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Geopolitical analysis in financial contagion scenarios: reconstructing spatial chains using their Legal Entity Identifier (LEI)

Abstract

This article explores the potential of spatial data for assisting in the geopolitical analysis of the international financial network. It examines the possibilities of using the Legal Entity Identifier Registry (LEI codes), a vast data bank that makes it possible to determine the spatial relationships of international financial intermediaries and their reported investment positions.

The objective is to refine the analysis in two scenarios: first, creating geopolitical codes related to international financial logic, and second, rebuilding the spatial structure of large financial intermediaries and their market positions. This makes it possible to identify contagion channels in the event of a crisis in one or more parts of the chain, which is of great interest to security.

Keywords

LEI codes; financial intelligence; geography of finance; financial contagion; geopolitical analysis.

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1. Introduction

International capital movements are the lifeblood of global capitalism. Without guaranteed financial transactions, economic exchange between countries would simply not be possible. The Asian Trade Bank estimates that 80% of global trade is financed through secure payment transactions, enabling trade even in the most insecure markets (Beck et al, 2019). However, studying the spatial mobility of transnational flows is not only of economic interest, as their behaviour can influence the evolution of specific geopolitical conflict scenarios that may be relevant to security.

Despite its centrality, few studies have paid attention to this issue. Its technical complexity is undoubtedly an obstacle for those unfamiliar with the peculiarities surrounding the cryptic world of finance. Geographers, sociologists, anthropologists and political scientists are not always comfortable studying a subject that, for decades, has been the exclusive preserve of a select group of economists. The significant lack of spatial studies of capital movements by experts from other disciplines has also influenced the prevailing discourse, which has not always considered their impact on numerous segments of society, and especially on international relations.

The geography of finance, an epistemological discipline that straddles economic and political geography, has been trying to bridge this gap for a decade. Although its implementation in Spain is practically non-existent, its has a growing presence in varied countries, such as the United Kingdom, the United States, the Netherlands, China and Russia. The 2008 crisis triggered its expansion, placing capital markets in the spotlight of experts from different areas, in response to the confusion caused by a swiftly spreading economic crisis that was financial in origin, and which subsequently affected other political, demographic and social structural conflicts.

This discipline allows us to understand in some detail how capital flows move in an organised way across the territory through a complex and specialised nodal network. Although they are not predictive, they do have regular movements that can be detected and used to make strategic security decisions. Therefore, understanding their behaviour is not just of theoretical academic interest. It has a lesser-known practical dimension, which can serve as a tool to assist in geopolitical analysis, as well as in planning foreign and security policy relations.

2. Background of applying spatial reconstruction techniques to financial chains. The state of play

Perhaps the main problem in the spatial study of international financial movements stems from restrictions on accessing information. The way asset trading is organised through broker-dealers makes it impossible to determine, using public data, who the end beneficiary is or where the real origin of a financial transaction lies. Although there are huge data banks on capital movements, it is no easy task to establish something as

apparently simple as knowing where capital movements are coming from and where they are going.

Financial intelligence units are the main stakeholders in these issues, and they use numerous and complex sources of information. Some are registered and some are informal; some are restricted and some are publicly accessible. Company reports, financial transaction reports, international trade reports, exchange of tax information and registry information are some of the known sources. For example, in Spain, the Fichero de Titularidades Financieras, managed since 2016 by the Executive Service of the Commission for the Prevention of Money Laundering and Monetary Offences (SEPBLAC), is of particular note. It is a gigantic database that gathers information on deposits, safe deposit boxes, cryptocurrencies and other assets belonging to individuals and legal entities.

