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and Caitlin Augustin

NOVEMBER 2016

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EXECUTIVE SUMMARY

The Paris Agreement entered into force on November 4, 2016, 11 months after it was adopted by more than 190 countries. The agreement establishes ambitious goals for the transition to a low-carbon economy, which will require substantial increases in climate finance in the decades ahead. ("Climate finance" is a term widely used to mean financial flows that contribute to climate change mitigation or adaption.) According to the International Energy Agency, spending on low-carbon technologies will need to increase at least fivefold over the next 20 years to meet the agreed global goal of limiting global average temperatures to well below a 2°C/3.6°F increase from pre-industrial levels.

In the public dialogue concerning the Paris Agreement, there has been considerable discussion about the potential impact of the accord on private sector financial decisions. However, data concerning the views of private sector decision-makers on the Paris Agreement are sparse. To help fill that gap, the authors surveyed investors, experts in energy and infrastructure development and non-experts using a survey methodology known as "conjoint analysis," in which respondents are asked to weigh the relative importance of different parts, elements or features of an outcome. The use of this methodology is novel in this area. The survey was conducted both before and after the Paris conference and collected 278 viable responses. Just over half of the respondents were from the United States (57 percent), with the remaining respondents coming from the United Kingdom (23 percent) and other countries (20 percent). Respondents from developing countries comprised 13 percent of the total respondents. (Budget and time constraints precluded obtaining a larger sample at this stage of the project.)

The survey results point to the following observations:

- Respondents viewed national climate policies as the most important tools for increasing climate finance. These policies included increasing subsidies for renewable energy investments, decreasing subsidies for fossil fuels, maintaining consistent policies supporting green investment and providing support for conducting early-stage feasibility studies for green investments.

- Private sector respondents ranked several elements of the Paris Agreement as among the most important factors for "creating a favorable state for climate finance investment," second only to national climate policies and ahead of national policies on other topics, market conditions and governance issues. These results tend to validate the view that the hybrid nature of the Paris Agreement—setting global goals while building a binding international system to support nationally determined climate policies—has the potential to significantly affect climate finance. That said, respondents emphasized that the impact of the Paris Agreement on investment flows in the future will depend upon further work and implementation.

- According to the survey data, the most important step for strengthening market signals from the Paris Agreement could be a robust system of transparency, including details about countries' domestic implementation and deep decarbonization plans. Many respondents indicated that more details about how countries will implement their targets is more important than the target itself.

- A striking result from the survey was the extent to which respondents drawn mostly from the US and UK private sectors considered international commitments by governments to increase climate funding to be relatively unimportant in mobilizing climate finance. In one respect, this tracks a divide in the UNFCCC negotiations, in which some developed countries have argued that private funds must be counted in evaluating progress toward climate finance pledges, while some developing countries have argued that pledges should be met mostly or only from public funds. Yet in other respects the survey results are potentially revealing. In many contexts, private sector decision-makers look to governments to co-finance or share risk before committing capital. The fact that private sector respondents to our survey weighted international governmental pledges to provide financing so low appears to indicate that the respondents find such pledges to be, at a minimum, several steps removed from decision-making on private capital. More work to evaluate the focus on public finance within the UNFCCC negotiations could prove especially valuable.

- Respondents ranked "high government corruption" as the factor most likely to prevent a climate finance investment from going forward.

These results suggest that the Paris Agreement has the potential to significantly influence climate finance, including private sector financial decisions. It also suggests strategies and priorities for enhancing that influence. The survey sample was drawn largely from the United States and United Kingdom; therefore, caution should be exercised in drawing inferences about views in other countries. Building on this research by obtaining larger and more representative samples, including more respondents from developing countries, could help inform the design of national and international policies to support climate finance. In the event the next US administration changes policies with respect to these issues, this methodology could be used to help assess the impact of those changes on attitudes of investors and others.

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INTRODUCTION

In December 2015, over 190 countries gathered in Paris and adopted a new climate change agreement that will set the direction for international climate action for the coming decades. The Paris Agreement entered into force on November 4 of this year.

A frequent theme in commentary on the Paris Agreement is that it sends a signal to the private sector that the world is moving to a low-carbon economy.[1] UN Secretary-General Ban Ki Moon, for example, said the Paris Agreement "finally provides the policy signals the private sector has asked for to help accelerate the low-carbon transformation of the global economy."[2] Many national leaders, business executives and environmental groups have emphasized this theme as well.[3]

Others have questioned the likely impact on private sector decisions. Critics have characterized the Paris Agreement as providing no more than nonbinding promises and leaving key issues unresolved.[4] Any impact of the Paris Agreement on equity markets appears to have been fleeting.[5]

So did the Paris Agreement send a signal to the private sector? And if it did, what features were most important? Are there aspects of the Paris Agreement that can be reinforced or replicated to strengthen any signal? To assess these questions, we surveyed investors, experts in energy and infrastructure development and non-experts about a variety of topics related to the Paris Agreement. We used a survey methodology known as "conjoint analysis," in which respondents are asked to weigh the relative importance of different parts, elements or features of an outcome. This use of this methodology is novel in this area and can provide a useful tool for further policy analysis.

