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Remote but well connected? Neighboring but isolated? Measuring remoteness in the context of SIDS

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Abstract:

Remoteness is one of the main challenges for small island developing States (SIDS). However, this term is commonly used in a narrow sense, referring only to geographical distance from markets resulting in higher transportation costs. This paper argues that remoteness is a broader concept, also involving distance to financing sources and political centers. In addition, it can be aggravated or attenuated by connectivity in transportation networks or through political and cultural linkages. Moreover, with the growing weight of the digital economy, issues of access and performance of information and communication technologies gain a higher importance. The paper proposes six dimensions to study remoteness, as well as available indicators for measuring them. This expanded study of remoteness identifies areas that can be prioritized through targeted investments and appropriate policies for helping SIDS overcome the challenges of geography.

Keywords:

Remoteness, Distance, Geography, SIDS, Development

1. Introduction

The first United Nations (UN) global conference on the sustainable development of small islands developing States (SIDS) recognized the structural disadvantages and specific vulnerabilities faced by this group of economies, including their “distance and isolation” (United Nations, 1994, p. 31). Successive conferences also highlighted their “traditional isolation”, the “limitations of isolation and remoteness”, and the “high transportation costs due to [their] geographical remoteness” (United Nations, 2005, pp. 20, 26, 83), as well as their “unique and particular” vulnerability due to the “remoteness from markets” (United Nations, 2014, p. 59). Remoteness is only one of the numerous economic disadvantages faced by SIDS. They also face restricted opportunities to reach higher scale economies due to their small size and limited domestic markets. Because of a narrow endowment of natural resources and their dependence on international markets, they are vulnerable to external shocks. Per capita costs of public administration and infrastructure are comparatively high. Also, given their low elevation and economic reliance on the ocean, they are particularly impacted by sea level rise, ocean acidification, natural disasters and other climate change impacts. Considering these challenges, the 2030 Agenda for Sustainable Development recognized that SIDS are among the most vulnerable economies and deserve special attention for progressing along sustainable development goals (United Nations, 2015, pp. 7, 13).

However, among the many challenges faced by SIDS, remoteness remains one the most formidable. A higher distance translates into increased costs, including transportation and insurance, weakening the competitiveness of domestic products in international markets and increasing the import bill. It also means that they generally lie far from the main transportation routes, potentially making their supply of resources costly and unreliable. Additionally, infrastructure projects, such as those enabling connections to energy and communication

networks, are more costly to implement and maintain. Coupled with their small economic and demographic weight, the remote location of SIDS means that they mostly drop off the radar from public and private financial flows, hindering these countries' capacity to finance development. As noted by House (2013), the isolation of SIDS translates into important economic disadvantages: small economies of agglomeration, high freight costs and reduced competitiveness.

But are remoteness and isolation still insurmountable obstacles for SIDS? We have seen some small island economies reach high income levels based on exports, not of goods, but of financial, logistical or tourism services. Moreover, in a context where financial flows can move from one side of the planet to the other instantaneously and where a growing share of value added comes from the digital economy and intangibles, physical distance might not be the impediment it once was. On the other hand, the toll from geographic separation could also derive from cultural or political factors, from being far away from the global centers where decisions are made and where the "action" takes place. How can connectivity, both digital and in terms of transportation, alleviate the obstacles brought about by economic and social isolation?

In the economics literature, remoteness is traditionally studied as a factor increasing transaction and information-exchange costs, therefore influencing bilateral trade or investment flows. However, this variable is considered in the traditional way: as a geographical barrier increasing trade and transport costs and therefore reducing potential inter-country linkages. Classic gravity models are examples of this. For instance, see the summary presented in Baier and Standaert (2020) and the treatment of a remoteness indicator in Wei (1996) and Harrigan (2003), whose trade models use bilateral distance weighted by GDP as a proxy for remoteness.

Beyond trade, the economics literature has also analyzed in great detail the spatial correlation of growth and the empirical evidence indicating regional convergence and agglomeration economies. Commonly, this is studied by focusing on the role of geographical distance on economic spillovers (see, for example, Guastella and Timpano (2010)). Geographical separation plays an equally prominent role in the literature studying the determinant of foreign direct investment, either from a macroeconomic perspective or by studying firm-level decisions (consider, for instance, the results in Carr et al. (2001) and Egger (2008)).