A key issue is developing algorithms to reconstruct the territorial mobility patterns of financial chains. This is not easy; the BIS (2019) estimates that there are more than 5 trillion trades per day in the foreign exchange market. To improve systems for detecting suspicious transactions involving money laundering or terrorist financing, complex and diverse systems must be put in place. Some informal systems for moving capital, such as *hawala,* are difficult to detect because they do not leave a digital footprint. At other times, artificial intelligence can be used. Techniques designed to understand different environments or the behaviour of capital flows are being developed. Classification algorithms, such as *Support Vector Machines*, are designed to identify suspicious behaviour in cross-jurisdictional transactions. *Analyses of financial transactions* detect dubious patterns or behaviour, such as transfers of large amounts of money to known tax havens. This also happens for movements to accounts of persons or entities linked to illegal activities. *Network analysis* has multiple possibilities, e.g. identifying an entity's financial contacts and transactions. *Big data* techniques allow the combined use of vast amounts of financial and other data, such as luxury goods consumption, to identify patterns and trends. The same is true for *geospatial analysis,* which analyses transactions between countries and regions. *Data mining* detects suspicious behaviour in large amounts of structured and unstructured financial data. *Artificial intelligence and machine learning analyses* is linked to the above techniques and makes it possible to systematise huge amounts of information for the detection of dubious flows. *Risk analyses* explore the possibility that an entity is involved in illegal activities, based on factors such as its location, type of business, financial history, and other relevant variables. Regression techniques; decision trees; neural network development; or the implementation of rule-based models are some of the tools used to develop all these analysis systems.

Despite its many possibilities, there are still obstacles to consolidating reliable models that can work in practice. Pinto and Sobreiro (2022) have reviewed the literature on this issue, pointing out three major shortcomings: the absence of common databases, the need to refine detection techniques in information scenarios of different sizes, and also the need to develop indicators on the effectiveness of existing models. They point to the geographical bias of models depending on their location. This is true of

the methodology for monitoring criminal activities, which may vary according to the geographical area where it is applied. This is not just a jurisdictional issue. Differences in political organisational systems, or the geographical and cultural environment of origin, may influence the design of different detection techniques. An algorithm that is valid in North America may not be as effective in other regions of the world.

Other obstacles stem from the impossibility of accessing information on financial transit flows through non-cooperating countries, which are common destinations for irregular transactions. Poor quality data sources, the use of inadequate indicators, and inaccurate correspondence between registry classifications, are other problems that make it difficult to detect these capital flows.

Another factor is the limitations of the techniques usually used, which are largely linked to the well-known *FATF Forty Recommendations* (2020) for tracing money laundering and terrorist financing. Essentially, the main difficulty is that, if a high threshold is used for information scrubbing, numerous cases of false positives are generated that consume fruitless resources. However, downgrading means that statistically insignificant but qualitatively relevant flows between territories may go unnoticed.

In recent years, there has been renewed interest in refining geographical models for locating irregular capital flows. Alonso and Carrillo (2021) highlight the growing systemic intersection between geopolitics and global finance, especially in monetary policy. They differentiate between financial intelligence analysis - FININT- and market intelligence analysis - MARKINT. Each was designed with different objectives but they have common goals of strategic security interests. Segovia-Vargas, Camacho and Rocha (2021) propose a geographical model based on analysing the operations carried out in Mexican financial institutions. The use of heat maps within its states makes it easier to localise spatial hotspots of movements with a high concentration of suspicious transactions.

Novikova and Kotenko (2014), in a study on the morphology of irregular operations in mobile transfer systems, suggest the possibilities offered by mapping: it does not only make it possible to pinpoint their intensity. It can also be used to identify the territorial scope of criminal networks. The same is true for the model proposed by Colladon and Remondi (2017) for Italy, which detects the regions and countries with the highest trafficking of suspicious flows. In this case, areas with the highest presence of Mafia organisations have a high concentration of illicit practices. As capital flows become concentrated in the central nodes of the financial network, there is a greater possibility of irregular practices. However, they themselves argue that a higher risk threshold is associated with flows at isolated nodes in the network. Therefore, irregular flows occur with individuals or legal entities at points of low centrality and high-value transactions. Segovia-Vargas, Camacho and Rocha (2022) suggest implementing alternative techniques for detecting shell companies in capital transactions linked to money laundering, tax evasion, drug trafficking, corruption and bribery. The aim is to limit the number of false positives that make monitoring by financial intelligence units difficult and expensive. In this case, greater geographical intensity of interactions

does not necessarily mean the existence of suspicious flows. They suggest looking more closely at the intensity of the interaction rather than at the high density geographic heat map.

As can be seen, the current focus is on designing effective techniques that use resources and efforts efficiently. It is certainly not an easy goal to achieve. The complexity of the international financial network, coupled with heterodox capital transfer systems, makes it extremely difficult to ensure the effective supervision of such practices.

