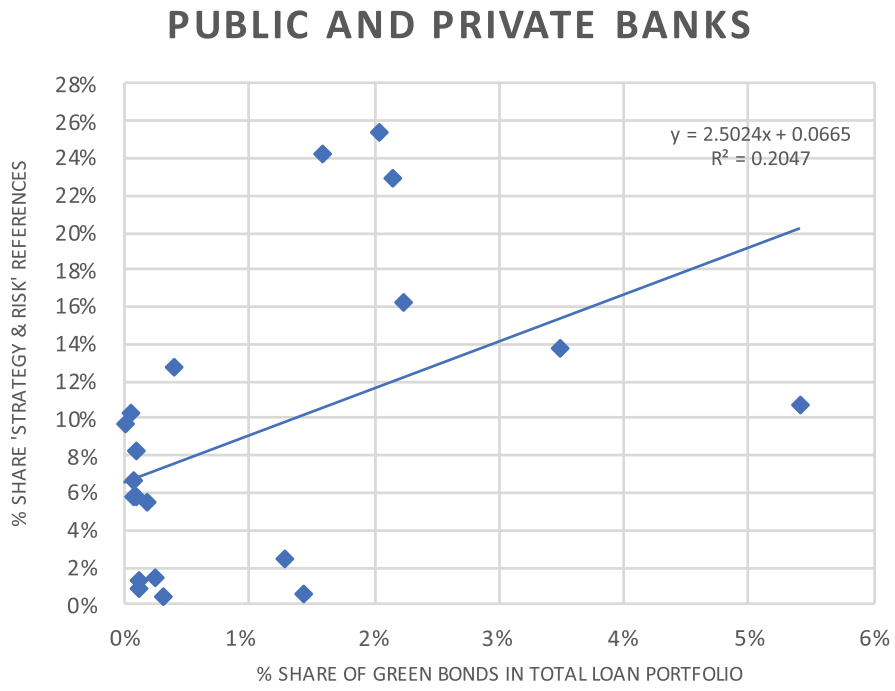


Figure 6: Linear regression – public banks

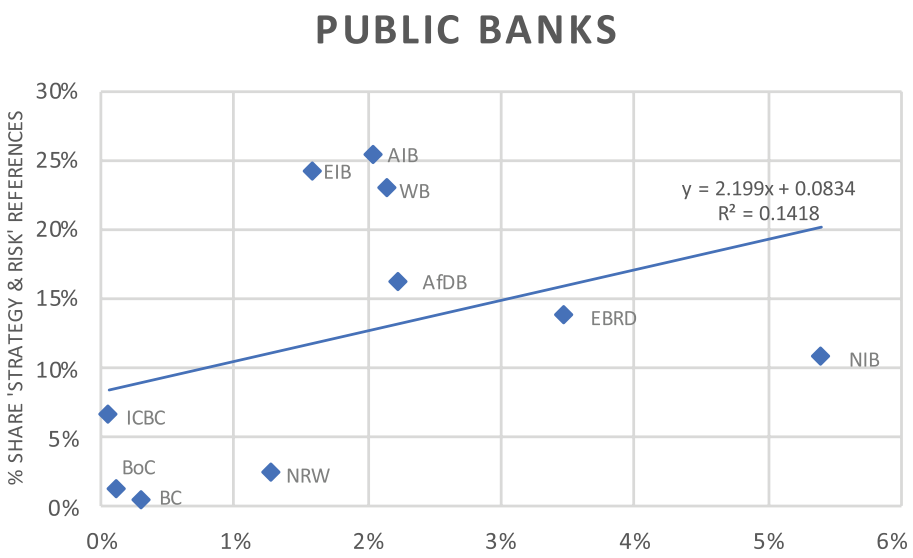
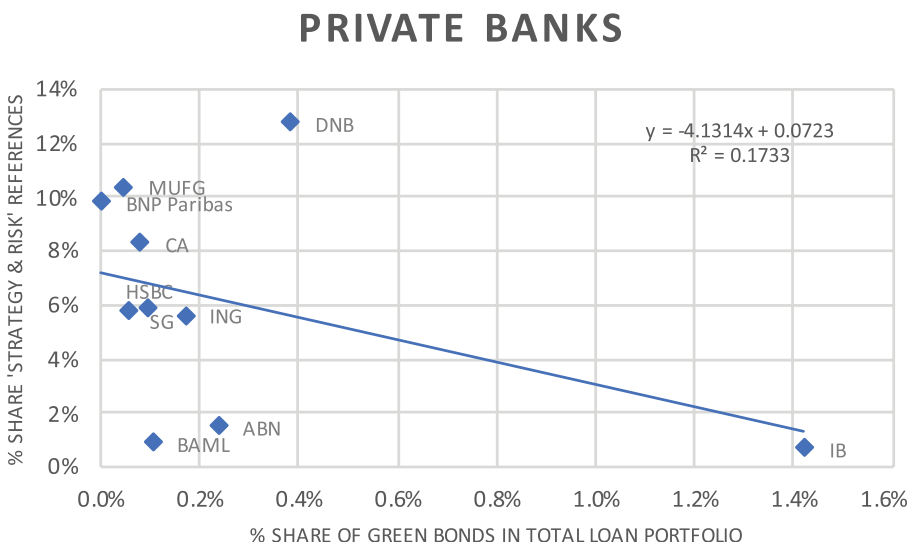


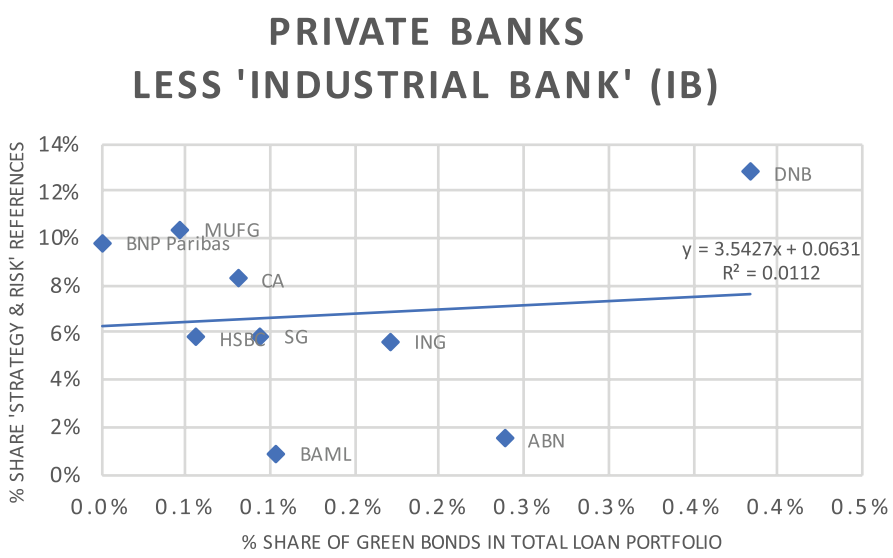
Figure 7: Linear regression – private banks



data can be used in the to model the relationship in the population. This is because the correlation coefficient (r) is significantly different from zero, and it may therefore be established that there is sufficient evidence to conclude a linear relationship between x and y.

To investigate this relationship further a multiple regression analysis – entailing a simultaneous analysis of three variables – was conducted in order to check for intervening variables (Bryman 2012, 345). Based on previous findings, the Chinese banks proved to be outliers in the overall relationship both within private and public banks. Therefore, the multiple regression analysis incorporated a third variable of 'country of origin', executed by assigning an artificial variable to the selection of twenty banks by way of an binary indicator variable – '0' indicating non-Chinese

Figure 8: Linear regression – private banks less 'Industrial Bank' (IB)



origin of the bank and '1' indicating that the bank is Chinese (Agresti and Franklin 2013, 658). The hypotheses were formulated as:

$H_0 : \beta_1 = \beta_2 = \beta_p = 0$

$H_A : \beta_j \neq 0$

Thus, rejection of H_0 implies that at least one of the explanatory variable is associated with y (Agresti and Franklin 2013, 644).

The multiple regression analysis portrayed a higher correlation coefficient than did the linear regression (0.59 vs 0.44). Also, the R-square is higher than in the linear regression analysis (0.35 vs 0.19), entailing that 35% of strategy and risk incorporation can be explained by nationality (x_1) and allocation of green bonds in loan portfolio (x_2). In other words, the multiple regression equation provides a better fit to the data. Moreover, the p-value derived from the multiple regression analysis ($p = 0.03$) indicates that we can reject the null hypothesis at $\alpha < 0.05$ and conclude that either β_1 or β_2 (or both) is not equal to 0. In sum, the addition of nationality as a variable of interest adds significantly to the prediction of y.

In conclusion, the linear regression showed a positive relationship between the weight of green bonds in the bank's portfolio (x) and the concern towards climate risk (y), while the multiple regression strengthened the relationship between x_2 and y, controlling for nationality (x_1). This test is key in establishing the robustness of the findings in the content analysis, establishing that in general, banks are "putting their money where their mouth is", i.e. putting words into action. This strengthens the findings under H^1 - where we mapped the most progressive banks in terms of their stance towards the transition to a low-carbon economy – and entails that greenwashing has been controlled for in this analysis.

Discussion

In the world of green bonds the big pattern is the prevalence of public banks. Moreover, public banks were the sole issuers in the green bond market for a duration of five years before pri-

vate actors entered the market (Broccardo and Mazzuca 2018, 193). The underlying data on the green bond market (figure 1) shows the large presence of other public actors, with states and municipalities making up 20% of the top 10 green bond issuers over 2014-2017, in addition to the 40 % share of public bank issuers. The fact remains that the largest green bond issuer over the said time period is the French state (appendix 1) and while municipalities and states were not included in the sample for the empirical research of this paper, they present an additional angle in support of the presence of public issuers in green financial market activities.

Based on the insights from the data, in support of the state as an entrepreneur and an initiator of market development, it is evident that the state approaches to green economic development affect the allocation of capital. In addition, Mazzucato (2015) illustrates how national policies translate the idea of green economic development into reality. The argument is that countries that engage in "'patchy' policies" (ibid., 128) do not manage to channel sufficient funding and resources to combatting their climate footprint or to take a lead in the global green markets. On the other hand, countries that have a clearly spelled-out long-term commitment to mitigating climate change are also the ones achieving green growth momentum through expansions of their economies, breaking the path-dependency of yesterday (ibid.).