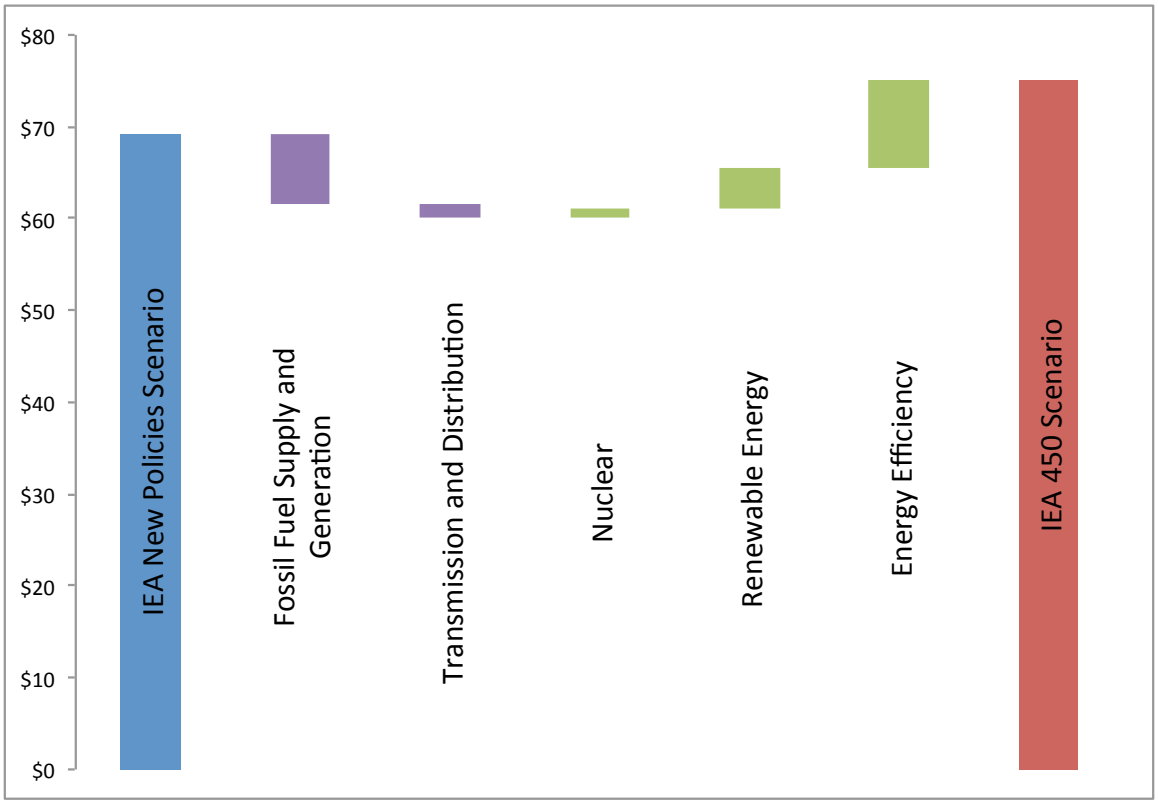
In this paper we first provide general background and then describe our survey and its results.

BACKGROUND ON CLIMATE FINANCE

The transition to a low-carbon economy will require substantial new investment in the energy sector in the decades ahead. According to the International Energy Agency (IEA), spending on low-carbon technologies will need to increase at least fivefold over the next 20 years (from approximately $400 billion per year in 2014 to over $2 trillion in 2035) to meet the agreed global goal of limiting global average temperatures to well below a C/3.6°F increase from preindustrial levels.[6]

The dollar figures are large, though not in comparison with the total investments needed to finance the world's energy needs. IEA estimates that the incremental cost of a low-carbon energy system necessary for an emissions trajectory consistent with the 2°C/3.6°F goal is approximately 5 percent between now and 2030 (and 8 percent between now and 2040).[7] As shown in Figure 1, this shift would involve reducing cumulative capital investments in fossil fuel supply and generation, as well as the distribution and transmission of electricity, by $9 trillion between now and 2040, and increasing capital investments in nuclear, renewables and energy efficiency by $15 trillion over that same time period. This results in a net increase of $6 trillion in cumulative capital investments to 2040.

Figure 1: Shift in Energy Investment Necessary to Get to 2-Degree Path
Cumulative Investment 2015–40 in Trillions of Dollars



SOURCE: International Energy Agency, World Energy Outlook 2015, Authors' analysis.