The implementation of Legal Entity Identifier (LEI) codes since 2012 adds a new source of information to the existing sources, and could perhaps help in this endeavour. It has an important advantage over other sources because it is publicly accessible, allowing researchers from universities, agencies and private companies to learn about an important part of the international financial network. Regardless of its theoretical interest for geopolitical studies, it has potential for a practical application. For example, it could help to develop *compliance* practices, *Know Your Customer* (KYC) regulatory processes, or techniques linked to developing *forensics* for detecting crimes by financial institutions themselves.

3. Geopolitics and financial chains: an asymmetric interaction

As has been seen, a substantial part of financial intelligence space studies are linked to detecting corporate relationship chains that are planned to commission illegal money laundering or terrorist financing activities. This is undoubtedly the most well-known dimension between geopolitics and finance in terms of its practical effects. It is worth remembering that prosecuting financial crimes consolidates cooperation between states, strengthens the credibility of institutions, provides financial resources to sustain them and, in short, endorses the redistributive democratic guarantees of the current Western political system.

However, the intersection between geopolitics and finance goes beyond financial crime. Their relationships develop in a sophisticated environment with a variable geometry. To explore this issue, two caveats must be raised first. The first comes from the danger of false causality. Suppose that there is, simultaneously, a sudden drop in European stock markets and a change of course in the conflict in Ukraine. There would no shortage of so-called experts ready to correlate the two factors, stating that the change to the conflict situation caused stocks to plummet. But can we really be sure of the correlation? Do we know enough about the background of financial markets to refute this causality? In the absence of a more convincing explanation, we establish relationships that it is not always possible to verify with any rigour, explaining why a geopolitical phenomenon determines a financial movement or vice versa.

The second obstacle stems from the different dimensions in which geopolitical and financial events interact. Attempts have been made, such those by as Caldara and Iacoviello (2018), to correlate daily events and financial developments, which may lead

to a rushed reading of the problem. A geopolitical event need not immediately trigger a financial one. Studying the interaction cannot only be short term, as its consequences affect different structural spheres of power relations between states, which normally move in the medium to long term. For example, the European Central Bank would probably never have accepted the massive purchase of sovereign debt at the worst moments of the financial crisis, were it not for the real danger that the European project could be politically dismantled. Perhaps it was forced to make this decision by the geopolitical risk of returning to a divided Europe, triggering one of the largest financial rescue operations in world economic history. However, the two events did not take place in tandem. It took years after the crisis escalated before a coordinated response was decided. While the collapse of Lehman Brothers was announced in the press on 15 September 2008, intervention in the Greek economy, a consequence of the previous event, was announced on 2 May 2010.

While these caveats prevent us from jumping to hasty conclusions, it does not mean that some considerations cannot be suggested with regard to the variable geometry that occurs on the geopolitical-finance axis.

– One. Some studies have identified how different spatial structures of the international financial network are linked to geopolitical logics (Fernández Cela, 2023). For example, rebuilding the financing map of international terrorism leads to a cross-spatial relationship between countries where ideological precursors, financiers and their victims are located. The 9/11 attacks highlighted the fragility of information systems in determining who was behind their financing. This event triggered expanded measures for automatically exchanging financial information between countries. The US *Foreign Account Tax Compliance Act* (FATCA), and later the OECD's *Common Report Standing* (CRS), were political responses to the practical impossibility of reconstructing international terrorist financing chains. These regulatory reforms have caused a quiet earthquake in the financial world over the last decade, in favour of better controls, knowledge and regulation of international financial transactions.

– Two. It is well known that, since the first third of the 20th century, there has been variable mapping of capital flows to tax havens. However, this logic has changed substantially following the implementation of FATCA and the CRS. Its legal architecture is questioning the country dimension as the basic spatial scale of analysis in capital movements. In terms of the geography of finance, the Westphalian concept of the state is being replaced by that of international financial jurisdiction. Although there are around 200 countries in the world, GLEIF has identified more than 300 different jurisdictions, which makes the study of spatial capital flows even more complex. This means that a London-bound transaction has a different legal environment compared to a transaction in Jersey or Guernsey. On the initiative of the United States, the definition of a tax haven as a place where no taxes are paid is being replaced by the concept of a territory that does not cooperate in the exchange of tax information with third parties. Under this definition, Delaware, by actively cooperating in the exchange

of information, could not be considered a tax haven, although its tax structure facilitates tax avoidance.