Mazzucato (2015) brings forward empirics supporting the impact of coherent national policies on green investments by comparing the case of China and the UK. Whilst China has set out a comprehensive 5-year plan[8] incorporating green growth strategies with focus "on a defined number of specific technology goals in its 'strategic emerging industries'" (Geall 2016) – such as renewable energies and electric vehicles – the UK has been tampering with mixed signals for committing to greening the economy (Mazzucato 2015, 131-133). In spite of promises by the conservative government in 2010 to be the "greenest government ever" (Randerson 2010), no substantial long-term pledge to a comprehensive green transition has been made in the UK. This has had implications for investments, since uncertainty about future government policies and unclear strategic directions deter both capital and research investments (Mazzucato 2015, 133-134).

China's 'big push' is evident in the results of this research where the Chinese banks come out in the top of the issuers of green bonds, as well through industry focus areas (ibid. 131-132). The UK, however, is on the track to become an 'importer' of green innovations rather than embarking on the mission to join the movement (ibid. 135). The issue is not the size of the economy – as the 6th largest economy in 2017[9] (World Bank n.d.) and the heart of Europe's financial activities, the UK does not lack financial expertise, funding or efficient market structure to facilitate green economic development. In contrast to China, the lack of green funding and green innovation is based in the issue of short-term government policies that choose to see "'green' investments as a trade-off to growth" (ibid. 134) and their reliance on the private financial actors to engage and for the market-based mechanisms to facilitate the transition.

Mazzucato's (2015) line of argument brings extensive explanatory power to one of the major puzzles in the findings: while China stands out as a central part of the current green bond market, the Chinese bank in this data remain outliers in the data with regards to their lack of acknowledgement of climate change risk. The argument posed by Mazzucato aids in this puzzle, in that Chinese banks are guided by the explicit national strategic policies on mitigating climate change, as opposed to bank-specific policies. Following this argument, henceforth, it is possible that national policies play a key role in aligning green development goal with both public and private finance. In this, it could be argued that public banks are better positioned to take part

[8] The 12th Five-Year Plan for 2011-2015 (Mazzucato 2015, 132)

[9] Respective of total GDP

in such an alignment, given they are naturally guided more towards the state purpose than are market-driven and profit-seeking private banks.

Both public and private banks inhabit the possibility of contributing to closing the green funding gap through green bond issuance. However, although the green bond market has seen rapid growth over the last ten years (Liaw 2018, 318-319) it still represents less than 1% of current debt capital markets (Berensmann, Dafe and Lindenberg 2018, 337).

By itself, the green bond market is insufficient in closing the green funding gap - expediting the vital transition towards a low-carbon economy requires a mobilization of mainstream finance. One way to facilitate such a mobilization is through enhancing abilities to quantify the materiality of climate change considerations (e.g. like efforts by Credit Agricole and Université Paris-Dauphine to quantify the level of GHG emissions indirectly induced by banking activities[10]) and create accurate projections of the climate risk exposure of investments and projects over time. Developments like these will likely bring forward results that would lead to the revaluation of assets and the downgrading of large assets, thus, such efforts must be incorporated cautiously in order to secure financial stability. Such projections of the downsides and potential upsides of climate change ensures proper pricing of financial instruments, potentially helping to increase the time horizon of investors (Carney 2019). One way of implementing such a pricing mechanism could be through carbon pricing, entailing that companies in the non-renewable and high-carbon sectors would be highly overpriced. Moreover, credible policy frameworks are necessary to continuously crowd in private finance with the aim of closing the green funding gap, as discussed with the case of Chinese policies of green growth. Another way to mobilize capital is to create structural change within the financial sector, in the pursuit of incentivizing the mobilization of green capital.

Conclusions

This paper presents conclusive evidence of the active role of the public sector in greening financial markets through green bond issuances. Although European issuers looms large, the empirics have shown a clear dominance by Chinese issuers – both private and public – in the green bonds market. Furthermore, public banks did not just talk the talk. They also actively addressed the gap in the financial markets for green assets, as showed by the greater strategic incorporation of climate risk in operations by public banks. In other words, the paper found a positive relationship between the banks' acknowledgement of climate risk in their corporate discourse and their allocation of green bonds in the total loan portfolio.

The findings challenge the widespread reliance in public policy circles on strictly market-led solutions to the challenges of the ongoing climate chaos. Through public financial institutions such as public development banks and other entities states act as key green entrepreneurs in an immature green economy.

A central limitation of the research paper is the relatively small sample size which hinders the generalizability of the findings. However, the fact remains that the green bond market (barely 12 years old), remains very young. What might appear to be a suboptimal number of banks in the sample is indeed a representative size given the current market structure and landscape of issuers. The implication for further research would thus be to reconduct a similar study with a larger sample size. The aim of such a study should be to attain more robust results of greater statistical significance. This can in turn strengthen the hypothesis that public banks incorporate climate change risk management in their strategy to a greater extent than private banks.

[10] Partnership with University of Paris-Dauphine, in which has been in operation since 2012 (Crédit Agricole 2016)

Secondly, further research on the case of Chinese banks and green bond issuance is needed. Research within this scope could explore possible correlations between the value and volume of Chinese green bond issuances and the degree of incorporation of green growth in national Chinese strategies. Such a correlation could be present, due to the high level of state involvement and high level of coordination of public actors in the private sphere in China. A further suggestion is to descriptively explore, at a deeper level, climate change risk management strategies among Chinese banks to uncover potential divergences and convergences between banks and if they aim to use the green bond proceeds to similar or different projects. Such a research project could potentially have the ability to map Chinese green financial activities in detail and detect the stage of the green economic transition.

Thirdly, considering the acuteness and threat in terms of e.g. rising water level and increased natural disasters (IPCC 2018), one potential research angle may be to examine possible correlations between the strategic incorporation of climate change risk management in public development banks, grouped by various risk zones and the height of the threat posed by climate change. Such a research project could discover whether a possible relationship between banks located in high-risk zones (and under greater threat) portray strategic responsiveness to said risk.

REFERENCES

ABN-AMRO. 2014. *Annual Report 2014.* Annual report, Amsterdam: ABN-AMRO.

ABN-AMRO. 2015. *Annual Report 2015.* Annual report, Amsterdam: ABN-AMRO.

ABN-AMRO. 2016. *Annual Report 2016.* Annual Report, Amsterdam: ABN-AMRO.

ABN-AMRO. 2017. *Annual Report 2017.* Annual report, Amsterdam: ABN-AMRO.

—. n.d. *Purpose & Strategy.* Accessed April 15, 2019. https://www.abnamro.com/en/about-abnamro/profile/who-we-are/purpose-and-strategy/index.html.

ABN-AMRO. n.d. "Sustainability Risk Policy."

African Development Bank . 2018. *AfCB Annual Report 2017.* Annual Report, Abidjan: African Development Bank .

African Development Bank . 2015. *AfDB Annual Report 2014.* Annual Report, Abidjan: African Development Bank.

African Development Bank. 2016. *AfDB Annual Report 2015.* Annual Report, Abidjan: African Development Bank.

African Development Bank. 2017. *AfDB Annual Report 2016.* Annual Report, Abidjan: African Development Bank.

African Development Bank. 2014. *Annual Report 2014.* Annual report, Abidjan: African Development Bank.

African Development Bank. 2015. *Annual report 2015.* Annual report, Abidjan: African Development Bank.

African Development Bank. 2016. *Annual Report 2016.* Annual report, Abidjan: African Development Bank.

African Development Bank. 2017. *Annual Report 2017.* Annual report, Abidjan: African Development Bank.

African Development Bank. 2012. "At the Center of Africa's Transformation: Strategy for 2012-2022." 10 year strategy.

African Development Bank. 2012. *Briefing Notes for AfDB's Long-Term Strategy Briefing Note 8: Green Growth: Perspectives for Africa and the AfDB in the 21st Century.* Briefing note, African Development Bank.

Agresti, Alan, and Christine Franklin. 2013. *Statistics: The Art and Science of Learning from Data.* Pearson.

Amundi. 2018. *IFC and Amundi successfully close world's largest green bond fund.* March 16. Accessed May 18, 2019. https://www.amundi.lu/professional/Local-Content/News/IFC-and-Amundi-successfully-close-world-s-largest-green-bond-fund.

Armstrong-Taylor, Paul. 2016. *Debt and Distortion: Risks and Reforms in the Chinese Financial System.* London: Palgrave Macmillan.

Asian Development Bank. 2015. *2014 Annual Report.* Annual Report, Mandaluyong: Asian Development Bank.

Asian Development Bank. 2015. *2014 Financial Report.* Annual Report, Mandaluyong: Asian Development Bank.

Asian Development Bank. 2016. *2015 Annual Report.* Annual Report, Mandaluyong: Asian Development Bank.

Asian Development Bank. 2016. *2015 Financial Report.* Annual Report, Mandaluyong: Asian Development Bank.

Asian Development Bank. 2017. *2016 Annual Report.* Annual Report, Mandaluyong: Asian Development Bank.

Asian Development Bank. 2017. *2016 Financial Report.* Annual Report, Mandaluyong: Asian Development Bank.

Asian Development Bank. 2018. *2017 Annual Report.* Annual Report, Mandaluyong: Asian Development Bank.

Asian Development Bank. 2018. *2017 Financial Report.* Annual Report, Mandaluyong: Asian Development Bank.

—. n.d. *ADB's Focus on Environment.* Accessed April 17, 2019. https://www.adb.org/themes/environment/main.

—. n.d. *Our Work.* Accessed April 18, 2019. https://www.adb.org/about/our-work.

Bachelet, Maria Jua, Leonardo Becchetti, and Stefano Manfredonia. 2019. *The green bonds premium puzzle: the role of issuer characteristics and third-party verificatin.* Journal article, Sustainability.

Baldwin, Claudia, Graham Marshall, Helen Ross, Jim Cavaye, Janet Stephenson , Lyn Carter, Claire Freeman, Allan Curtis, and Geoff Syme. 2019. "Hybrid Neoliberalism: Implications for Sustainable Development." *Society & Natural Resources, 32:5*, 566-587.

Baldwin, Claudia, Graham Marshall, Helen Ross, Jim Cavaye, Janet Stephenson, Lyn Carter, Claire Freeman, Allan Curtis, and Geoff Syme. 2019. "Hybrid Neoliberalism: Implications for Sustainable Development." *Society & Natural Resources*, March 5: 566-587.

Bank of America . 2017. *Annual Report 2017.* Annual report, Charlotte: Bank of America.