The total investment requirements for clean energy are split evenly between developed and developing economies. While clean-energy investments in developing countries have been lagging behind those in developed countries, in 2015 capital investments for renewables in developing countries (including China) exceeded those in developed countries for the first time ($156 billion versus $130 billion).[8] Most of the money for these investments was raised and spent in the same country (74 percent of total public and private finance flows and 92 percent of private climate finance in 2013 and 2014).[9] With the cost of clean energy rapidly decreasing and government policies supporting it continuing to spread to additional countries, there is reason to be optimistic.

Yet financing flows for clean energy need to increase substantially to meet global climate goals. Financing flows need to increase in all areas—within developed countries, within developing countries and between developed and developing countries. The OECD and Climate Policy Initiative estimate that the current climate finance flows from developed to developing countries averaged approximately $57 billion in both 2013 and 2014, including bilateral public funds, multilateral funds and "mobilized" private finance.[10] Disagreement remains as to whether the $57 billion should all count toward meeting the existing goal of mobilizing $100 billion from developed to developing countries because of differences over the definition of what is "additional" public finance and whether the private finance counted was actually mobilized by the public finance.[11]

The term "climate finance" is widely used to mean financial flows that contribute to climate change mitigation or adaption. Sometimes the term is used to refer to cross-border financial flows, in particular from developed to developing countries, though often it is used to refer to spending on climate mitigation or adaptation in any context.

There is an extensive literature on climate finance.[12] Many studies have identified policies to promote climate finance.[13] These policies include:

- setting a price on carbon (through cap-and-trade system, carbon tax or other measures);
- establishing a feed-in tariff and transparent procedures for grid access;
- reducing delays and improving transparency in permitting procedures for clean energy projects;
- improving long-term stability of climate policies (i.e., not retroactively removing feed-in tariffs or subsidies, putting policies in place for more than one or two years); and
- training programs to enhance in-country technical expertise regarding clean-energy projects.

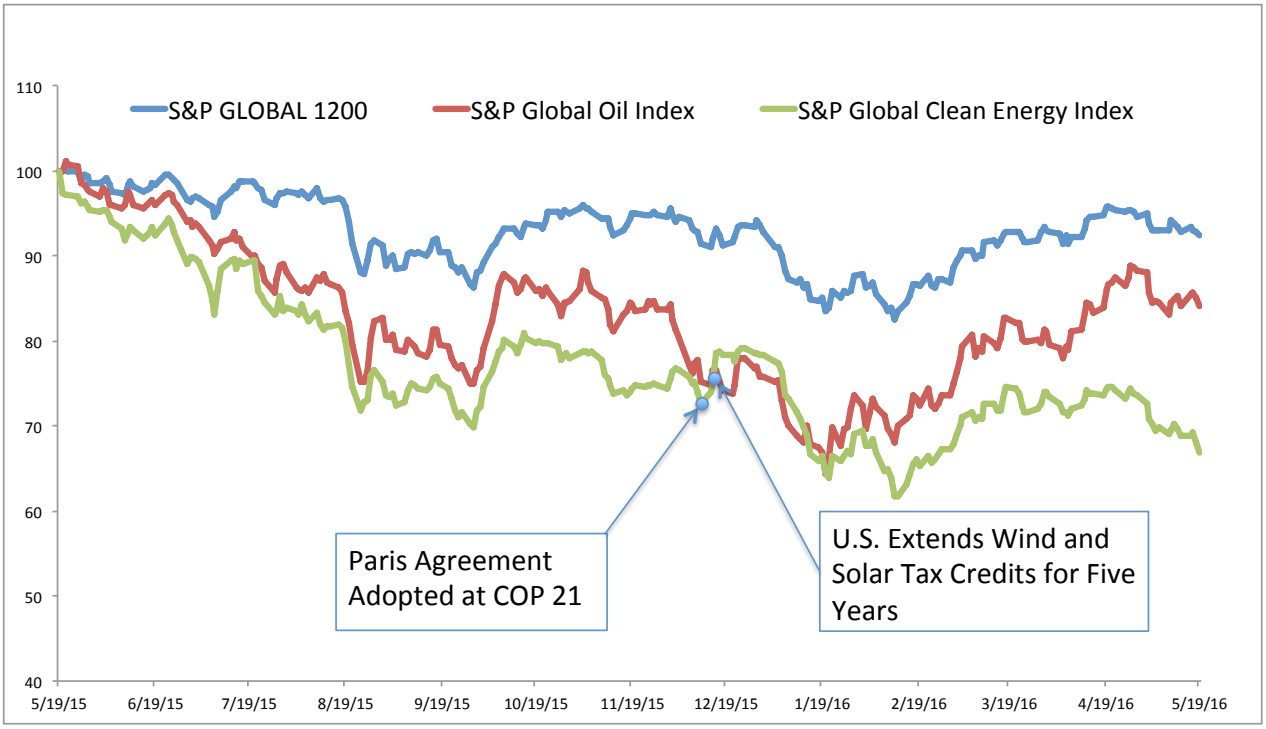
Studies have also identified barriers to increased flows of climate finance. Those barriers include uncertainty with respect to policy support (an issue that has been especially acute in recent years in the United Kingdom, Italy, Spain and the United States, among other countries.)[14] Lack of in-country expertise and limits on the availability of local financing have also been barriers (in many countries in the world and especially in developing countries). These barriers can influence investment flows both within a country and between countries.[15]