– Three. To ensure the system works, it is essential to locate financial centres and tax havens in territories that are trusted geopolitically and legally predictable. It must be remembered that much capital movement is not just a simple movement between points of origin and destination. This is not the time to go into this issue in depth, but it is worth noting that the morphology of capital flows takes different forms depending on their particular nature. It seems unlikely that North Korea's most sensitive financial operations are conducted from London or New York. Nor would it be reasonable to use these centres if Russia were to make attempts to circumvent international sanctions. Financial mapping is also affected by the prevailing climate of international relations. The choice of financial centres and tax havens is key due to cost and legal certainty, and also because of trust and political proximity. The existence of a stable political regime with a repository of sensitive financial information is key to ensuring the confidence of wealthy individuals.

– Four. It is uncontroversial to state that foreign financial relations are a matter of national security. And this does not only affect non-resident holders of sovereign debt, or which countries can control certain companies in key sectors. Knowing the structure of end beneficiaries especially investment funds, and avoiding certain countries having control of strategic companies, is a common intelligence task. There is type of financial mapping that identifies who is a debtor or creditor of whom, or which country controls which company, and having this information is a central issue in economic diplomacy.

  This may be particularly relevant for safeguarding the interests of investors in third countries. A financial intelligence unit should provide country risk information to companies considering internationalisation. This is not just a matter of ensuring compliance with contracts. Knowing how their financial markets behave, how their capital supply works, which investment funds have positions in companies in strategic sectors is key information for many related strategic issues.

– Five. Furthermore, analysing these chains can make it easier to understand spatial contagion systems in crisis situations. Valuable information can be gleaned from studying the organisational structures of large global financial intermediation companies. Holding the assets or debt of a subsidiary that is located in a country in economic difficulty, or in geopolitical conflict, can open the door to the contagion of other markets. If it were possible to identify the location of their subsidiaries, the markets where they operate and their positions in bonds and assets, you could reconstruct the spatial contagion chain of the crisis with greater viability, a key aspect when it comes to establishing preventive measures to avoid a repetition of the events of 2008, when a crisis that began in the United States spread to a large part of the world's financial system.

4. Spatial structure of financial chains: the case of LEI codes

The Legal Entity Identifier is a tool that can assist in the geopolitical analysis of international financial interests. It is far from being a panacea. The information it provides is limited, but it can be useful in certain contexts, as described above. The Ministry of Justice (2023) defines this Identifier as "*a global and unique code.../..., which is used to identify legal entities that are parties to financial transactions and to comply with reporting requirements in financial markets*". This Register was endorsed by the Financial Stability Board in 2012. The *Global Legal Entity Identifier Foundation* (GLEIF), based in Basel, is the body responsible for its design and maintenance. It was created to respond to the uncertainty generated during the 2008 crisis by the lack of knowledge about investment ownership chains in the derivatives market. It is a primary source of high technical quality, which is an added value for refining financial intelligence analysis.

Its usefulness for geopolitical analysis is twofold: on one hand, it makes it easier to re-establish dependence in international financial chains. On the other hand, it can be connected to three external registers: the Securities Identification Number (ISIN); the Trading System Identification (TIN)[1]; and the SWIFT code, which recognises the receiver of an international transfer. In other words, LEI codes make it possible to reconstruct part of the territorial chains of corporate relations and to identify some of their investments, whether these are domestic or in third countries. It is designed to establish confidence in the markets when it comes to knowing about specific positions for assets with a high contagion risk.

Knowledge of these structures can be useful for both financial intelligence and geopolitical planning. Identifying who owns which company, its nodal structure, which countries are part of the network, and in which assets they hold investments, is information that can be of interest for a variety of operational and strategic purposes.