Bank of America. 2014. *Annual Report 2014.* Annual report, Charlotte: Bank of America.

Bank of America. 2015. *Annual Report 2015.* Annual Report, Charlotte: Bank of America.

Bank of America. 2016. *Annual Report 2016.* Bank of America, Charlotte: Bank of America.

—. n.d. *Our commitment to environmental sustainability.* Accessed April 16, 2019. https://about.bankofamerica.com/en-us/what-guides-us/environmental-sustainability-governance-and-policies.html.

—. n.d. *Who we are.* Accessed April 16, 2019. https://about.bankofamerica.com/en-us/who-we-are/our-company.html#fbid=p8qRkXkCNJT.

Bank of China. n.d. *Bank of China Overview.* Accessed April 20, 2019. http://www.boc.cn/en/aboutboc/ab1/200809/t20080901_1601737.html.

Bank of China Limited. 2015. *2014 Annual Report .* Annual Report, Beijing: Bank of China Limited.

Bank of China Limited. 2016. *2015 Annual Report.* Annual Report, Beijing: Bank of China Limited.

Bank of China Limited. 2017. *2016 Annual Report.* Annnual Report, Beijing: Bank of China Limited.

Bank of China Limited. 2018. *2017 Annual Report .* Annual Report, Beijing: Bank of China Limited.

Bank of China. 2018. *Message from the Chairman in Corporate Social Responsibility Report Bank of China Limited 2018.* Corporate Social Responsibility Report, Beijing: Bank of China .

Bank of Communications . 2015. *2014 Annual Report.* Annual Report, Shanghai: Bank of Communications.

Bank of Communications. 2016. *2015 Annual Report .* Annual Report, Shanghai: Bank of Communications.

Bank of Communications. 2015. *2015 Interim Report.* Annual Report, Shanghai: Bank of Communications.

Bank of Communications. 2017. *2016 Annual Report .* Annual Report, Shanghai: Bank of Communications.

Bank of Communications. 2018. *2017 Annual Report.* Annual Report, Shanghai: Bank of Communications.

—. n.d. *About the Bank.* Accessed April 19, 2019. http://www.bankcomm.com/BankCommSite/shtml/zonghang/en/3182/3204/list.shtml?channelId=3204.

Bank of England. n.d. *Climate change: what are the risks to financial stability?* Accessed May 14, 2019. https://www.bankofengland.co.uk/knowledgebank/climate-change-what-are-the-risks-to-financial-stability.

Barclays PLC. 2014. *Annual Report 2014.* Annual report, London: Barclays PLC.

Barclays PLC. 2015. *Annual Report 2015.* Annual report, London: Barclays PLC.

Barclays PLC. 2016. *Annual Report 2016.* Annual report, London: Barclays PLC.

Barclays PLC. 2017. *Annual Report 2017.* Annual report, London: Barclays PLC.

Barclays PLC. 2019. "Barclays Energy and Climate Change Statement."

Barclays PLC. 2017. "Positioned for growth, sharing and success." Strategic Report.

Berensmann, Kathrin. 2017. *Upscaling Green Bond Markets: The Need for Harmonised Green Bond Standards .* Briefing Paper, German Development Institute (DIE).

Berensmann, Kathrin, Florence Dafe, and Nannette Lindenberg. 2018. "Demystifying green bonds." In *Research handbook of investing in the triple bottom line: finance, society and the environment*, by Sabri Boubaker, Douglas Cumming and Duc Khuong Nhuyen, 333-351. Northampton, MA: Edward Elgar Publishing Inc. .

Bhagwati, Jagdish. 1998. "The Capital Myth: The Difference between Trade in Widgets and Dollars." *Foreign Affairs, Vol. 77, No 3*, May-June: 7-12.

BNP Paribas. 2017. "2017 Report on Activity and Corporate Responsibility."

BNP Paribas. 2014. *Annual Report 2014.* Annual report, Paris: BNP Paribas.

BNP Paribas. 2015. *Annual Report 2015.* Annual report, Paris: BNP Paribas.

BNP Paribas. 2016. *Annual Report 2016.* Annual report, Paris: BNP Paribas.

BNP Paribas. 2017. *Annual Report 2017.* Annual report, Paris: BNP Paribas.

BNP Paribas. 2017. "BNP Paribas 2017-2020 Business Development Plan."

Broccardo, Eleonora, and Maria Mazzuca. 2018. "An alternative way to think of finance: The case of innovative, sustainable financial instruments." In *Research handbook of investing in the triple bottom line: finance, society and the environment*, by Sabri Boubaker, Douglas Cumming and Duc Khuong Nguyen, 185-211. Northampton, MA: Edward Elgar Publishing Inc.

Bryman, Alan. 2012. *Social Research Methods.* Vol. 4th Edition. Oxford: Oxford University Press.

Carney, Mark. 2019. *A New Horizon.* SUERF Policy Note, Issue No 65.

Carney, Mark. 2019. *Speech given by Mark Carney at the European Commission conference on "A global approach to sustainable finance"* (March 21).

Carney, Mark, Francois Villeroy de Galhau, and Frank Elderson. 2019. "The financial sector must be at the heart of tackling climate change." *The Guardian*, April 17.

Castro, Lavinia Barros de. 2018. "Financial Regulation and Risk Management in Development Banks." In *The Future of National Development Banks*, by Stephany Griffith-Jones and José Antonio Ocampo, 231-255. Oxford: Oxford University Press.

Cerny, Philip G. 1997. "Paradoxes of the Competition State: the Dynamics of Political Globalization." *Government and opposition,*, April: 251-274.

Chandrasekhar, C. P. 2016. *Rethinking Development Strategies After the Financial Crisis: Volume II: Country Studies and International Comparisons.* Special Report, Vienna: UNCTD.

Chin, Gregory T., and Kevin P. Gallagher. 2019. "Coordinated Credit Spaces: The Globalization of ChineseDevelopment Finance." *Development and Change 50 (1)*, January 13: 245-274.

CICERO. 2018. *'Second Opinion' on The Republic of Indonesia's Green Bond and Green Sukuk Framework.* CICERO.

Climate Bonds Initiative. 2016. *CBI Green Bond Database Methodology* . Green Bond Methodology , London: Climate Bonds Inititative.

Crédit Agricole. 2014. *Annual Report 2014.* Annual report, Montrouge: Crédit Agricole.

Crédit Agricole. 2015. *Annual Report 2015.* Annual report, Montrouge: Crédit Agricole.

Crédit Agricole. 2016. *Annual Report 2016.* Annual report, Montrouge: Crédit Agricole.

Crédit Agricole. 2017. *Annual Report 2017.* Annual report, Montrouge: Crédit Agricole.

Crédit Agricole. 2016. "Green Notes Framework."

—. n.d. *Our profile.* Accessed May 1, 2019. https://www.ca-cib.com/about-us/our-profile.

—. n.d. *Our Sustainable Financing Policy.* Accessed May 1, 2019. https://www.ca-cib.com/about-us/committed-and-responsible/our-sustainable-financing-policy.

Cœuré, Benoît. 2018. "Benoît Cœuré: Monetary policy and climate change." *Scaling up Green Finance: The Role of Central Banks.* Basel: Bank of International Settlements. 1-9.

Desjardins, Jeff. 2017. *All of the World's Money and Markets in One Visualization.* The Money Project.

DNB. 2014. *Annual Report 2014.* Annual report, Oslo: https://www.ir.dnb.no/about-dnb/corporate-responsibility.

DNB. 2015. *Annual Report 2015.* Annual report, Oslo: DNB.

DNB. 2016. *Annual Report 2016.* Annual report, Oslo: DNB.

DNB. 2017. *Annual Report 2017.* Annual report, Oslo: DNB.

—. n.d. *Corporate Responsibility.* Accessed May 1, 2019. https://www.ir.dnb.no/about-dnb/corporate-responsibility.

—. n.d. *Strategy and Targets.* Accessed May 1, 2019. https://www.ir.dnb.no/about-dnb/strategy-and-targets.

Dougherty, Carter. 2007. "German bank becomes first EU victim of U.S. subprime mortgage woes." *The New York Times*, July 30.

Ehlers, Torsten, and Frank Packer. 2017. *Green Bond FInance and Certification.* BIS Quarterly Review September 2017.

EU Technical Expert Group On Sustainable Finance. 2019. "Report of the Technical Expert Group (TEG) subgroup on Green Bond Standard Proposal for an EU Green Bond Standard."

European Bank for Reconstruction and Development. 2015. *Annual Review 2014.* Annual Report, London: European Bank for Reconstruction and Development.

European Bank for Reconstruction and Development. 2016. *Annual Review 2015.* Annual Report, London: European Bank for Reconstruction and Development.

European Bank for Reconstruction and Development. 2017. *Annual Review 2016.* Annual Report, London: European Bank for Reconstruction and Development.

European Bank for Reconstruction and Development. 2018. *Annual Review 2017.* Annual Report, London: European Bank for Reconstruction and Development.

—. n.d. *Environmental and social sustainability.* Accessed April 16, 2019. https://www.ebrd.com/who-we-are/our-values/environmental-and-social-sustainability.html.

European Bank for Reconstruction and Development. 2015. *Financial Report 2014.* Annual Report, London: European Bank for Reconstruction and Development.

European Bank for Reconstruction and Development. 2016. *Financial Report 2015.* Annual Report, London: European Bank for Reconstruction and Development.

European Bank for Reconstruction and Development. 2017. *Financial Report 2016.* Annual Report, London: European Bank for Reconstruction and Development.

European Bank for Reconstruction and Development. 2018. *Financial Report 2017.* Annual Report, London: European Bank for Reconstruction and Development.

—. n.d. *Our Values.* Accessed April 16, 2019. https://www.ebrd.com/our-values.html.

European Investment Bank. 2007. *Activity and Corporate Responsibility Report (Volume 1).* Annual Report, Luxembourg: European Investment Bank.

—. n.d. *EIB at a glance.* Accessed April 15, 2019. https://www.eib.org/en/about/index.htm.

European Investment Bank. 2015. *Financial Report 2014.* Annual Report, Luxembourg: European Investment Bank.

European Investment Bank. 2016. *Financial Report 2015.* Annual Report, Luxembourg: European Investment Bank.

European Investment Bank. 2017. *Financial Report 2016.* Annual Report, Luxembourg: European Investment Bank.

European Investment Bank. 2018. *Financial Report 2017.* Annual Report, Luxembourg: European Investment Bank.