THE PARIS AGREEMENT AND MARKET RESPONSE

The Paris Agreement has many parts. The preparations for the Paris Agreement were among the most important. Even before the Paris conference opened, more than 170 countries submitted national climate action plans known as Intended Nationally Determined Contributions (INDCs). This put climate change on the agenda in national capitals around the world, in a context in which many governments were eager to display their ambition in addressing the climate challenge. In the Paris Agreement itself, countries agreed to (among other things) ambitious global temperature goals, a long-term goal of reaching zero net emissions in the second part of this century, the establishment of a single system of transparency in the UNFCCC to track progress on meeting a country's INDCs and a renewed commitment from developed countries to mobilize $100 billion per year to assist developing countries with climate finance needs.

In the six months before and after the Paris negotiations, clean-energy indices mostly underperformed both the stock market overall and other parts of the energy sector such as oil and gas (see Figure 3). Coinciding with the conclusion of the Paris Agreement, clean-energy indices outperformed oil and gas indices for approximately five weeks. This time period also coincided, however, with the extension of the US tax credits, which may have a bigger impact on the valuations or many clean-energy companies that operate in the United States. In any event, the magnitude of the movement of clean-energy indices in December 2015 and January 2016 was not large in comparison to other movements in the past several years.

Figure 2: Twelve-Month Comparison of Stock Indices



Note 1: S&P Dow Jones Indices, 100 equals value on 5/19/15.

SURVEY

We deployed a fifteen-minute web-based survey through multiple channels both before and after the Paris negotiations and collected 278 viable survey responses. Just over half of the respondents were from the United States (57 percent), with the remaining respondents coming from the United Kingdom (23 percent) and other countries (20 percent). Respondents from developing countries (defined as non-Annex 1 countries in the UNFCCC) comprised 13 percent of the total respondents. (We attempted to obtain a more globally representative sample but were unable to do so within the budget and time constraints for this stage of our project. We would welcome the opportunity to extend this survey or ones like it to a broader pool of respondents.) The respondents were sourced through an expert panel provider as well as the crowdsourcing platforms Mechanical Turk and Prolific Academic (both heavily cited within the survey literature).*

The core expert group of respondents (106), sourced and verified by a panel-provider, were individuals from the United States and United Kingdom who work at banks, institutional investors, insurance companies and other businesses in the financial sector. The individuals in this core expert group were predominantly investors in energy or infrastructure projects, but not necessarily clean-energy projects. A second group of respondents (96) were developers, consultants, analysts and regulators with relevant expertise in energy and other infrastructure development. These first two groups of respondents on average had approximately a dozen years of experience, and just over half were in supervisory positions. A third group of respondents (76) was drawn from the general population. In this paper we report primarily on the results from the full respondent group (n=278). We assessed whether there were significant differences in responses from the three subgroups, as well as from different geographic regions. Where relevant, we have identified those differences.

We undertook a conjoint survey – a tool for determining how people value different attributes of a product, service or outcome. In conjoint analysis, respondents are asked to make judgments concerning the relative importance of different features, elements or parts of whatever is being assessed. Conjoint studies have been widely used in market research for many years and more recently deployed to diverse topics including healthcare systems[16], environmental impact evaluation[17] and energy policies.[18]

For our survey, we identified 21 policies or approaches relevant to climate finance, categorized under four broad topics: national policies, international policies, market conditions and infrastructure. (Using language typical in conjoint analysis, we described each policy or approach as a "feature.") All of the features we included have been identified by experts and in the literature on this topic as important or potentially important to help drive climate finance. Respondents went through a multistep process to rank the relative importance of features for creating a more favorable state for climate finance investment, with a focus on clean-energy investments. We designed our conjoint survey in four parts based on a framework first published in 1988.[19] This framework forms the basis for the conjoint survey question block in Qualtrics,[20] our survey provider.* A complete list of the questions asked and the features assessed can be found in Appendix A. This process provided us scores to calculate both the importance rating and desirability of each feature—showing us not only if a feature was preferred, but also how intensely it was preferred relative to other features. We used these scores to determine the utilities for the broad categories and specific features by multiplying the importance rating and desirability rating.

Our analysis of the conjoint survey results points to the following observations.