We argue that remoteness relates to more than just geographical distance from markets resulting in higher transportation costs. It also involves integration into transport networks, as well as political and cultural linkages. Moreover, with the growing relevance of the digital economy, access and performance of digital networks gain a greater importance. This paper presents the main dimensions of remoteness and proposes indicators for measuring them. These issues are presented in the context of the sustainable development of SIDS.

From the policy perspective, the broader analysis of remoteness introduced in this paper allows a more complete monitoring of progress made in sustainable development, fully taking into consideration one of the most salient challenges faced by SIDS. More importantly, although location and geographical distance cannot be changed, the expanded definition of remoteness proposed in this paper considers factors that can be improved through targeted investment and appropriate policies. This can serve as guidance when dissecting how some small island economies have successfully developed and reached a high national income level in spite of their physical remoteness.

2. Methodology

Remoteness is not only a geographical construct. Instead, it is also deeply linked with other concepts, such as connectivity and global presence. Moreover, digital technologies are transforming the way economic production takes place and how societies and economies connect, and this process is changing the relative importance of distance.

This paper proposes to study remoteness as geographical distance adjusted for connectivity. All things equal, a greater distance imposes additional costs and increases the isolation from markets and people. However, a better connectivity could considerably reduce

the distance premium. We could therefore have an economy that is remote but well connected, but also a neighboring country that remains isolated. More relevant, while a country has no control about its physical location, it can influence its connectivity through targeted investment in infrastructure and greater participation in cultural and political networks.

Both distance and connectivity are multidimensional concepts. Distance could be measured with respect to main populated areas, markets or sources of financing, for instance. Connectivity could refer to transport routes, socio-cultural linkages or digital networks, among others. This paper proposes the following dimensions to study both aspects of remoteness, including a set of relevant indicators for measuring them.

1. *Geographical distance from markets.* This is the traditional dimension of remoteness, indicating geographical proximity to other territories and separation from relevant economic centers. It will be measured through three variables: distance to nearest neighbor, distance to economic centers, and distance to trading partners.
2. *Distance from financing sources.* While distance is not an obstacle for financial flows, financial activity tends to cluster around specific centers, where most of the business and investment decisions are made. Countries far from these centers risk falling off the radar from these decisions. The indicators included in this dimension are the distance to business centers, distance from sources of foreign direct investment (FDI), and distance from senders of official development assistance (ODA).
3. *Distance from cultural and political centers.* In addition to the economic costs attached to distance, a frequently neglected burden of remoteness is the potential isolation from the centers of cultural and political power. These are the countries with a great deal of influence in defining international rules, shaping the global discourse and setting cultural trends. This dimension will be assessed as the distance to the main centers of global soft power and the countries with the strongest global presence, as measured through international indicators available in the literature.
4. *Transport connectivity.* Well-developed transport links could ease the burden of distance, facilitating the inflow and outflow of products and people. Maritime, air and land connectivity are measured in this dimension.
5. *Social and political connectivity.* It is important to consider not only the physical links of a country through its transport infrastructure, but also its cultural or social connections with the rest of the world. This is a broad dimension that will be studied through indicators on the number of immigrants in the country and the stock of nationals living abroad, foreign (tertiary) students registered in the national education system and nationals studying (tertiary education) abroad, foreign diplomatic representations in the country, and membership in economic, trade, defense or other alliances.
6. *Digital connectivity.* As described above, the digital economy has the potential to mitigate many of the disadvantages of physical remoteness. However, this requires infrastructure in information and communication technology (ICT), as well as widespread access to these tools among businesses and individuals. This dimension will be assessed through three indicators: (i) Internet access of the population; (ii) international bandwidth per Internet user, which functions as a proxy of the available Internet infrastructure; and (iii) the latency rate, a measure of network performance.

Cantu-Bazaldúa (2021) includes complete information on the 21 variables listed above, including their definition, data sources, and details on imputation methods, when relevant.