—. n.d. *Sustainable throughout.* Accessed April 15, 2019. https://www.eib.org/en/about/cr/index.htm.

Finansinspektionen. 2016. *How can the financial sector contribute to sustainable development?* Stockholm: Finansinspektionen.

Fitch Ratings. 2019. *ESG Relevance Scores for Corporates* . January 7. Accessed May 13, 2019. https://www.fitchratings.com/site/re/10058480.

Frandon-Martinez, Camille. 2018. "Climate Bonds Initiative." *France: Country briefing April 2018.* April. Använd den 2 March 2019. https://www.climatebonds.net/files/reports/france_report_final_20.04.18_0.pdf.

Friedman, Lisa. 2019. "What Is the Green New Deal? A Climate Proposal, Explained." *The New York Times.* February 21. Accessed 13.05.2019. https://www.nytimes.com/2019/02/21/climate/green-new-deal-questions-answers.html.

Geall, Sam. 2016. "China's 5-year plan to meet environmental goals." *World Economic Forum.* June 3. Accessed May 16, 2019. https://www.weforum.org/agenda/2016/06/chinas-5-year-plan-to-meet-environmental-goals.

Griffith-Jones, Stephany, José Antonio Ocampo, Filipe Rezende, Alfredo Schclarek, and Michael Brei. 2018. "The Future of National Development Banks." In *The Future of National Development Banks* , by Stephany Griffith-Jones and José Antonio Ocampo, 1-43. Oxford, UK: Oxford University Press.

Guterres, António. 2018. *Speech given by UN Secretary-General António Guterres at UN Headquarters September 10th 2018* (September 10).

HSBC. 2014. *Annual Report 2014.* Annual report, London: HSBC.

HSBC. 2015. *Annual Report 2015.* Annual report, London: HSBC.

HSBC. 2016. *Annual Report 2016.* Annual report, London: HSBC.

HSBC. 2017. *Annual Report 2017.* Annual report, London: HSBC.

—. n.d. *Building a sustainable future.* Accessed May 1, 2019. https://www.hsbc.com/our-approach/building-a-sustainable-future.

—. n.d. *Our strategy.* Accessed May 1, 2019. https://www.hsbc.com/our-approach/our-strategy.

ICMA. 2018. *Green Bond Principles - Voluntary Process Guidelines for Issuing Green Bonds.* ICMA.

Industrial and Commercial Bank of China. 2014. *Annual Report 2014.* Annual report, Beijing: Industrial and Commercial Bank of China.

Industrial and Commercial Bank of China. 2015. *Annual Report 2015.* Annual report, Beijing: Industrial and Commercial Bank of China.

Industrial and Commercial Bank of China. 2016. *Annual Report 2016.* Annual report, Beijiing: Industrial and Commercial Bank of China.

Industrial and Commercial Bank of China. 2017. *Annual Report 2017.* Annual report, Beijing: Industrial and Commercial Bank of China.

—. n.d. *Corporate Strategy.* Accessed April 19, 2019. http://www.icbc-ltd.com/ICBCLtd/About%20Us/Corporate%20Strategy/.

—. 2017. *ICBC Hosts the International Symposium on Environmental Risk Analysis.* September 11. Accessed April 20, 2019. http://www.icbc.com.cn/icbc/en/newsupdates/icbc%20news/ICBCHoststheInternationalSymposiumonEnvironmentalRiskAnalysis.htm.

Industrial and Commercial Bank of China Limited. 2015. *Annual Report 2014.* Annual Report, Xicheng: Industrial and Commercial Bank of China Limited.

Industrial and Commercial Bank of China Limited. 2016. *Annual Report 2015.* Annual Report, Xicheng: Industrial and Commercial Bank of China Limited.

Industrial and Commercial Bank of China Limited. 2017. *Annual Report 2016.* Annual Report, Xicheng: Industrial and Commercial Bank of China Limited.

Industrial and Commercial Bank of China Limited. 2018. *Annual Report 2017.* Annual Report, Xicheng: Industrial and Commercial Bank of China Limited.

—. n.d. *Corporate Strategy.* Accessed April 15, 2019. http://www.icbc-ltd.com/icbcltd/About%20Us/Corporate%20Strategy/.

Industrial and Commercial Bank of China Limited. 2017. "CSR Report 2017."

Industrial Bank. n.d. *About us.* Accessed May 1, 2019. https://www.cib.com.cn/en/aboutCIB/investor/profile/index.html.

Industrial Bank. 2014. *Annual Report 2014.* Annual report, Fuzhou: Industrial Bank.

Industrial Bank. 2015. *Annual Report 2015.* Annual report, Fuzhou: Industrial Bank.

Industrial Bank. 2016. *Annual Report 2016.* Annual report, Fuzhou: Industrial Bank.

Industrial Bank. 2017. *Annual Report 2017.* Annual report , Fuzhou: Industrial Bank.

Industrial Bank Co. Limited. 2015. *2014 Annual Report.* Annual Report , Fuzhou: Industrial Bank Co. Limited.

Industrial Bank Co. Limited. 2016. *2015 Annual Report.* Annual Report, Fuzhou: Industrial Bank Co. Limited.

Industrial Bank Co. Limited. 2017. *2016 Annual Report.* Annual Report, Fuzhou: Industrial Bank Co. Limited.

Industrial Bank Co. Limited. 2018. *2017 Annual Report.* Annual Report, Fuzhou: Industrial Bank Co. Limited.

Industrial Bank. n.d. *Environmental and Social policies of IB.* Accessed May 1, 2019. https://www.cib.com.cn/en/aboutCIB/social/policy/.

ING. 2014. *Annual Report 2014.* Annual report, Amsterdam: ING.

ING. 2015. *Annual Report 2015.* Annual report, Amsterdam: ING.

ING. 2016. *Annual Report 2016.* Annual report, Amsterdam: ING.

ING. 2017. *Annual Report 2017.* Annual report, Amsterdam: ING.

—. n.d. *ING at a glance.* Accessed May 1, 2019. https://www.ing.com/About-us/Profile/ING-at-a-glance.htm.

—. n.d. *ING's approach to climate action.* Accessed May 1, 2019. https://www.ing.com/Sustainability/Our-direction/INGs-approach-to-climate-action.htm.

Intergovernmental Panel on Climate Change. 2018. *Global Warming of 1.5 C.* IPCC Special Report, Genève: Intergovernmental Panel on Climate Change.

International Capital Market Association. 2018. *Green Bond Principles: Voluntary Process Guidelines for Issuing Green Bonds June 2018.* Guidelines for Issuing Green Bonds, Zürich: International Capital Market Association.

Kregel, J.A. 2015. *Minsky's Irreconcilable Masters Governing Financial Regulation and Financial Structure.* Discussion Paper No. 4, The Multidisciplinary Institute for Development and Strategy (MINDS).

Krippner, Greta R. 2005. "The financialization of the American economy." *Socio-Economic Review* 3: 173-208.

Kundzewicz, Zbigniew W., James Painter, and Witold J. Kundzewicz. 2019. "Climate Change in the Media: Poland's Exceptionalism." *Environmetnal Communication*, April 3: 366-380.

Liaw, K. Thomas. 2018. "Asset allocation and the green bond market." i *Research handbook of investing in the triple bottom line: finance, society and the environment*, av Sabri Boubaker, Douglas Cumming och Duc Khuong Nguyen, 314-332. Northampton, MA: Edward Elgar Publishing Inc. .

Lijphart, Arned. 1975. "The Comparable-Case Strategy in Comparative Research." *Comparative Political Studies* 8 (2): 158-177.

Lombard, Matthew, Jennifer Snyder-Duch, and Cheryl Campanella Bracken. 2006. "Content Analysis in Mass Communication: Assessment and Reporting of Intercoder Reliability ." *Human Communication Research, Volume 28, Issue 4*, January 10: 587-604.

Luna-Martinez, J. de, and Vicente C. 2012. *Global Survey of Development Banks.* World Bank Policy Research Working Paper No. 5969, Washington DC: The World Bank .

Mason, Jennifer. 1996. *Qualitative Researching.* SAGE Publications.

Mazzucato, Mariana. 2015. *The entrepreneurial etate: debunking public vs. private myths .* New York : PublicAffairs.

McKinsey. 2016. *Bridging Glovbal Infrastructure Gaps.* Shanghai, Abu Dhabi, Zurich, Stockholm, Toronto: McKinsey Global Institute.

Mitsubishi UFJ Financial Group. 2014. *Annual Report 2014.* Annual report, Tokyo: Mitsubishi UFJ Financial Group.

Mitsubishi UFJ Financial Group. 2015. *Annual Report 2015.* Annual report, Tokyo: Mitsubishi UFJ Financial Group.

Mitsubishi UFJ Financial Group. 2016. *Annual Report 2016.* Annual report, Tokyo: Mitsubishi UFJ Financial Group.

Mitsubishi UFJ Financial Group. 2017. *Annual Report 2017.* Annual report, Tokyo: Mitsubishi UFJ Financial Group.

—. n.d. *Policies and Guidelines.* Accessed May 1, 2019. https://www.mufg.jp/english/csr/policy/index.html.

—. n.d. *Strategy .* Accessed May 1, 2019. https://www.mufg.jp/english/profile/strategy/index.html.

Moody's. 2016. "Environmental Risks - Sovereigns: How Moody's Assesses The Physical Effects Of Climate Change On Sovereign Issuers ."

Moses, Jonathon W, and Torbjørn L. Knutsen. 2017. *Ways of Knowing: Competing Methodologies in Social and Political Research.* London: Palgrave Macmillan.

Network for Greening the Financial System. 2019. *A call for action: Climate change as a source of financial risk.* Comprehensive report on , Network for Greening the Financial System.

Nordic Investment Bank. n.d. *About.* Accessed April 18, 2019. https://www.nib.int/who_we_are/about.

Nordic Investment Bank. 2015. *Annual Report 2014.* Annual Report, Helsinki: Nordic Investment Bank.

Nordic Investment Bank. 2016. *Annual Report 2015.* Annual Report, Helsinki: Nordic Investment Bank.

Nordic Investment Bank. 2017. *Annual Report 2016.* Annual Report, Helsinki: Nordic Investment Bank.

Nordic Investment Bank. 2018. *Annual Report 2017.* Annual Report, Helsinki: Nordic Investment Bank.

—. n.d. *Corporate responsibiltity.* Accessed April 18, 2019. https://www.nib.int/who_we_are/our_impact/corporate_responsibility.