First, respondents viewed national policies as the most important tools for increasing climate finance. These

*The survey framework and output of results for this paper was generated using Qualtrics software, Version winter 2015/spring 2016 of Qualtrics. Copyright © 2016 Qualtrics. Qualtrics and all other Qualtrics product or service names are registered trademarks or trademarks of Qualtrics, Provo, UT, USA. <http://www.qualtrics.com>

*The method of conjoint analysis we used was a "self-explicated conjoint," which focuses on the evaluation of individual attributes rather than packages of attributes.

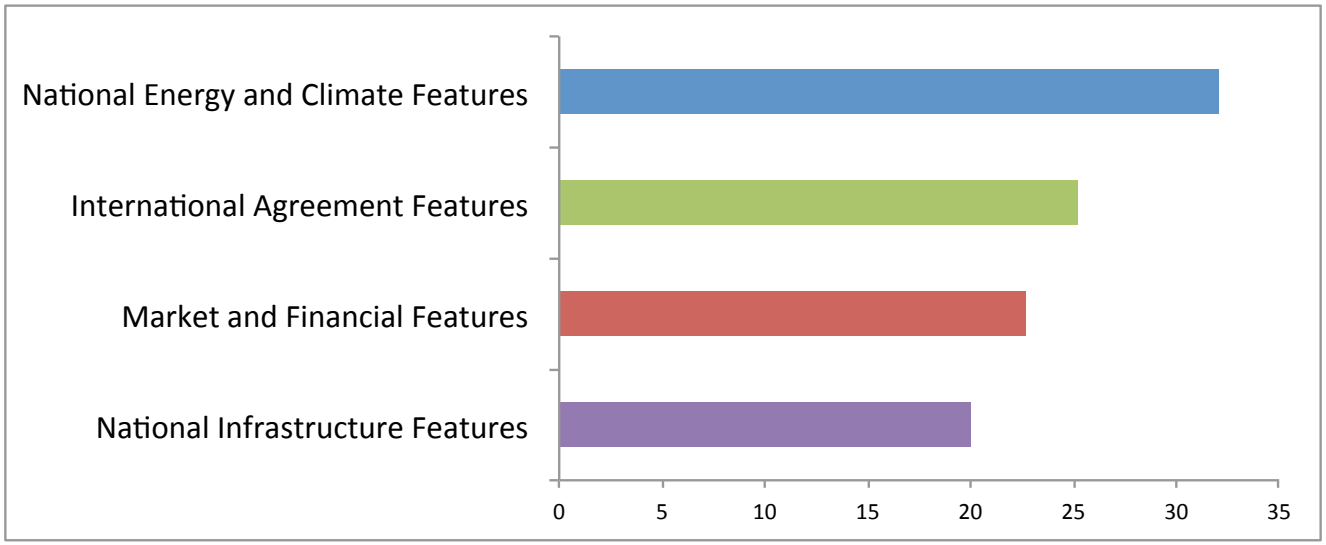
policies, which we categorized as *National Energy and Climate Features*, included increasing subsidies for renewable energy investments, decreasing subsidies for fossil fuels, maintaining consistent policies supporting green investment and providing support for conducting early-stage feasibility studies for green investments.

Second, respondents ranked international agreements as the second most important tools for driving climate finance. The *International Agreement Features* in our survey were ranked ahead of many national policy and market features that had been previously identified in the policy literature as important to help drive climate finance (we categorized these various other features as *Market and Financial Features and National Infrastructure Features*).[21] The *Market and Financial Features* included the availability of credit financing in country, the rate of energy-demand growth in-country and the level of corporate taxation in-country. The *National Infrastructure Features* included features such as developing a national infrastructure roadmap and having predictability in permitting and licensing (see Figure 4).

Third, respondents ranked the global long-term emissions reduction goal highest among the international features. Developing a system of international transparency and accountability for national climate policies and countries' emissions reduction commitments also ranked among the most important of any individual features. In fact, the only individual features ranked above these three international features were in-country features that provided direct support for climate and clean-energy investments.

Fourth, the international commitment to increased public climate finance ranked as the lowest of the 21 national and international policy and market features, dramatically lower than the other international agreement features.* (See Figure 4.) The composition of our sample—heavily weighted toward the private sector—likely played a role in this result.

Figure 3: Relative Importance of International Agreement Features (Potential Paris Outcomes) Compared to Other Policy and Market Features



Note: Respondents assigned 100 points across the four feature categories, with more important feature categories receiving more points.