Cross-referencing financial records is not easy to obtain or analyse, despite the fact that the information is publicly available. It is even harder when the analysis has a strategic objective, because it was not designed for this function. There is a geopolitical logic to the financial connections in the registers. The problem is developing a model that makes it possible to understand it effectively. The first aspect is related to its management model and spatial organisation. The structure of the information available in the GLEIF identifies two main sets of information: the *Level 1* set contains data about the name and registered office of the legal entity identifiers, among other data. *Level 2* information identifies financial relationship chains from the previous level, determining "who owns whom" (Figure 1). This information is important for geopolitical analysis because, among other data, it provides the addresses of millions of headquarters and subsidiaries of financial intermediaries around the world.

1 Locator for securities that do not have an ISIN code.

Level 1 information shows that the Register had 2.34 million registered companies in March 2023. Given its recent implementation, this figure is expected to increase as the LEI code becomes widely required for new types of transactions, especially for corporate transactions in non-financial sectors[2]. Companies are present in 231 jurisdictions, including almost every country in the world (Map 1). The United States leads with 280,522 registered companies. The second block, in a range between 100,000 and 200,000 entries, are the major Western European economies (UK, Italy, Spain, Netherlands and France) together with China and India. The third tier corresponds to small and medium-sized EU economies, alongside Japan, Canada and tax havens such as the Cayman Islands, British Virgin Islands and Jersey, all with values ranging from 10,000 to 100,000 registered companies.

365,880 national and international connections have been registered among the 2.34 million identifiers. Most of them correspond to parent companies and subsidiaries located within the same country. However, it is important to pay attention to the connections that are made with other countries. With the significant exception of Japan, the rest of the world's major corporations have a high level of territorial diversification in several countries, under a complex architecture of various legal formulas. No significant relocation of companies registered in Japan to third countries has been detected. This is probably the result of the inheritance of the cross-shareholding *zaibatsu* and *keiretsu* models, two structures in the Japanese financial sector that combine decentralisation without offshoring to third countries.

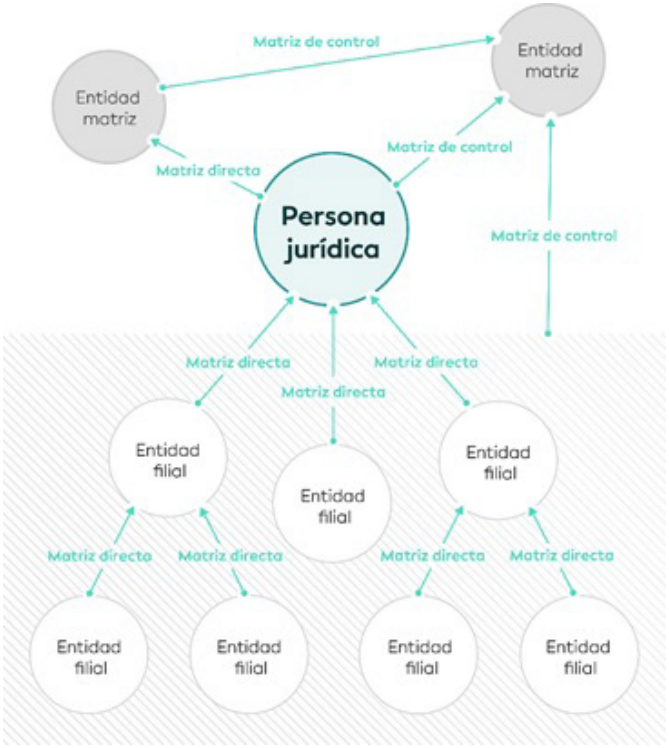
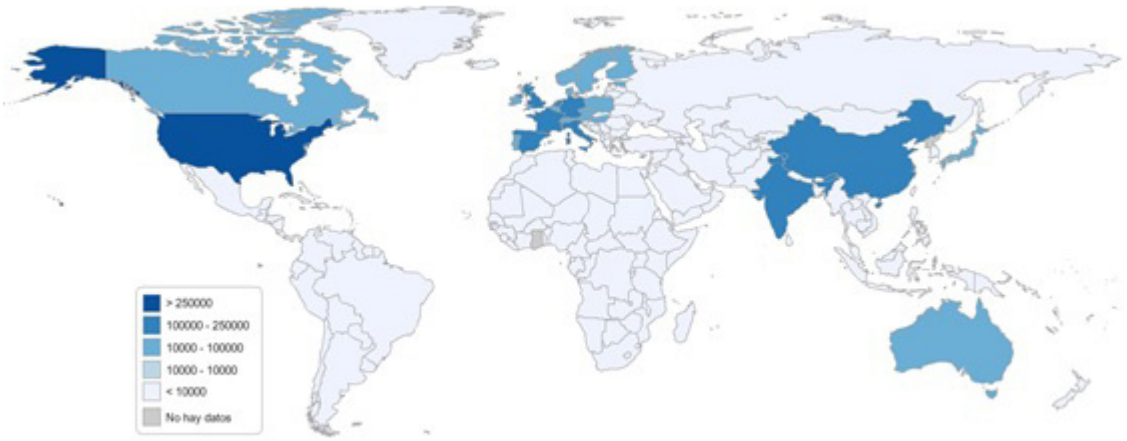