Nordic Investment Bank. 2015. *Financial Report 2014.* Annual Report, Helsinki: Nordic Investment Bank.

Nordic Investment Bank. 2016. *Financial Report 2015.* Annual Report, Helsinki: Nordic Investment Bank.

Nordic Investment Bank. 2017. *Financial Report 2016.* Annual Report, Helsinki: Nordic Investment Bank.

Nordic Investment Bank. 2018. *Financial Report 2017.* Annual Report , Helsinki: Nordic Investment Bank.

NRW.Bank. 2014. *Annual Report 2014.* Annual report, Düsseldorf: NRW.Bank.

NRW.Bank. 2015. *Annual Report 2015.* Annual report, Düsseldorf: NRW.Bank.

NRW.Bank. 2016. *Annual Report 2016.* Annual report, Düsseldorf: NRW.Bank.

NRW.Bank. 2017. *Annual Report 2017.* Annual report, Düsseldorf: NRW.Bank.

NRW.Bank. 2015. *Financial Report 2014.* Annual Report, Düsseldorf: NRW.Bank.

NRW.Bank. 2016. *Financial Report 2015.* Annual Report, Düsseldorf: NRW.Bank.

NRW.Bank. 2017. *Financial Report 2016.* Annual Report, Düsseldorf: NRW.Bank.

NRW.Bank. 2018. *Financial Report 2017.* Annual Report, Düsseldorf: NRW.Bank.

—. n.d. *Sustainability.* Accessed May 1, 2019. https://www.nrwbank.com/en/about-us/sustainability.html.

—. n.d. *Tasks and promotional fields.* Accessed May 1, 2019. https://www.nrwbank.com/en/about-us/tasks_and_fields_of_promotion.html.

Palley, Thomas I. 2004. "From Keynesianism to Neoliberalism: Shifting Paradigms in Economics." In *Neoliberalism - A Critical Reader*, by Deborah Johnston and Alfredo Saad-Filho, 20-29. Pluto Press.

Patzdorf, Louise. 2018. "Bonds and Climate Change State of the Market 2018 report: Total USD1.45tn in green and climate-aligned bonds – Launch at Climate Week NYC." *Climate Bonds Initiative.* September 24. Accessed March 6, 2019. https://www.climatebonds.net/2018/09/bonds-and-climate-change-state-market-2018-report-total-usd145tn-green-and-climate-aligned-bonds.

Randerson, James. 2010. "Cameron: I want coalition to be the 'greenest government ever'." *The Guardian.* May 14. Accessed May 15, 2019. https://www.theguardian.com/environment/2010/may/14/cameron-wants-greenest-government-ever.

Rezende, Felipe Carvalho de. 2018. "Financial Sustainability and Infrastructure Finance." In *The Future of National Development Banks*, by Stephany Griffith-Jones and José Antonio Ocampo, 302-335. Oxford: Oxford University Press.

S&P Global . n.d. *Our Approach to Assessing ESG in Ratings* . Accessed May 13, 2019. https://www.spratings.com/en_US/products/-/product-detail/our-approach-to-esg-in-ratings.

Shishlov, Igor, Romain Morel, and Ian Cochran. 2016. *Beyond transparency: unlocking the full potential of green bonds.* Working paper, Institute for climate economics.

Société Générale. 2014. *Annual Report 2014.* Annual report, Paris: Société Générale.

Société Générale. 2015. *Annual Report 2015.* Annual report, Paris: Société Générale.

Société Générale. 2016. *Annual Report 2016.* Annual report, Paris: Société Générale.

Société Générale. 2017. *Annual Report 2017.* Annual report , Paris: Société Générale.

Societe Generale. n.d. *Climate commitments.* Accessed May 1, 2019. https://www.societegenerale.com/en/measuring-our-performance/csr/environment.

—. n.d. *Identity & strategy.* Accessed May 1, 2019. https://www.societegenerale.com/en/about-us/identity-and-strategy.

Stern, Nicholas. 2006. *Stern Review on the Economics of Climate Change.*

The Task Force on Climate-related Financial Disclosure (TCDF). n.d. *About the Task Force.* Accessed May 13, 2019. https://www.fsb-tcfd.org/about/.

The World Bank . n.d. *Environmental and Social Policies.* Använd den 20 April 2019. http://www.worldbank.org/en/projects-operations/environmental-and-social-policies.

The World Bank. 2015. *Annual Report 2014.* Annual Report, Washington DC: World Bank.

The World Bank. 2016. *Annual Report 2015.* Annual Report, Washington DC: World Bank.

The World Bank. 2017. *Annual Report 2016.* Annual Report, Washington DC: World Bank.

The World Bank. 2018. *Annual Report 2017.* Annual Report, Washington DC: World Bank.

—. n.d. *GDP (current US$).* Accessed May 16, 2019. https://data.worldbank.org/indicator/NY.GDP.MKTP.CD.

—. n.d. *Who We Are.* Accessed April 19, 2019. https://www.worldbank.org/en/who-we-are.

—. 2008. "World Bank and SEB partner with Scandinavian Institutional Investors to Finance "Green" Projects." *The World Bank.* November 6. Accessed March 3, 2019. http://www.worldbank.org/en/news/press-release/2008/11/06/world-bank-and-seb-partner-with-scandinavian-institutional-investors-to-finance-green-projects.

Thunberg, Greta. 2018. *Addressing the COP24 in Katowice, December 2018* (December).

Thurbon, Elizabeth. 2016. *Developmental Mindset: The Revival of Financial Activism in South Korea.* Cornell University Press.

Whiley, Andrew. 2017. *An oil & gas bond we knew would come eventually: Repsol: Good on GBPs, not so sure on green credentials.* Climate Bonds Initiative, May 23.

Wray, L. Randall. 2009. *An Alternative View of Finance, Saving, Deficits, and Liquidity.* Working Paper No. 580, Annadale-on-Hudson, NY: The Levy Economics Institute.

WWF. 2016. "Green bonds must keep the green promise!"

Wynne, Trilbe. 2018. *Passive investing continues to captivate global audience* . Pensions & Investments.

Appendix Coding Scheme: Data Analysis

Private Banks		
Coding Words	**Sum of Total Mentions**	**Sum of Percentage Share Total**
Environment	1996	33.831%
Sustainable growth, Sustainable economy	1914	32.441%
(De)Carbon	628	10.644%
Green finance, economy, bond, project	624	10.576%
Climate change	348	5.898%
Climate risk, Environmental risk	260	4.407%
Adapation	44	0.746%
Mitigation	38	0.644%
Due diligence	34	0.576%
Resilience	14	0.237%
Total	**5900**	**100.000%**

Public Banks		
Coding Words	**Sum of Total Mentions**	**Sum of Percentage Share Total**
Environment - Environmental	1477	30.316%
Sustainable - Sustainability	1142	23.440%
Green	873	17.919%
Climate Change	545	11.186%
(De)Carbon	282	5.788%
Resilient - Resilience	156	3.202%
Risk	135	2.771%
Mitigate	119	2.443%
Adapt	112	2.299%
Due Diligence	29	0.595%
Greening	2	0.041%
Total	**4872**	**100.000%**

Private Banks (General)			
Coding Words	**Sum of Total Mentions**	**Sum of Percentage Share Total**	**Percentage Share per Category**
Environment	1996	33.831%	36.225%
Sustainable growth, Sustainable economy	1914	32.441%	34.737%
(De)Carbon	628	10.644%	11.397%
Green finance, economy, bond, project	624	10.576%	11.325%
Climate change	348	5.898%	6.316%
Totalsumma	**5510**	**93.390%**	**100.000%**

Private Banks (Strategy & Risk)			
Coding Words	**Sum of Total Mentions**	**Sum of Percentage Share Total**	**Percentage Share of Strategy & Risk Category**
Climate risk, Environmental risk	260	4.407%	66.667%
Adapation	44	0.746%	11.282%
Mitigation	38	0.644%	9.744%
Due diligence	34	0.576%	8.718%
Resilience	14	0.237%	3.590%
Totalsumma	**390**	**6.610%**	**100.000%**

Public Banks (General)			
Coding Words	**Sum of Total Mentions**	**Sum of Percentage Share Total**	**Percentage Share of General Category**
Environment - Environmental	1477	30.316%	34.198%
Sustainable - Sustainability	1142	23.440%	26.441%
Green	873	17.919%	20.213%
Climate Change	545	11.186%	12.619%
(De)Carbon	282	5.788%	6.529%
Totalsumma	**4319**	**88.649%**	**100.000%**

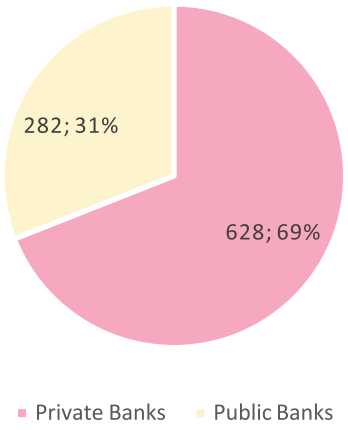
Public Banks (Strategy & Risk)			
Coding Words	**Sum of Total Mentions**	**Sum of Percentage Share Total**	**Percentage Share of Strategy & Risk Category**
Resilient - Resilience	156	3.202%	28.210%
Risk	135	2.771%	24.412%
Mitigate	119	2.443%	21.519%
Adapt	112	2.299%	20.253%
Due Diligence	29	0.595%	5.244%
Greening	2	0.041%	0.362%
Totalsumma	**553**	**11.351%**	**100.000%**

Public Banks	Percentage Share S&R	
ADB	25.445%	Best performing
EIB	24.242%	
WB	22.951%	
AFDB	16.245%	
EBRD	13.776%	
NIB	10.815%	
ICBC	6.670%	
NRW	2.484%	
BC	1.333%	
BoC	0.450%	Worst performing

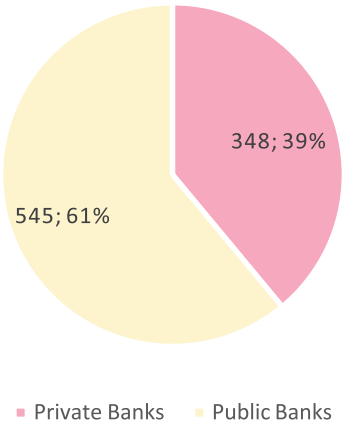
Private Banks	Percentage Share S&R	
DNB	12.766%	Best performing
MUFG	10.375%	
BNP Paribas	9.807%	
CA	8.294%	
SG	5.865%	
HSBC	5.729%	
ING	5.631%	
ANG-AMRO	1.499%	
BAML	0.901%	
IB	0.692%	Worst performing