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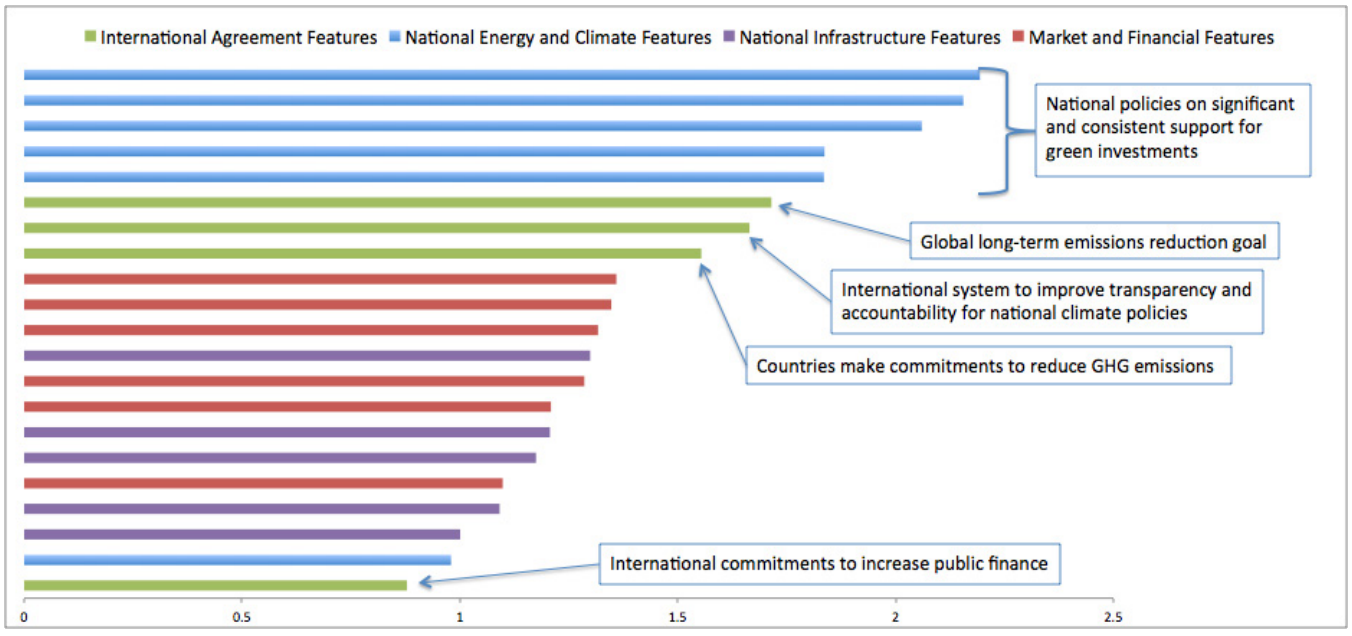
Figure 4: Relative Importance of All Twenty-One Policy and Market Features Respondents Assessed



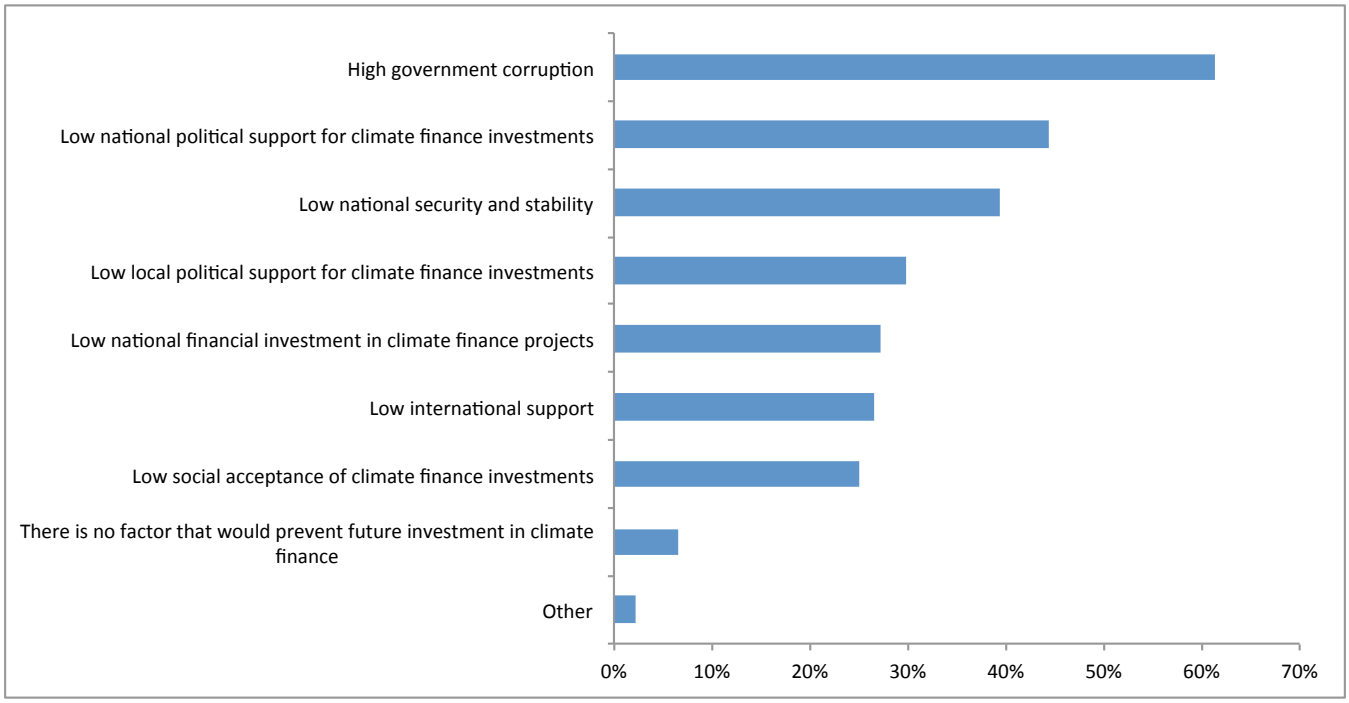
Note: The utility scores for each factor are derived by dividing the level of preference for each by the points assigned to each overall category.