Figure 1.- Organisational structure of the Legal Entity Identifier.
Fte: GLEIF

2 The register is updated daily. The golden copy of the data analysed corresponds to the file download on 21 March 2023.



Map 1.- Reported companies with LEI codes (March 2023, in thousands). Fte: GLEIF and own work

Two of its largest Japanese banks, *Custody Bank of Japan* and *The Master Trust Bank of Japan*, are the most interconnected companies in the world. However, despite having more than 6,500 branches, no off-island locations have been detected. This anomalous system of spatial concentration contrasts with US, Chinese or European organisational logic, where the existence of important chains of financial relations in many countries is common practice. The most frequent mapping of spatial relationships fluctuates around the US-UK-EU triangle. This is the case for the major financial companies, which have more than 1,000 subsidiaries: *Amundi Asset Management*, with headquarters in France and present in sixteen countries; *Blackrock Institutional Trust Company*, with headquarters in the United States with subsidiaries in fourteen states; and *Universal Investment*, with headquarters in Germany and located in thirteen countries (Figure 2).

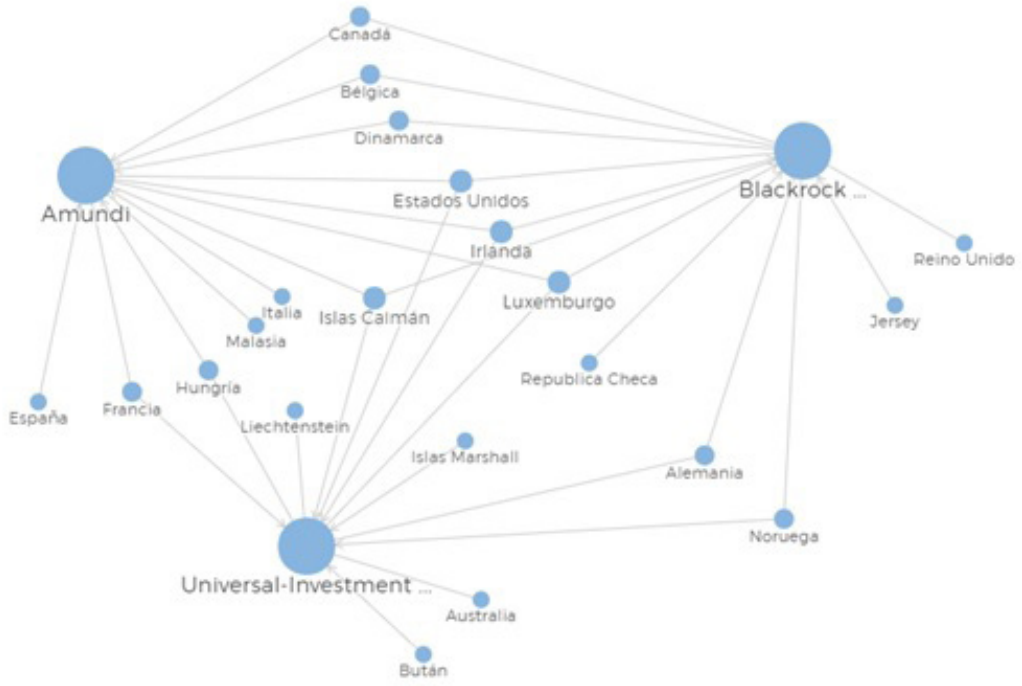


Image 2.- Registered spatial connections of the international financial companies with the highest level of offshoring. Fte: GLEIF and own work