Appendix 2.6. Coding Scheme: Data Analysis of Coding Words

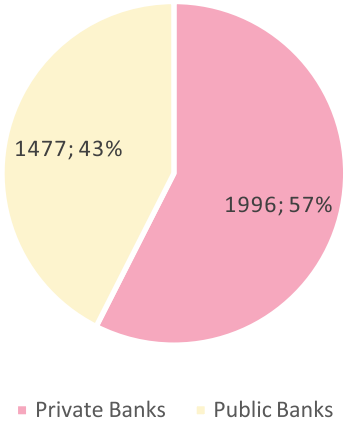
(DE)CARBON



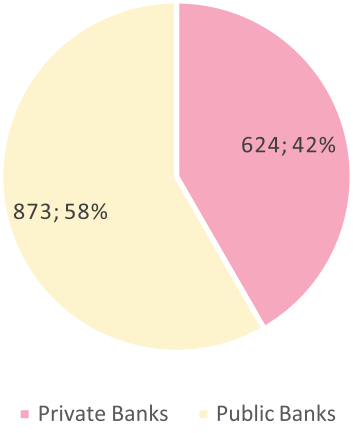
CLIMATE CHANGE



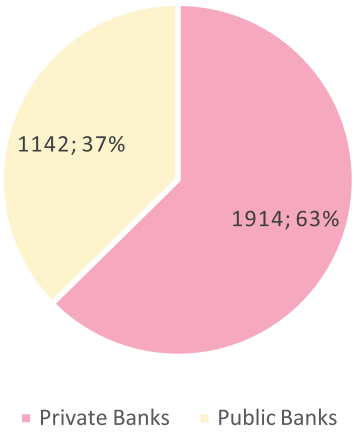
ENVIRONMENT AND ENVIRONMENTAL



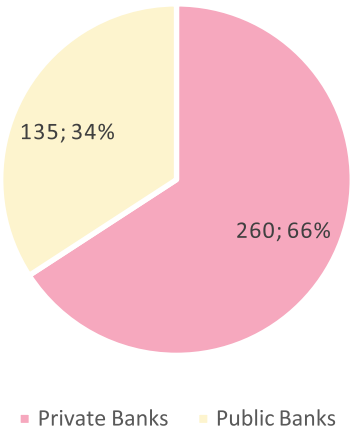
GREEN



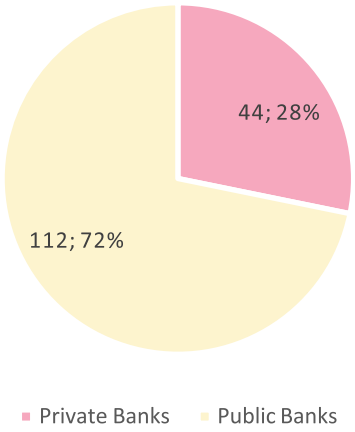
SUSTAINABLE AND SUSTAINABILITY



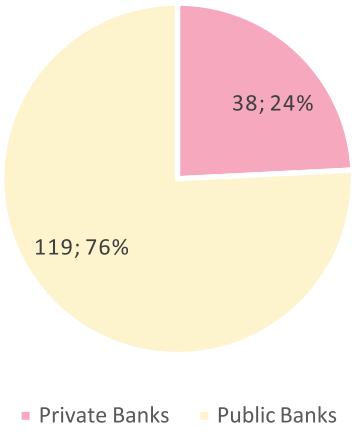
ENVIRONMENTAL AND CLIMATE RISK



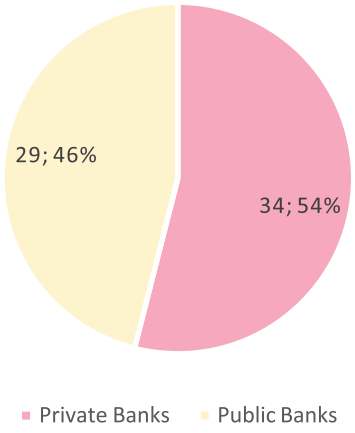
ADAPTION



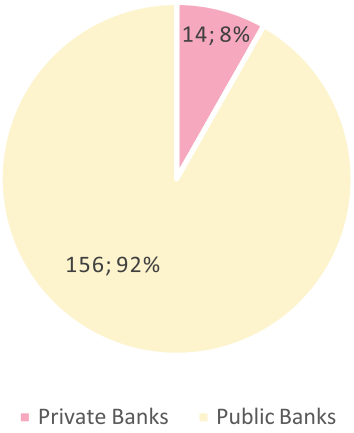
MITIGATION



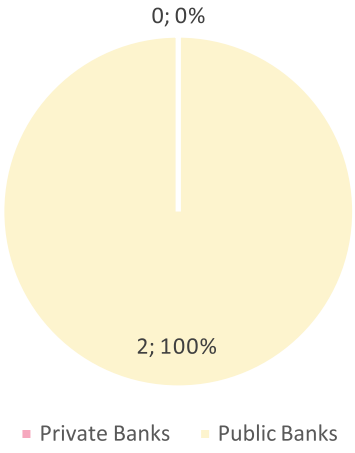
DUE DILIGENCE



RESILIENCE



GREENING



Appendix 2.7. Coding Scheme: Linear Regression – Strategy – All Banks

Regresion								
Multiple R		0.464						
R-squared		0.215						
Adjusted R-squared		0.169						
Standard errors		0.067						
Observations		19						
	fg	***SK***	***GK***	***F***	***Significance-F***			
Regresion	1	0.021	0.021	4.664	0.045			
Residuals	17	0.075	0.004					
Sum	18	0.096						
	Coefficents	***Standard error***	***t-Stat***	***P-value***	***Lower 95%***	***Upper 95%***	***Lower 95.0%***	***Upper 95.0%***
Intersection	0.061	0.019	3.253	0.005	0.022	0.101	0.0215	0.101
0.015859	2.308	1.069	2.16	0.045	0.053	4.563	0.0532	4.563

Appendix 2.8. Coding Scheme: Multiple Regression – Strategy – All Banks

Regresion								
Multiple R		0.5915						
R-squared		0.3498						
Adjusted R-squared		0.2686						
Standard errors		0.0624						
Observations		19						
	fg	***SK***	***GK***	***F***	***Significance-F***			
Regresion	2	0.0335	0.017	4.305	0.03			
Residuals	16	0.0623	0.004					
Sum	18	0.0959						
	Coefficents	***Standard error***	***t-Stat***	***P-value***	***Lower 95%***	***Upper 95%***	***Lower 95.0%***	***Upper 95.0%***
Intersection	0.1442	0.0489	2.951	0.009	0.04	0.25	0.04	0.25
1	-0.065	0.0359	-1.82	0.088	-0.14	0.01	-0.1	0.01

Appendix 2.9. Coding Scheme: Linear Regression – Strategy – Public Banks

Regresion								
Multiple R		0.1067						
R-squared		0.0114						
Adjusted R-squared		-0.236						
Standard errors		0.0929						
Observations		6						
	fg	*SK*	*GK*	*F*	*Significance-F*			
Regresion	1	0.0004	4E-04	0.046	0.841			
Residuals	4	0.0345	0.009					
Sum	5	0.0349						
	Coefficents	*Standard error*	*t-Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intersection	0.1695	0.0864	1.961	0.121	-0.07	0.4095	-0.0705	0.4095
0.0159	-0.604	2.8132	-0.21	0.841	-8.41	7.2072	-8.4143	7.2072

Appendix 2.10. Coding Scheme: Linear Regression – Strategy – Private Banks

Regresion								
Multiple R		0.106						
R-squared		0.011						
Adjusted R-squared		-0.13						
Standard errors		0.042						
Observations		9						
	fg	*SK*	*GK*	*F*	*Significance-F*			
Regresion	1	0.00014	1E-04	0.07907	0.7867			
Residuals	7	0.01244	0.002					
Sum	8	0.01258						
	Coefficents	*Standard error*	*t-Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intersection	0.063	0.02162	2.918	0.02242	0.012	0.114	0.012	0.114
0.014228	3.543	12.599	0.281	0.78669	-26.25	33.33	-26.25	33.33

Appendix 2.11. Coding Scheme: Linear Regression – Strategy – Private Banks less Chinese banks

Regresion								
Multiple R		0.121						
R-squared		0.015						
Adjusted R-squared		-0.149						
Standard errors		0.045						
Observations		8						
	fg	*SK*	*GK*	*F*	*Significance-F*			
Regresion	1	0.0002	0.0002	0.09	0.77453			
Residuals	6	0.0123	0.002					
Sum	7	0.0124						
	Coefficents	*Standard error*	*t-Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intersection	0.064	0.0234	2.7383	0.034	0.00681	0.1212	0.0068	0.12121
0.01423	4.082	13.621	0.2997	0.775	-29.2469	37.411	-29.25	37.4105

Appendix 2.12. Coding Guidelines

Climate change

- when coding IB, there were no results for «climate change» but two for «climate changes«. I coded the other documents for «climate changes» as well, and coded one entry from DNB.

Green:

- included green bond principles
- included «green bond framework«
- included green technologies (ie financing green technologies)
- removed products: PREMIUM GREEN TV 22 PREMIUM GREEN TV 26/07/22 PREMIUM

Adapt:

- removed «strengths allow us to continuously adapt to changing client needs»
- included «increasing demands on natural resources and brings the risks of global warming. Our clients are responding by adopting more sustainable business practices, and we are adapting our lending to support them»

Greening:

- No entries at all in private banks

Environmental/Environment Risk

- Uncoded ESG/ESE Risk
- Uncoded environmental and social risks

- Added «carbon risks«
- Uncoded sustainability risk
- Coded for the whole paragraph (in the custom option)

Sustainable

- Uncoded 'sustain'
- Uncoded 'SDG'
- Only coded 'sustainability' in the context of environment
- Uncoded any use of 'sustainable' in project, conference, or programme titles
- NRW: uses sustainability to explain economic performance - I think !