The variables considered vary considerably in terms of data ranges and units of measurement. They were transformed to a 0-100 scale through a min-max transformation to facilitate comparisons between countries and indicators. Given space limitation, a full analysis of the variables for SIDS and a comparison with other world regions will not be presented in this paper. However, in an attempt to reduce the multidimensionality of remoteness and present summary indicators, a simple aggregation exercise will be presented in the next section. One important preliminary step is transforming all variables into a common direction. For some of the variables (e.g. distance to trading partners or network latency), a higher score indicates a higher remoteness. Other variables follow the opposite direction (e.g. maritime

connectivity or Internet access). When required, variables were transformed so that a higher value corresponds to higher remoteness.

With all variables in a common scale, the index for each dimension was calculated through a simple average of the variables included. The results were then adjusted to a 0-100 scale through a min-max transformation so that, for each dimension, the most remote country takes a value of 100 and the most proximate country a value of zero. The overall remoteness index was then calculated as a simple average of the aggregate indicators for the six dimensions.

3. Results

The results for the 38 SIDS are presented in Figure 1, where each of the colored circles represents one of the six dimensions of remoteness and the triangle indicates the overall index. This chart is ordered from the most remote to the least remote SIDS, in terms of the overall index. All data is for 2019.

According to this indicator, the most remote SIDS is Tuvalu, closely followed by Tonga and Vanuatu. Samoa and Solomon Islands complete the top five. The top ten is composed exclusively of Pacific SIDS, which are remote on all or most dimensions.

After that, we observe some variability, where the overall index is improved by positive scores in one or a few dimensions of remoteness. For example, while Timor-Leste and Papua New Guinea score high in most of the dimensions, the general index is reduced by their geographical location, relatively closer to main markets and trading partners. A similar situation is observed in Nauru, although in this case it is a relatively high transport connectivity, mostly based on air transport, which lowers the overall score. The score of Mauritius is significantly improved by its well-developed digital connectivity.

On the other hand, the graph also shows some SIDS that are more proximate, in relative terms, across most dimensions, but whose score is penalized by a poor result in one dimension. For Suriname, Cuba, Guyana and Trinidad and Tobago, the area lagging behind is transport connectivity. For Maldives and Palau, it is their social and political isolation.

We observe the least remote SIDS at the bottom of the graph, starting with the Bahamas, which compensates for a relatively low social/political connectivity through a shorter average distance to markets and an excellent digital infrastructure. Following closely are Singapore, Bahrain and some of the high-income SIDS in the Caribbean (Saint Kitts and Nevis, Antigua and Barbuda and Barbados).