*This comparison of each individual policy or market attribute was obtained by combining the level of preference respondents gave to each attribute within a category (where only the attributes within that category were being compared by respondents) with the relative points given to each category (where respondents were comparing categories).

Fifth, results did not vary significantly between developed- and developing-country respondents. In fact, developed- and developing-country respondents both drew their eight top-ranked features from National Energy and Climate Features and International Agreement Features, although developed-country respondents were more likely to rank features related to energy subsidies slightly higher (both increasing subsidies for renewable energy and decreasing fossil fuel subsidies). Developing-country respondents also viewed international commitments to increase public finance as the least important of the international features and ranked it second to last among all 21 features. However the sample size of developing-country respondents was small (36 respondents) and not necessarily representative. Further surveys with larger, more representative samples would be necessary to draw more robust conclusions.

Sixth, when asked to identify features that would prevent or inhibit climate finance investments, respondents were most likely to identify national policies or conditions. Government corruption was identified as a potential barrier to making a climate finance investment by 61 percent of respondents. Roughly 44 percent of respondents identified low national political support for climate finance investments and poor national security conditions and stability as potential barriers. Low international support was identified by approximately 25 percent of respondents. Respondents who took the survey before the Paris negotiations were completed (n=93) also were given the option of identifying the "failure to reach an agreement in Paris" as a barrier. Fifteen percent of those respondents stated that failure to reach an agreement in Paris would be a barrier to making a climate finance investment.

Figure 5: Percentage of Respondents Identifying Individual Features That Could Prevent Them From Making a Climate Finance Investment



DISCUSSION

Our survey results provide potential insights relevant to climate finance, national climate policies and the UNFCCC negotiations.

First, national climate policies are widely perceived to be the top priority in mobilizing climate finance. This result was robust across all respondent categories in our survey. This view is consistent with the structure of the Paris Agreement, which places great emphasis on the importance of national climate policies by requiring countries to adopt and report on nationally determined climate plans (known as "nationally determined commitments" or "NDCs"). Like the negotiators who shaped the Paris Agreement, our respondents gave high priority to national climate policies.

Second, our survey data support the conclusion that the Paris Agreement did, in fact, send a signal to the private sector. When asked to identify "the relative importance of features for creating a more favorable state for climate finance investment," our private sector respondents ranked elements of the Paris Agreement as the second most important (just behind national climate policies but ahead of market, financial and infrastructure features that have often been identified as important in the literature and public discussions on this topic). Those elements were the global long-term emissions goal, an international system to improve transparency and accountability for national climate policies and the commitment of governments to reduce emissions under the Paris Agreement. These results tend to validate the view that the hybrid nature of the Paris Agreement—setting global goals while building a binding international system to support nationally determined climate policies—has the potential to significantly affect climate finance. That said, respondents emphasized that the impact of the Paris Agreement on investment flows in the future depends upon further work and implementation.

Third, our survey data suggest that the most important step for strengthening market signals from the Paris Agreement could be a robust system of transparency, including details about countries' domestic implementation and deep decarbonization plans. Indeed responses from our core group of experts indicate that providing more details about how countries will implement their targets is more important than the target itself. We asked the post-Paris respondents to assess the importance of five actions for supporting clean energy investments that individual countries took as part of the Paris Agreement. The expert-investor respondents from that post-Paris deployment (n=72) ranked three actions tied as most important: submitting a description of the domestic laws and policies that will be implemented to achieve the emissions reductions; producing a long-term plan for decarbonizing the economy; and submitting a specific target for deploying renewable energy.* In other words, our investor respondents cared more about the details of how a country will achieve its emissions reduction target than the target itself.