Environmental

- Uncoded 'Ministry of Environmental Protection'
- Uncoded award titles including 'environmental'
- NIB: Uncoded 'NIB Environmental Bond'
- NIB: Category is 'Energy & Environment' is coded
- NIB: 'Improving competitiveness and the environment' refers to a non-environmental context in many cases but not all
- NRW: 'Environmental figures were collected from…' was uncoded due to being a piece of information for referencing
- NRW (environment): promotion theme 'Environment/Climate/Energy' is coded

Due Diligence

- EBRD: Some reference entries need to be coded as 'custom 50 words' and not as broad
- EBRD: Include EBRD's mention of environmental due diligence in coding
- EIB: environmental aspects are a a part of the due diligence assessment

Resilience

- ADB: 'Disaster resilience' is included in the coding in the cases when it is combined with effects of climate change. In the case of disasters arising from earthquakes, no climate change effects are mentioned and they are therefore excluded. In case 'disaster resilience' arises as a general term, it is not included in the coding
- ADB: 'Resilient city' is included in the coding as it partly refers to the environmental development of the city
- BoC: Talks about the Chinese economy possessing 'potential, resilience, and strength with long-term sustainability and promise' but it is not coded in the context of environmental sustainability but instead one of the economy
- EBRD: 'resilience' in the context of resilient economies and investment climates are not coded

EBRD: 'economic resilience' is not coded when followed by 'addressing climate change' as the sentence points to resilience not being connected to climate change

- EBRD: case study of Poland as a descriptive title is included in the coding
- EBRD: 'flood resilience' is coded

Mitigation

- Mitigation for fossil fuels etc are coded as they signal a shift to a green economy
- ADB: 'disaster mitigation' is not coded in the occasions when climate change is not mentioned in conjunction with disaster
- ADB: 'mitigation' in the context of safeguarding policy is uncoded
- NIB: Mitigation related to environmental impacts have been included in coding

Adapt

- EBRD: included 'aimed at assisting clients as they adapt to a changing and more variable climate' since it was in the context of adapting to climate change
- NIB: included the first one in AR 17 in bullet point since it's in the text

Green

- Uncoded 'Green Climate Fund'
- Uncoded 'US Green Building Council'
- Uncoded 'Green Business Forum'
- Uncoded 'green tea'
- Uncoded 'Green Bond programme'
- Uncoded 'Best Financial Institution Green Bond in Asia'
- Coded 'Green Development concept'
- Uncoded 'MSCI Green Bond Index' (BC)
- Coded 'Green China Covered Bond'
- Coded 'Green Credit Policy'
- Uncoded 'Working Report on Green Bond'
- Uncoded 'Notice on Further Strengethening of the Green Credit Work'
- Coded 'Provide green life services'
- Coded 'Green economy transition' EBRD
- Uncoded 'Green cities framework' EBRD
- Uncoded 'Lending Green Bond purchases'
- Uncoded 'Executive Committee on Green Bond Principles' NIB
- Uncoded 'Green light' NIB
- Uncoded 'Green Office Logo' NIB

- Uncoded 'Green Dot*'
- Uncoded 'Green Growth Complex' AFDB
- Uncoded 'Green Growth Agenda'
- Coded 'Green Growth strategy'
- Coded 'Africa's green development bank'

Risk

- ADB: disaster risk
- NRW: coded 'sustainability-related risks'

Climate Change

- Uncoded 'Paris Agreement on Climate Change'
- Uncoded 'Climate Change Fund'

Appendix 2.13. Two group t-test: testing the difference in means between two groups in the same sample

Treatment 1	Diff (x-m)	Sq. Diff (X-M)^2
260	182	33124.00
44	-34	1156.00
38	-40	1600.00
34	-44	1936.00
14	-64	4096.00
	M: 78.00	SS: 41912.00
Treatment 2		
156	45.8	2097.64
135	24.8	615.04
119	8.8	77.44
112	1.80	3.24
29	-81.20	6593.44
	M: 110.20	SS: 9386.80
Treatment 1		
N_1: 5		
$df_1 = N - 1 = 5 - 1 = 4$		
M_1: 78		
SS_1: 41912		
$s^2_1 = SS_1/(N - 1) = 41912/(5-1) = 10478$		

Treatment 2
N_2: 5
$df_2 = N - 1 = 5 - 1 = 4$
M_2: 110.2
SS_2: 9386.8
$s^2_2 = SS_2/(N - 1) = 9386.8/(5-1) = 2346.7$
T-value Calculation
$s^2p = ((df_1/(df_1 + df_2)) * s^2_1) + ((df_2/(df_2 + df_2)) * s^2_2) = ((4/8) * 10478) + ((4/8) * 2346.7) = 6412.35$
$s^2M1 = s^2p/N_1 = 6412.35/5 = 1282.47$
$s^2M2 = s^2p/N_2 = 6412.35/5 = 1282.47$
$t = (M_1 - M_2)/\sqrt{(s^2M1 + s^2M2)} = -32.2/\sqrt{2564.94} = -0.64$
The *t*-value is -0.6358. The *p*-value is .542666. The result is *not* significant at $p < .05$.

Appendix 5: Inductive Coding Scheme

Appendix 5.1. Inductive Coding Scheme: African Development Bank

AFDB	
Inductive coding words	**2014**
Annual reports	**SDG**
	mitigation
	adaptation
	transtition into green economy
	green growth
	green growth agenda
	GHG
	resilience
	green bond
	low carbon investments
	SRI
	2015
	energy and climate change nexus
	carbon intensity of growth
	Paris agreement
	2 degrees
	sdg
	structural transformation

AFDB	
	clean technology
	bank plays catalytic role in financing
	climate finance
	leverage financing for green investments
	ghg
	2016
	green climate fund
	climate investment funds
	food security
	climate-proof
	climate risk
	2017
	climate resilience
	mainstreaming cliamte change and green growth initatives
	climate - informed projects
Bank mission	AFDB's Strategy for 2013-22
	environmentally sustainable growth
	green growth
	10 yr strategy focuses on green and inclusive growth
	esg risks
Environment/sustainability commitment	ESG issues rank high on agenda
	need for a strong approach to ESG integration in operation
	mainstreaming environmental sustainability in all AFDB operations
	championing climate-resilient and low-carbon development

Appendix 5.2. Inductive Coding Scheme: European Bank for Reconstruction and Development

European Bank for Reconstruction and Development	
Inductive coding words	**AR 2014**
Annual reports	'Limit climate change'
	'Natural resources'
	'Sustainable long-term growth'
	'Promote sustainable use of resources'
	'Climate change resilience'
	'Tackling climate change'

European Bank for Reconstruction and Development	
	'Boosting resource efficiency'
	'Sustainable energy resources'
	'Sustainable energy projects'
	'Environmental due diligence'
	FR 2014
	'Environmental policy'
	AR 2015
	'Transition into sustainable economies'
	'Green financing'
	'Sustainable energy'
	'Environmentally friendly services'
	'Sustainable resource project'
	'Green transport'
	'Sustainable energy financing'
	'Sustainable markets'
	'Increased volume of low-carbon investments'
	'Climate change adaptation investments'
	'Sustainable energy lending'
	'Support climate change adaptation'
	'Climate resilience'
	'Sustainable energy'
	'Environmental impacts'
	FR 2015
	'Environmental policy'
	AR 2016
	'Sustainable growth'
	'Transition to a green economy'
	'Become greener'
	'Build green economies'
	'Build resilient eocnomies'
	'Ensuring economic resilience'
	'Investment in sustainable energy'
	'Investments in resource and climate resilient projects'
	'Sustainable energy and resource credit'
	'Climate resilience project'
	'Combating climate change'
	'Low-carbon energy generation'
	'Green Economy Transition'

European Bank for Reconstruction and Development	
	'Environmental sustainability markets'
	'Climat-resilience projetcs'
	'Climate-change adaptation'
	'Increase climate resilience'
	AR 2017
	'Transition into sustainable economies'
	'Green financing'
	'Sustainable energy'
	'Environmentally friendly services'
	'Sustainable resource project'
	'Sustainable energy financing'
	'Sustainable markets'
	'Increased volume of low-carbon investments'
	'Climate change adaptation investments'
	'Sustainable energy lending'
	'Climate change adaptation'
	'Climate resilience'
	'Sustainable energy'
	'Environmental impacts'
	FR 2016
	'Environmental policy'
	FR 2017
	'Environmental policy'
Bank mission	'Envrionmentally sound'
	'Sustainable development'
	'Environmentally friendly transition'
	'Resilient transition'
	'Environmentally sustainable'
Sustainability commitment	'Environmental sustainability'
	'Sustainability approach'
	'Environmentally sound'
	'Sustainable development'
	'Environmental requirements'
	'Environmental issues'
	'Economic inclusion'
	'Building capacity'
	'Innovation'
	'Safeguard for the future'

Appendix 5.3. Inductive Coding Scheme: European Investment Bank

European Investment Bank	
Inductive coding words	**2014**
Annual reports	'Due diligence process'
	'Risk policies'
	'Environmental'
	'Green bonds'
	'Green bond benchmark'
	'Climate Awareness Bond'
	2015
	'Evironmental'
	'Due diligence'
	'Environemntal externalities'
	'Emissions'
	'Carbon footprint'
	'Climate action'
	'Green reference yield curves'
	'Green bond curve'
	'Climate impact'
	2016
	'Risk management practises'
	'Environmental standards'
	'Due diligence'
	Risk policies'
	'Climate action'
	'Carbon footprint'
	'Material emissions'
	'Economic price of carbon'
	'Environmental externalities'
	2017
	'Climate action'
	'Environmental'
	'Environmental angle'
	'Climate aspects'
	'Carbon footprint'
	'Economic price of carbon'
	'Environmental externalities'
	'Global green bond market'
	'Green bond benchmark'

European Investment Bank	
	'Climate policy experts'
	'Green bond standards'
	'Green finance'
	'Green finance definition'
	'Climate change mitigation assets'
	'Green investor demand'
	'Environmental principles'
Bank mission	'Focus area: environment'
	'Environmental standards'
	'Climate specialists'
	'Green bond'
	'Greenest multilateral banks'
	'Long-term finance'
	'Sustainable investment projects'
Environment/sustainability commitment	'Sustainable growth'
	'Sustainable development'
	'Sustainability due diligence'
	'Sustainability credentials'
	'Environmental aspects'
	'Enironmental principles'
	'Resources'
	'Carbon'
	'Greenhouse gas emissions'

