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Risk assessment

CLIMATE CHANGE RELATED RISKS AND OPPORTUNITIES: EVIDENCE FROM TURKISH FIRMS

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Abstract. The main purpose of this study is to examine the Turkish firms' opinions on climate change related risk and opportunity drivers and their potential impacts. The research is based on the Carbon Disclosure Project (CDP) Turkey climate change survey reports. In 2017, 58 companies from Turkey participated in CDP survey. 42 of these companies were listed on the Borsa Istanbul (BIST) 100 index and 41 companies made their responses public. In this framework, it is aimed to examine how Turkish firms evaluated climate change related risks and opportunities and their impacts. The results of the study present a portrait of current corporate governance approaches related to climate change and contribute to climate change management literature.

Keywords: climate change risks and opportunities, Turkish firms.

AIMS AND BACKGROUND

Climate change represents one of the greatest challenges to both society and companies all over the world since it has been considered as the main source of environmental, economic and social risk[1–4]. It is altering the world drastically and forces companies to take action[5]. Actually, it is stated that climate change produces both risks and opportunities to the companies[6,7]. There might be an increase in firms' operational costs due to the climate change related regulations, or firms which implement strategies to deal with climate change might improve their reputation and public relations[8].

It is a well-known scientific fact that the increase of global greenhouse gas (GHG) emissions is the main cause for the climate change and the role that companies play with regard to climate change is related to their carbon footprints[9–15]. Therefore, recently, stakeholders have pointed an accusing finger at organisations about the climate change and there is an increasing demand on companies for the disclosure of carbon emissions. Thanks to this increased environmental sensitivity

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of the stakeholders, many initiatives have emerged and one of the most prominent of them is the Carbon Disclosure Project (known as CDP).

Turkey is located in one of the areas (Mediterranean Basin) that share many of these changes. According to the Intergovernmental Panel on Climate Change (IPCC) reports, temperatures are expected to rise from 2.4 to 4°C in the next century. Dellal and Unuvar[16], Serbes et al.[17] and Dino and Akgul[18] assert that floods and droughts are expected to become more frequent in this area due to the irregularity of environmental events such as severe heat waves, increasing temperatures, decreasing rainfall and sea level increases. In spite of the heightened interest on the issue of climate change, there is little research on this topic in Turkey. Therefore, to fill this gap, the present study aims to examine the Turkish firms' opinions on climate change related risk and opportunity drivers and their potential impacts based on the CDP Turkey climate change survey.

EXPERIMENTAL

In 2017, more than 7,000 firms responded to the CDP's questionnaire reporting on numerous aspects of their carbon management[19]. 58 of these companies were from Turkey and 42 of them were listed on the Borsa Istanbul (BIST) 100 index. Only 41 of them made their responses public, however, only 39 companies' responses are reflected the climate change related drivers and impacts that underpinned this research. The analysis of this data reported by the companies has constituted the empirical core of our research.

In this study, all data were obtained from the reports of companies participating in CDP Turkey Climate Change 2017 report and made their responses public. Initially, risk and opportunity drivers are prepared based on the frequency of reporting by the Turkish companies. The risk and opportunity impact figures were created in two steps. Firstly, the magnitude of impact and likelihood envisaged by companies formed the *Y* and *X* axes. Latter, the bubbles are sized according to the frequency of reporting by the Turkish companies' foresight of that impact.

RESULTS AND DISCUSSION

Risk and opportunity drivers from the perspective of Turkish companies. According to CDP Climate Change 2017 report, based on the responses of participant companies, it is possible to have an idea about the perceptions of Turkish firms on the issues of risk and opportunity drivers, and their potential impacts of climate change. CDP Turkey Climate Change 2017 Report gives us the most commonly reported climate change related risks and opportunities[20].

Figure 1 shows the climate change related risk drivers reported on CDP Turkey Climate Change 2017 survey.



Fig. 1. Climate change related risk drivers reported on CDP Turkey Climate Change 2017 Report (*16 other less reported climate change related risks)

Reputation is a great concern in this environmentally sensitive period of our world. As stated by Dawkins and Fraas[21], disclosures on a subject, including climate change related issues, may provide evidence whether or not a company performance in the field fulfills social expectations. In this sense, taking or not taking environmental activities and deciding to share these activities with the public may improve or deteriorate the reputation of companies[22].

Fuel/energy taxes and regulations may be seen as increased operational costs due to fuel and electricity prices and possible carbon taxes[19]. These taxes are imposed to absorb the final consequences of climate change[23].

International agreements became a critical issue for companies after Paris Agreement (2015). Due to cross border agreements, companies have to cope with the extra weight from not only domestic regulations but also external taxes and regulations[19].