However, what is less well known and has greater relevance for intelligence, are the financial connections that global or regional powers have with other geopolitical zones. Cross-referencing LEI, ISIN, SWIFT and BIC codes, i.e. the network of companies and financial assets they hold, makes it possible to obtain a snapshot of what could be geopolitical hotspots in third regions. This is where the interests of global financial companies can be detected in territories far removed from their headquarters, and which are outside the more obvious sphere of influence of their multinational structures. A second possibility offered by this information is that it can be useful for further delineating the spatial channels of financial contagion transmission in crisis scenarios. This is what happened with the instances of contagion in the 1994 *Tequila Crisis*, or during the 1997 Asian crisis, when the financial crisis spread between widely separated territories through the domino effect of interconnected investments between different world regions. The golden copy of the file finds that the 2.34 million registered companies have declared holdings of 8 million different bonds that they control through their worldwide network of subsidiaries, with an average of 3.3 securities per company.

The international structure of the subsidiaries of financial intermediaries reveals the interests of the world's major geopolitical players in virtually every region of the world. With the aforementioned exception of Japan, the large financial companies of the world's major powers have a large international network that allows them to expand their interests in any country. The origin-destination matrix determines that the European Union has the world's largest network of financial connections to third regions, with 30,653 localised records going preferentially to the rest of Europe, including the United Kingdom[3]. North America, East Asia and South East Asia are other relevant destinations. 22,248 US corporate connections abroad have been recorded. Preferred destination regions are the European Union, the Caribbean, other North American countries and the United Kingdom.

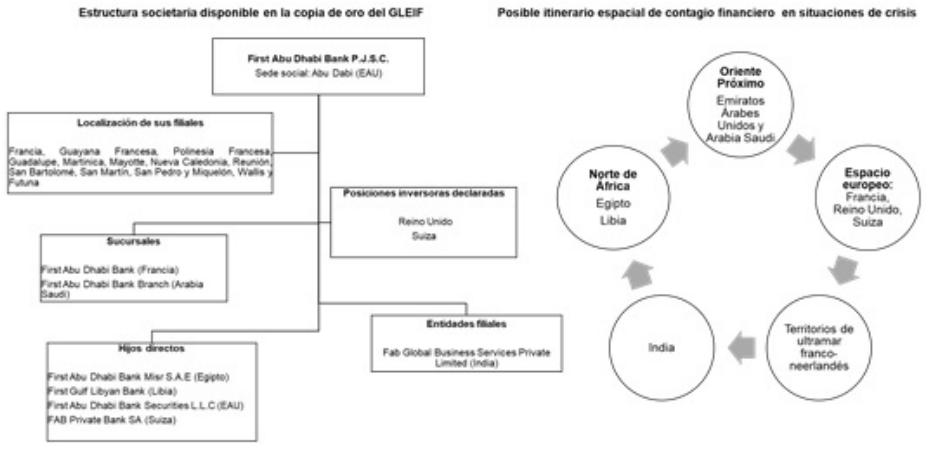


Image 3.- Geopolitical territories of interest due to the financial risk of spatial contagion from the National Bank of Abu Dhabi. Fte: GLEIF and own work

3 It probably overtakes the United States in interconnections because of the distortion caused by comparing a single state and the 27 EU member states.

The rest of the regions are some way behind the others. The UK's major financial interests are concentrated in the EU, North America and the Caribbean. The offshoring of the Chinese financial system is minor and is concentrated in East Asia, the Caribbean and the EU. The opposite is true for India, which has more homogeneous spatial offshoring, spread across the EU, the UK, the Caribbean, the Middle East and South East Asia. Russia has interconnections with Europe, including both the EU and the UK. It is worth noting the presence of several subsidiaries located in some sub-Saharan African countries. Finally, it is important to note that Saudi Arabia's major financial offshoring is to tax havens in the Caribbean.