Fourth, more work to evaluate the focus on public finance within the UNFCCC negotiations could be especially valuable. Perhaps our most striking result was the extent to which respondents mostly drawn from the US and UK private sectors considered international governmental commitments to increase climate funding to be relatively unimportant in mobilizing climate finance. In one respect, this tracks a well-established divide in the UNFCCC negotiations, in which some developed countries have argued that private funds must be counted in evaluating progress toward climate finance pledges, while some developing countries have argued that pledges should be met mostly or only from public funds. Yet in other respects the survey results are potentially revealing. In many contexts, private sector decision-makers look to governments to co-finance or share risk

*The fifth action we asked investors to judge was recognition by a country that its subsequent emissions reduction targets would increase in ambition. This factor was ranked lower than the top three, though the difference was not significant. In contrast, their ranking of the emissions-reduction commitment was significantly lower.

†The developing-country respondents also thought the other international agreement features were more important than increasing public finance. Due to the small sample size, this result should be viewed with caution.

before committing capital. The fact that private sector respondents to our survey weighted international pledges by governments to provide financing so low appears to indicate that the respondents find such pledges to be, at a minimum, several steps removed from decision-making on private capital. Especially because private sector capital flows are so much greater than those from the public sector, the views of private sector decision-makers are worth exploring further.†

Fifth, our survey results underscore the importance of creating adequate enabling environments in a country to attract investment. When respondents considered what would potentially prevent a climate finance investment, high levels of government corruption that would make permitting and contract enforcement unpredictable was the most cited factor. Countries that do not have an adequate domestic enabling environment to foster private investment (both domestically and from abroad) run a serious risk of missing out on any benefits that may flow from positive market signals from the Paris Agreement.

All these observations are qualified by our limited sample, made up primarily of US and UK respondents. We would welcome suggestions for refinements or adjustments to the methodology used in the survey, as well as the opportunity to survey a much broader population.

CONCLUSION

Many factors will affect the growth in capital flows for climate finance in the years ahead. Seeking stakeholder views on the relative importance of those factors can provide important insights.

Our survey using "conjoint analysis," a well-established tool widely used in market research, suggests that stakeholders rate some factors identified in the literature for promoting climate finance as far more important than others. Our respondents deemed national climate policies the most important, with international actions such as the Paris Agreement second. Different features of the Paris Agreement were ranked differently. The relatively low priority respondents attached to governmental pledges to increase climate finance under the UNFCCC was striking, although the composition of the respondent pool (principally the US and UK private sector) shaped that outcome.

Our survey results provide empirical support for the idea that a strength of the Paris Agreement in influencing investors is its hybrid nature, linking collective international actions like the long-term temperature goal with specific individual country actions reflected in the INDCs. The best short-term opportunities for strengthening signals from the Paris Agreement could be to make progress on the transparency system and to encourage more countries to come forward with their long-term decarbonization plans. Our respondents were more interested in the details of how countries will meet their targets than in the target itself.

Statements such as "the Paris Agreement sent a signal to the private sector" provide an important top-line summary. Analyzing which features of the Paris Agreement make the most difference, and what other factors influence private sector decision-makers, will be important to strengthening that signal over time. Conjoint survey methodology offers a useful tool for further work in this area.

APPENDIX A

Questions Asked in Conjoint Portion of the Survey

Below are the instructions and questions survey respondents were given:

"In this first step, you will indicate the relative importance of features for creating a more favorable state for climate finance investment by selecting your most preferred and least preferred feature level from the options below. For purposes of the following, 'Most Preferred' and 'Least Preferred' mean the most and least important factors in creating a favorable state for climate finance."

"In this second step, you will indicate the relative importance of feature levels for creating a more favorable state for climate finance investment. Please indicate the important of each option below (with 10 being the most important and one being the least important). The options you selected as 'Most Preferred' and 'Least Preferred' in Step 1 are automatically assigned the maximum and minimum values, respectively."

"In this third step, you will indicate the relative importance of feature levels for creating a more favorable state for climate finance investment by allocating 100 points across the options you selected as your most preferred options."

"In this final step, you will indicate the relative importance of features (categories) for creating a more favorable state for climate finance investment by allocating 100 points across the broad categories we provided."

Four "Feature Categories" and 21 "Feature Levels"

National Energy and Climate Features

- National price on carbon
- Eliminated/reduced subsidies for fossil fuel use
- Developed/increased subsidies for renewable fuel use
- Consistency of financial support for green investment
- Significant amount of financial support for green investment
- Support for feasibility studies for green projects

International Agreement Features

- International commitments to increase public finance
- Global long-term emissions reduction goal
- Countries make commitments to reduce GHG emissions
- Countries develop international system to improve transparency and accountability for national climate policies

Market and Financial Features

- Lower corporate taxation on investment
- Reduced cost of capital
- High/growing energy demand in country
- Fossil fuel commodity prices
- Availability of cash grants
- Availability of credit financing

National Infrastructure Features

- Predictability in permitting and licensing
- Predictability in enforcing private contracts
- Publicized national infrastructure roadmap
- Availability of local financial services
- Monitoring of projects to provide better data on infrastructure transactions

NOTES

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21 Respondents ranked the individual features within each category using the same methodology described in the note to Figure 2.


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