Change in precipitation extremes and droughts is a great evidence of climate change. Severe weather events make a great sense for companies' manufacturing and shipping processes. Prolonged droughts, floods, storms, and sea-level rise are such weather events that interfere with the activities of companies. Also, electricity outages or interruptions due to climate change affect directly and negatively the daily operations of any company[24,25].

There are also opportunities for companies that develop and implement various strategies to mitigate climate change and adapt to changes that have already occurred. Forward-thinking companies that fine-tune their operations, such as; cost savings by using more efficient resources, consumption of low-emission energy sources, developing and launching reduced emission products and services may get benefit from climate change[7,26].

Reputation matters because companies with positive environmental performance have a direct channel to use the disclosures as an opportunity platform. In addition, companies with less favorable environmental performance build a barrier against legitimacy threats by making disclosures[21].

Changing consumer behaviour affects the market environment and its conditions in a long-term. Thus, the purchasing habits of the consumers force companies to update the products and services that they offer[27]. As such physical aspects like

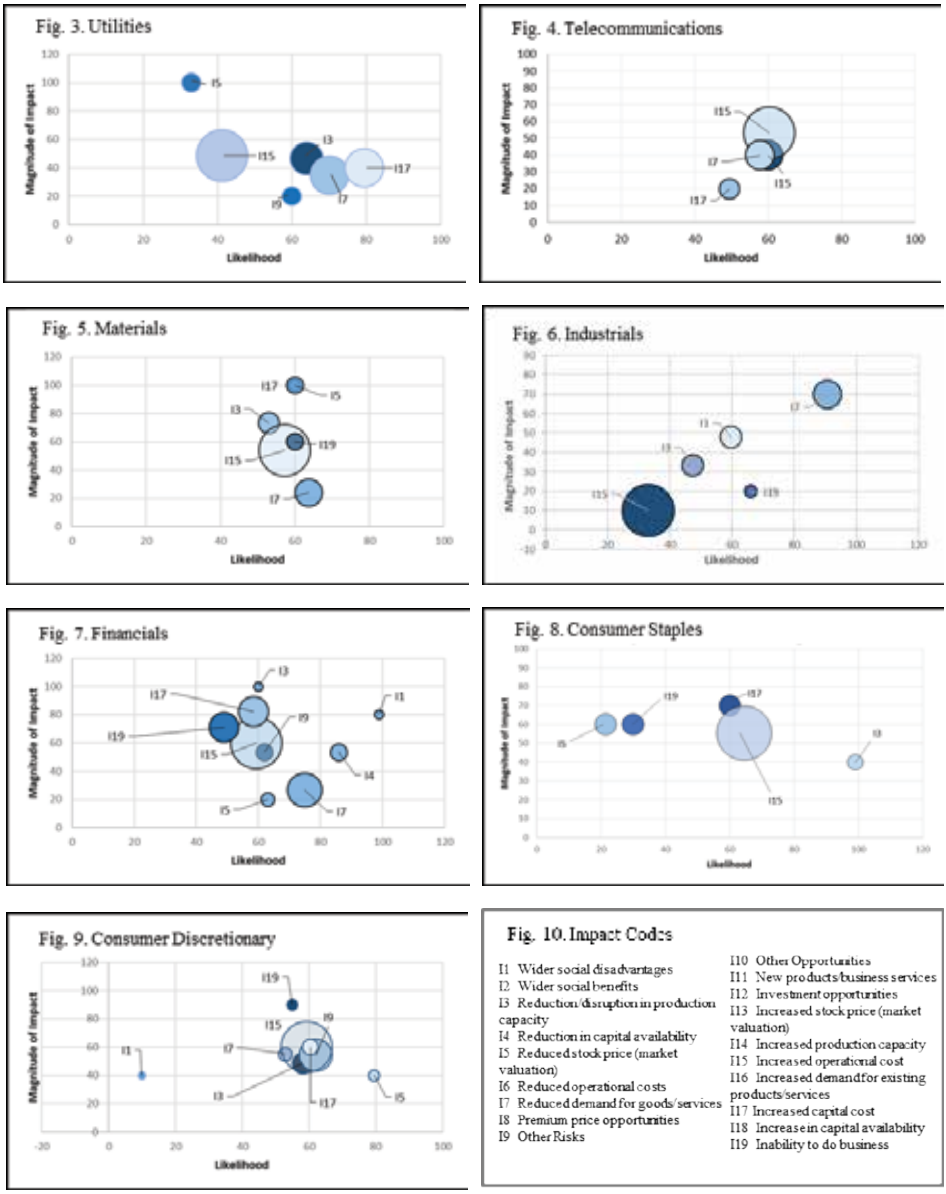
change in mean (*average*) *temperature* become more pronounced, demand for environmentally sensitive products and services are expected to increase. It is believed that companies with sufficient capacity will earn financial returns in line with these demands[19].