However, its potential for use also mean it is possible to identify the geopolitical interests of a given financial institution. Knowing the location of their investments, and their branch network, makes it easier to explore their level of dependence on specific regional markets. For example, this is the case with the *National Bank of Abu Dhabi*. It has a sophisticated financial structure with offshoring in nine countries on three continents, with interconnections that make it possible to determine the most likely routes of spatial contagion in the event of a crisis. It has issued 91 bonds in the UK market and 7 in the Swiss market, further internationalising its connections between different regions (Figure 3).

Despite its promising potential for geopolitical analysis, the Register has some important shortcomings that should be highlighted. The first is the limited number of registered companies. Although its use is expected to grow over time, especially if it becomes mandatory for certain transactions in international markets, its volume is still low and segregated to the Western financial environment. The second limitation is that the ISIN code makes it possible to identify bond trading markets, but does not identify the end beneficiaries, as the registered companies function mostly as intermediaries. This is important for the overall assessment of geopolitical dependence because, in practice, behind the intermediaries registered in Hong Kong, London and New York you can find end beneficiaries located in other geopolitical regions.

5. Conclusions

The relationship between geopolitics and finance is complex, and in a permanent state of variable geometry. Exploring this relationship necessitates a technical analysis so that their interaction can be understood structurally, because it leads to critical consequences. The geography of finance is a tool that can help to improve the study of finance: finding the logic behind international capital movements is an important step towards understanding this interaction. Differences between territorial jurisdictions are a key factor in this issue.

Perhaps the main difficulty in understanding this interaction stems from the fact that there is no single relationship plane between geopolitics and finance. Their symbiosis produces at least five distinct analysis dimensions. First, financial mapping as an aid to reconstructing illicit activities: money laundering, corruption, drug trafficking

and especially international terrorism are among the most well-known possibilities. Second, international capital flows need secure transit territories. Financial centres, computer servers or tax havens must be located in territories with high levels of geopolitical trust. Third, financial mapping can help to identify end beneficiaries in critical sectors. Knowing that a given state controls an investment fund present in a strategic company is a basic aspect of the work of financial intelligence units. Fourth, it provides an insight into the financial structure of third countries, a strategic aspect for defining the geopolitical codes of international relations. Fifth, it helps to identify possible spatial channels where contagion might spread in crisis situations. Identifying the international positions of large investment funds can make this task easier.

Support Vector Machines, financial transaction analysis, network analysis, *big data* techniques, geospatial analysis, data mining, artificial intelligence and machine learning analysis, risk analysis, regression techniques, decision trees, neural network development and the implementation of rule-based models are some of the tools currently used to detect the behaviour of international financial flows. A lack of shared data banks, the need to refine detection techniques in information scenarios of different sizes and to develop indicators to show the effectiveness of existing models are the main obstacles currently faced.

This article contributes to the topic by suggesting that a new source could be incorporated, which may be of help in certain tasks. The Legal Identity Identifier Register (LEI code) is a promising database because its structure makes it possible to reconstruct parts of international financial chains. Moreover, its connection with other registers, such as SWFIT, BIC and especially the ISIN code, opens a window of opportunity to establish the bond and asset positions of the main international financial intermediaries and the markets in which they operate.

The 2.34 million registered companies form a global nodal network of 365,000 financial connections. With the exception of Japan, all major geopolitical actors have spatially diversified financial structures with a global reach. Geopolitical affinity and a shared cultural environment continue to be the predominant localisation patterns in the logic of these networks. Nevertheless, the Register means interesting connections can be reconstructed, such as connections maintained by Russia in some sub-Saharan African countries.

As this information is publicly available on a company-by-company basis, using it makes it possible to identify the levels of exposure of certain international investors to countries at risk of default. By knowing the spatial structure of branches, and the financial markets where they invest, it is possible to find out more to reconstruct the spatial routes of contagion between countries in the event of an economic crisis.

However, despite these advantages, it is important to note the significant limitations of this source. The information available on GLEIF is very limited, although it is expanding due to its young age. Moreover, reported asset holdings only refer to financial intermediaries, and not to the end beneficiaries of the investment, which

remain unknown. These may be located in third countries that do not appear in the data bank, so it is quite likely that their geopolitical reach is even greater.

Future research is open to the possibility of an in-depth analytical use of this source, which may offer interesting opportunities to find out more about the geopolitical scenario surrounding international capital markets.

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