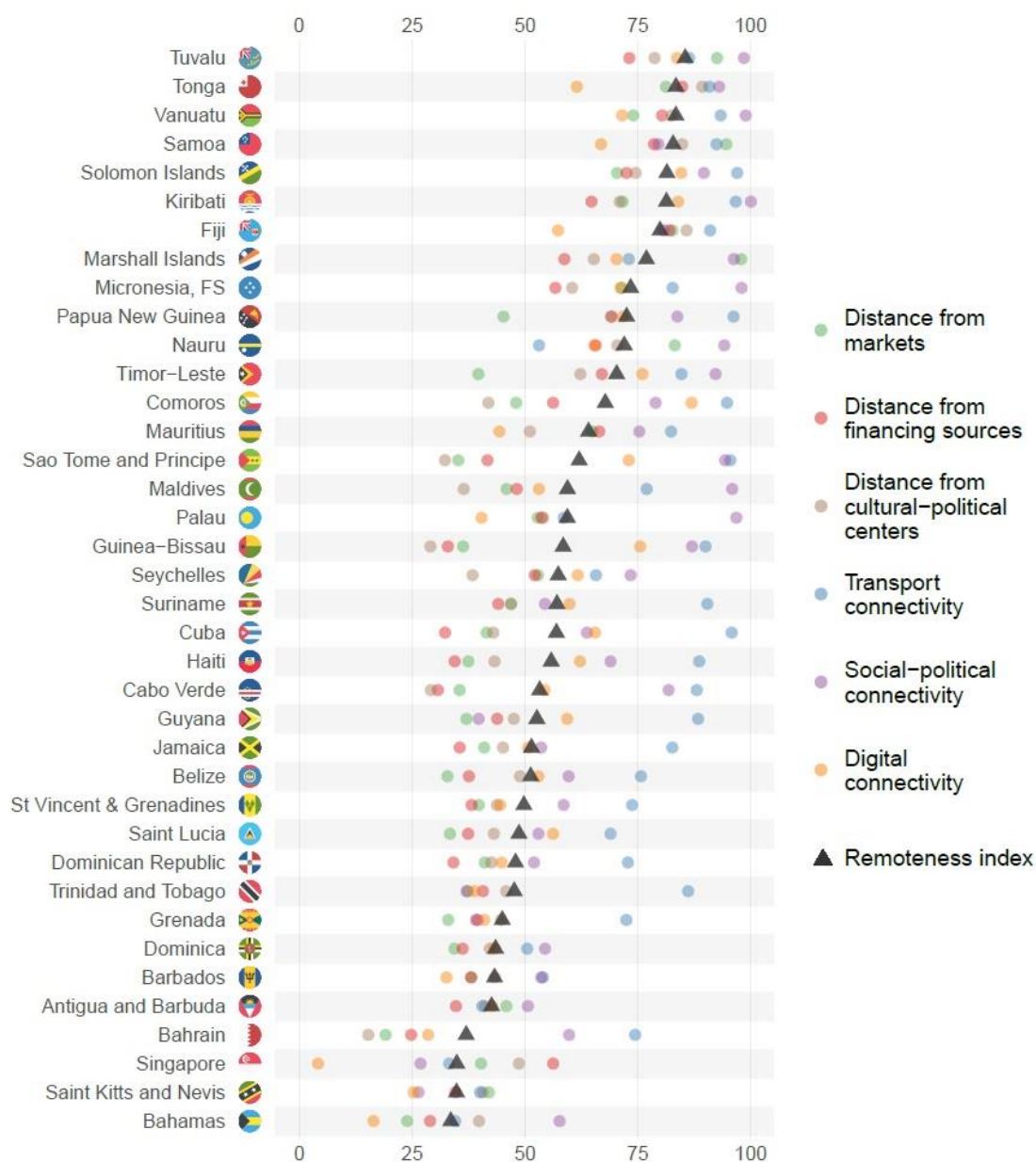
When comparing the scores of SIDS to the world distribution, they are indeed among the most remote economies in the world, particularly Pacific SIDS. Among the top 15 most remote countries according to the overall index, all of them are Pacific SIDS except New Zealand (8th), Australia (13th) and Madagascar (15th). The most remote SIDS outside the Pacific is Comoros, ranked 18th in the world.

Figure 2 presents the aggregate results for SIDS and several benchmarks. A first highlight of this graph is the strict ordering observed for each of the six dimensions of remoteness according to income level. This indicates a clear link between remoteness and economic performance, as well as a clustering effect. SIDS have a score in the remoteness index comparable to low-income economies.

Another striking result is that SIDS are not worse off than least developed countries (LDCs) or landlocked developing countries (LLDCs) in terms of remoteness. While they are located at a greater distance from markets, financing sources and cultural centers, they partially compensate for this disadvantage through better connectivity, especially in terms of ICT and digital technologies. This draws attention to the importance of connectivity and considering all aspects of remoteness beyond just geographical distance when studying the development of SIDS.

As shown in the country-level results shown in Figure 1, the SIDS average hides some important differences between countries. SIDS in the Pacific Ocean are distinctly more remote, with a higher score in most dimensions, particularly transport and socio-political connectivity. SIDS in the Atlantic and Indian Ocean (AIMS) are the least remote, thanks in part to their improved digital and transport connectivity.