Fig. 2. Climate change related opportunity drivers reported on CDP Turkey Climate Change 2017 Report (*12 other less reported climate change related opportunities)

Risk and opportunity impacts from the perspective of Turkish companies. In order to examine the potential impacts of risks and opportunities related to climate change, the data obtained from the CDP Turkey Climate Change 2017 survey are classified by industries. Among 39 companies those participated CDP survey and made their response public; 12 of them in consumer discretionary (31%), 9 of them in financials (23%), 6 of them in industrials (15%), 5 of them in materials (13%), 3 of them in consumer staples (8%), 2 of them in telecommunications (5%) and 2 of them in utilities (5%) sector. Apparently, not only carbon-intensive industries, but also non-intensive industries participate CDP survey in Turkey. That means there is a growing awareness of climate change in Turkey and it can be considered as a promising step.

Potential risk impacts for industries. Risk impacts were analysed according to likelihood and magnitude for 7 industries including utilities (Fig. 3), telecommunications (Fig. 4), materials (Fig. 5), industrials (Fig. 6), financials (Fig. 7), consumer staples (Fig. 8), and consumer discretionary (Fig. 9). The increase in operational costs in all industries is seen as the biggest potential risk impact of climate change. However, the likelihood and magnitude of this impact varies according to the industries.

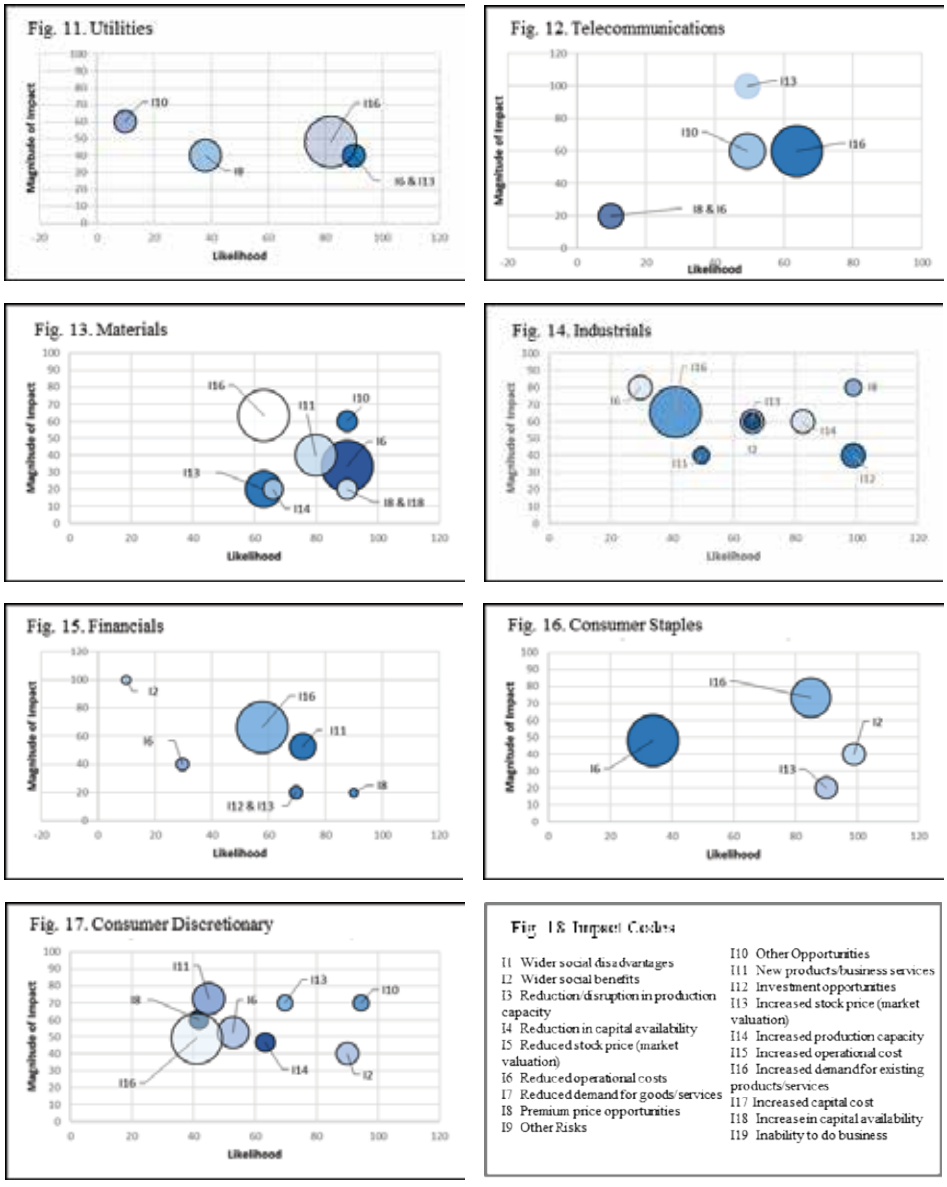


Figs 3–10. Relevance of risk impacts for different industries and impact codes

In 2017 for utilities industry, increased operational cost is seen as the biggest potential risk impact, reduced demand for goods/services and increased capital cost are seen as the following major impacts. Although increased operational cost is the most reported impact, companies do not see a higher likelihood like other major impacts. In telecommunications the increase in operational cost is again the