Appendix 5.4. Inductive Coding Scheme: Industrial Bank Co Ltd

Industrial Bank Co Ltd	
Inductive coding words	**2014**
Annual Reports	'Environmental protection financing'
	'Environmental protection'
	'Green companies'
	'Sustainable finance'
	'Green financial business'
	'Environmental Industry Service'
	'Green environmental-friendly'
	'Environmental risk management'
	'Sustainable finance'
	'Environmental friendliness'

Industrial Bank Co Ltd	
	'Sustainable development'
	'Environmental policies'
	'Sustainable business development'
	'Green finance'
	'Green Bank'
	'Environmental finance'
	2015
	'Environmental financial business'
	'Environmental finance'
	'Green finance'
	'Green Bank Award'
	'Sustainable development'
	'Sustainable manner'
	'Environmental protection'
	'Green leasing businesses'
	'Green travel'
	'Green China'
	'Environmental protection'
	2016
	'Green finance'
	'Environmental protection'
	'Sustainable innovation'
	'Environmental benefits'
	'Green wealth management'
	'Sustainable development'
	'Sustainable financial services'
	'Green credit assets'
	'Green travel business'
	'Environemtnal projects'
	'Green leasing business'
	2017
	'Environmental finance'
	'Environmental protection'
	'Green finance'
	'Green leasing'
	'Environmental benefits'
	'Sustainable development'

Industrial Bank Co Ltd	
	'Environmental risk management'
	'Environmental risk warning'
	'Sustainability'
	'Green trust'
Company mission	'Equator Bank'
	'Sustainable bank'
Environmental/sustainability commitment	'Environmental policies'
	'Environmental risks'
	'Environmental deterioration'
	'Sustainable finance'
	'Sustainable environmental policies'
	'Environmental development'

Appendix 5.5. Inductive Coding Scheme: ING Group

ING Group	
Inductive coding words	**2014**
Annual Reports	'Sustainable progress'
	'Greenhouse gas'
	'Sustainable transitions'
	'Sustainable local businesses'
	'Environmental preservation'
	'Environmental risk management'
	'Climate policy goals'
	Environmental performance'
	'Sustainable profit growth'
	'Climate change and mitigation'
	'Environmental aspects'
	'sustainable finance'
	2015
	'Climate change'
	'Environmental challenges'
	'Climate change regulation'
	'Environmental risk'
	'Green loans'
	'Green bond issue'
	'Environmental damage'

ING Group	
	'Sustainable development'
	'Environmental performance'
	'Sustainable finance'
	'Climate change mitigation'
	'ESR due diligence'
	'Equator principles'
	2016
	'Climate change mitigation'
	'Environmental risk'
	'Environmental performance'
	'Greener economy'
	'Sustainability'
	'ESR due diligence'
	'Environmental outperformers'
	'Green projects'
	'Sustainability indices'
	'Environmental challenges'
	'Green electriciy'
	'Low-carbon'
	2017
	'Green economy'
	'ESR due diligence'
	'Climate resilience'
	'Sustainability criteria'
	'Climate-related risk'
	'Sustainable assets under management'
	'Green electricity'
	'Sustainable energy'
	'Sustainability context'
	'Low-carbon'
	'Climate impact'
Company mission	'Dow Jones Sustainability Index'
	'Climate finance'
	'ESG finance'
	'Social Impact finance'
	'Sustainable assets under management'
	'Sustainable progress'

ING Group	
Environmental/sustainability commitment	'Climate change'
	'Environmental challenges'
	'Scarcity of water'
	'Low-carbon'
	'Clean energy'
	'Low-carbon economy'
	'Sustainability'
	'Resilience to climate change'
	'Climate neutral'
	'CO2 emissons'
	'Water footprint'
	'Circular economy solutions'
	'Green bonds'
	'Sustainability improvement loan'
	'Climate performance'
	'Environmental criteria'
	'Climate finance'
	'Renewable energy'
	'Combatting climate change'

Appendix 5.6. Inductive Coding Scheme: Mitsubishi UFJ Financial Group

Mitsubishi UFJ Financial Group	
Inductive coding words	**2014**
Annual Reports	'Environmental initiatives'
	'Environmental issues'
	'Green project suppoer loan'
	'Sustainable growth'
	'Environmental efforts'
	'Environmental risk research'
	2015
	'Climate change mission'
	'Equator principles'
	'ESG investment'
	'Renewable energy investment fund'
	'Environmental factors'
	'Environmental preservation'

Mitsubishi UFJ Financial Group	
	'Environmental problems'
	2016
	'Environmental problems'
	'Sustainable development'
	'Responsible finance'
	'Environmental risk'
	Environmental impacts'
	'ESG investment'
	'ESG concerns'
	'Sustainable value'
	2017
	'Addressing ESG issues'
	'Sustainable growth'
	'Renewable energy'
	'Green bond'
	'Greenhouse gas'
	'Carbon dioxide emissions'
	'Clean energy'
	'Green projects'
Company mission	'Address environmental challenges'
Environmental/sustainability commitment	'Protecting the environment'
	'Responding to climate change'
	'Global environmental issues'
	'Environmental risks'
	'Environmental related initiatives'
	'Promoting sustainable growth'
	'Environment related initiatives'
	'Environmental policy statement'

Appendix 5.7. Inductive Coding Scheme: Société Générale SA

Société Générale SA	
Inductive coding words	**2014**
Annual Reports	'Environmental risks'
	'Sustainable growth'
	'Green Bond Principles'
	'Green bonds'

Société Générale SA	
	'Sustainable growth model'
	'Environmental commitments'
	'Sustainable progress'
	'Environmental risk'
	'Climate change'
	'GHG emissions'
	'Decrease water use'
	'Environmental considerations'
	'Renewable energy'
	'Carbon footprint'
	2015
	'Green funding'
	'Positive Impact Finance'
	'Climate change'
	'Greenhouse gas emissions'
	'Adapting to climate change'
	'Impact of climate change'
	'Waste management'
	'Environmental risks'
	'Waste prevention'
	'Sustainable use of resources'
	2016
	'Sustainable development'
	'Sustainable profitability'
	'Environmental risks'
	'Climate change adaptation'
	'SRI'
	'Equator Principles'
	'Policy on biodiversity'
	'Positive Impact Finance'
	'Sustainable Development'
	'ESG Assessments'
	'ESG criteria'
	'Climate intiative'
	2017
	'Energy transition'
	'Climate change'

Société Générale SA	
	'Risks associated with climate change'
	'Environmental impact'
	'Commitment to the 2 degree scenario'
	'Biodiversity'
	'Climate strategy'
	'Climate change-related risks'
	'Green financing'
	'Impact finance'
Company mission	'Sustainable growth'
	'Environmental transition'
	'Climate commitments'
	'Low-carbon economy'
	'Impact on the climate'
	'Carbon footprint'
	'Sustainable entrepreneurs'
Environmental/sustainability commitment	'Incorporate sustainable development objectives'
	'Renewable energies'
	'Decarbonise the economy'
	'Carbon energies activities'
	'Green bonds'
	'Energy transition'
	'Positive Impact Finance'
	'Reduce acitivies involving fossil fuels'
	'Sustainable developmetn'
	'Principles for Responsible Banking'
	'Sustainable Development Goals'
	'Climate change risks'
	'Management of emissions'
	'Global warming'
	'Reducing the carbon footprint'
	'Carbon reduction programme'
	'Carbon tax'
	'CO2 emissions'
	'Environmental efficiency intiatives'
	'Low-carbon development'
	'Responsible sourcing'

Appendix 5.8. Inductive Coding Scheme: The World Bank

World Bank	
Inductive coding words	**2014**
Annual reports	sustainable growth
	environmentally sustainable
	climate change
	sustainable future
	sustainable energy
	climate finance
	adapt
	hydropower
	clean electricity
	green bonds
	renewable energy
	energy efficient
	technology
	GHG
	low-carbon economy
	biodiversity
	sustainable agriculture
	climate change risk
	long-term sustainability
	mitigation
	resilience
	climate risk
	2015
	GHG
	green bonds
	mitigate
	adapt
	climate instruments
	SDG
	fundamental threat
	low-carbon
	climate-resilience
	carbon pricing
	paris climate agreement

World Bank	
	social responsibility
	increasing risks and instability
	climate financing
	2016
	2 degree
	climate action plan
	climate change-related shocks
	2030 agenda for SD
	climate adaption finance
	disaster risk management
	2017
	low-carbon energy
	climate change risk
	climate change action plan
	sustainable urbanization
	climate resilience
	sdg-linked bonds
	greening the financial sector
	sustainable investing
	social investment
Environment/sustainability commitment	'Environmental risk'
	'Environmental considerations'
	'Environmental policies'

Appendix 5.9. Inductive Coding Scheme: Mathilde Inductive Coding Words

Mathilde's suggested inductive coding words
General
Energy (renewable, green, efficiency)
ESG
SDG
Paris (Agreement)
Carbon
GHG/Greenhouse gas
Sustainable economy / sustainable growth
Climate change

Mathilde's suggested inductive coding words
Strategy/risk
Resilience
Responsible (investment, growth)
Impact
(Green) Technology/Innovation
Solution
(Environment, climate) risk
Commitment
Facilitate
Footprint
Reduce
Risk assessment/reporting/compliance/disclosure
Adapt/Adaption
Green Growth
Climate/green finance/projects/portfolio
Mitigate/Mitigation
Climate/environment due diligence

Appendix 5.10. Inductive Coding Scheme: Maja Inductive Coding Words

Maja's suggested inductive coding words
General
'Renewable energy'
'Carbon'
'Climate finance'
'Responsible investment'
'Climate change'
'Paris agreement'
'Green finance' / 'Green economy(ies)' / 'Green bond(s)' / 'Green project(s)'
'Energy transition'
'Carbon neutrality'
'Green bond'
'Environmental'
'ESG'
'Responsible finance'
'Sustainable economy' / ' Sustainable growth'
'Carbon market'
'Suatainability'
'Climate action plan'

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Maja's suggested inductive coding words
Strategy/Risk
'Due diligence'
'Climate/environment risk'
'Managing risk'
'Resilience'
'Climate/environmental strategy'
'Mitigation' / 'Mitigate' / 'Mitigating'
'Adaptation' / 'Adapt' / 'Adapting'
'Decarbonise' / 'Decarbonising'
'Reduction' / 'Reduce' / 'Reducing'
'Greening'
'Risk management' / 'Risk assessment'
'Environmental solutions'
'Footprint'
'Long-term'
'Commitment'
'Disclosure'
'Impact'
'Alternative energy banking'
'Alternative energy finance'
'Combat'
'Standards'