Figure 1. Remoteness index for SIDS, 2019



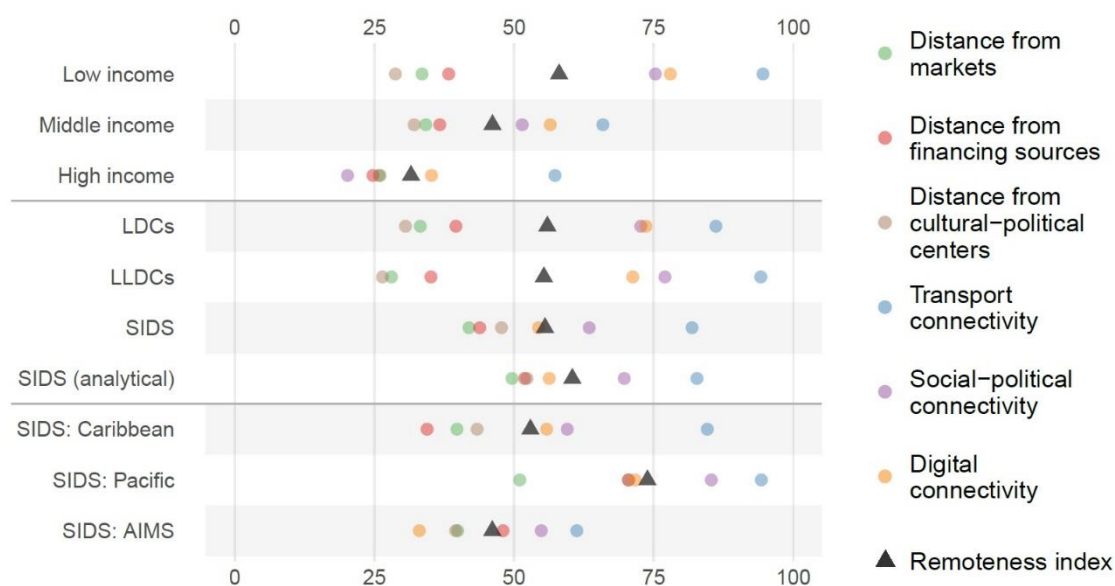
Source: Author’s calculations based on data from different sources, see Cantu-Bazaldua (2021).

Note: For all dimensions, a higher score indicates a higher remoteness.

4. Discussion and Conclusion

In terms of geographical isolation, New Zealand is a remarkable case. Across all geographical indicators (the first three dimensions presented in this paper), this is the most remote country in the world, sometimes by a large margin. However, it partially makes up for this disadvantage through a well-developed connectivity infrastructure, especially in terms of ICT. A similar situation can be observed in Australia. As additional examples, Uruguay compensates for its location by excellent digital and transport connections, while Chile has well developed social and political networks (including one of the world’s highest number of defense and trade pacts).

Figure 2. Remoteness index for selected country groups, 2019



Source: Author’s calculations based on data from different sources, see Cantu-Bazaldua (2021).

Note: Country groups are calculated as averages using total population as weights. For all dimensions, a higher score indicates a higher remoteness. SIDS (analytical) refer to a subset of SIDS adhering more closely to the conceptual definition of SIDS, see MacFeely et al. (2021).

These countries show that remoteness is not an insurmountable obstacle. While geographical distance does entail higher transportation costs and a limited participation in global decision-making, this can be offset by targeted investments in transport, communication and information connectivity, as well as an active participation in cultural and political networks. SIDS have already done important progress in this front and, on average, they are not more remote than other groups of countries (LDCs or LLDCs), according to the index presented here.

The broader study of remoteness presented in this paper also highlights the heterogeneity within SIDS. While most SIDS located in the Pacific Ocean are objectively remote in all dimensions, SIDS in the Caribbean Sea or other regions are not more remote than an average middle-income country. This calls for a more detailed disaggregation of SIDS that reflects the most pressing challenges they face.

The remoteness index proposed in this paper could be used as an objective measure to evaluate the challenges faced by SIDS as a result of their isolated location. This index reflects the importance of geography, but also of attenuating factors stemming from targeted policies for improving connectivity. Moreover, this index reflects all aspects of remoteness, including the limited options for transport connectivity (no land borders in the case of most SIDS, but also lack of access to maritime transport for most LLDCs). It could therefore be used as a broad indicator measuring the economic vulnerabilities arising from remoteness, and it could be used for determining objective inclusion and graduation criteria for SIDS, LDCs, LLDCs and other groups of countries.

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