most reported potential risk impact of climate change for this industry. Where other impacts are reported in relatively close numbers, the magnitude and likelihood of increased operational cost are considered as the highest. In materials, increased capital cost and reduced stock price (market valuation) are reported with the highest magnitude among all other 10 potential risk impacts. The reduced demand for goods/services which is considered as the most likely, has the lowest magnitude. In industrials, the reduced demand for goods/services is seen as the most likely and magnitude potential risk impact of climate change. The magnitude and likelihood of increased operational cost is seen as the least. The industry in which the highest number of climate change related potential risk impact is reported is financials. Among the 9 potential impacts, increased operational cost, reduced demand for goods/services, increased capital cost and inability to do business are the most reported impacts respectively. In this industry, while the most likely impact seen as wider social disadvantages, the most magnitude impact is reduction/disruption in production capacity. Consumer staples is a sector in which the magnitude of potential impacts can be shown almost horizontally. While the most likely potential impact is reduction/disruption in production capacity, the most magnitude impact is seen as increased capital cost. In consumer discretionary, reduced stock price is seen as the most likely potential impact while the most magnitude impact is inability to do business for this industry.

Potential opportunity impacts for industries. Opportunity impacts are also reviewed according to their likelihood and magnitude for 7 industries including utilities (Fig. 11), telecommunications (Fig. 12), materials (Fig. 13), industrials (Fig. 14), financials (Fig. 15), consumer staples (Fig. 16), and consumer discretionary (Fig. 17). The increased demand for existing products/services is seen as the biggest potential opportunity impact of climate change for all industries. In utilities, increased demand for existing products/services is the most reported potential opportunity impact with average magnitude and relatively high likelihood. But when the most likely opportunities are considered, reduced operational costs and increased stock price (market valuation) are coming forward. For telecommunications industry, other opportunity is the second biggest opportunity impact following increased demand for existing products/services. While increased stock price (market valuation) is seen as the most magnitude impact, increased demand for existing goods/services is the most likely potential opportunity impact. Materials, industrials and consumer discretionary are the industries that the most various impacts are reported.



Figs 11–18. Relevance of risk impacts for different industries and impact codes

In materials, reduced operational costs, premium price opportunities, and other opportunities and increase in capital availability are the most likely potential opportunity impacts. The most magnitude opportunity impact is seen as increased demand for existing goods/services for this industry. Even though it is less reported than increased demand for existing goods/services, investment opportunities is the most likely and magnitude potential opportunity impact for companies operating

in industrials. Reduced operational cost and investment opportunities are the other most magnitude and likely impacts respectively. The biggest impact remains unchanged for financials. New products/business services is reported as the second biggest potential opportunity impact. Wider social benefits is the most magnitude and also premium price opportunities is the most likely opportunity impacts for this industry. Only four potential opportunity impacts are reported for consumer staples. Interestingly, reduced operational cost is the most reported potential opportunity impact for this industry. The subsequent impact which is also reported as the most magnitude impact is increased demand for goods/services. Wider social benefits is stated by companies as the most likely impact. Other opportunities are seen as the most magnitude and likely potential opportunity impact for consumer discretionary. The other most magnitude reported impacts are new products/business services and increased stock price (market valuation) while the most likely reported second impact is wider social benefits.

CONCLUSIONS

Climate change and the problems it brings with are accepted as one of the most important challenges of our time. Being aware of these changes and taking necessary actions in order to (mitigate and) adapt to the changing environment is crucial for companies that aim to maintain their sustainability in the business world. This leads companies to transparently share their environmental movements with the public. One of the most prominent signs is the increasing tendency of companies to make disclosures. With the increasing number of participating companies, CDP reports hint the increased corporate transparency around climate change in Turkey. This study has underlined the growing awareness of climate change related issues in Turkey. It is clear that Turkey made progress on climate change and its practices. When it is remembered that Turkey is a developing country, in the coming years it is inevitable to take precaution on issues that have a profound impact on climate change, such as carbon emissions. Companies need to prepare themselves for possible policy changes as of today to meet the needs of a sustainable and green society.

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