

# **Brexit and the ties that blind?**

## **How global finance shapes city-level growth models**

Nicolò Fraccaroli, Mark Blyth, Aidan Regan

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### **Abstract**

This paper contributes to the Growth Model (GM) research programme within comparative and international political economy by analysing the impact of Brexit on London and other financial centres within the EU - Paris, Amsterdam, Frankfurt and Dublin. We make two key contributions. First, we argue that for many countries, national growth models are really *city-level* growth models, and that this is directly observable in financial centres. Second, we argue that high-tech cities are sticky, adaptable, and do not move easily. Empirically, we test this argument with the case of Brexit, and use bank-level data from the Bureau van Dijk database to observe the movement of loans, jobs and financial assets within the UK, Ireland, Netherlands, France and Germany. Our findings suggest that whilst there have been important changes, there has not been any significant relocation away from London to EU-based financial centres. Post-Brexit, all of these financial cities have grown, suggesting that they are better conceptualized as part of a complementary global wealth chain. We conclude with some observations on what this means for GM theory within the study of political economy.

## Introduction

Recent research in comparative and international political economy has sought to address the criticism of ontological nationalism leveled at the ‘Growth Model’ (GM) research program by better specifying the integration of global and regional growth drivers (Stockhammer 2021; Schwartz and Blyth forthcoming; Bacarro, Blyth and Pontusson – forthcoming), and by focusing on cases of foreign-investment led growth, such as Ireland and Hungary, where global growth dynamics more clearly determine local outcomes (Bohle and Regan 2021). We aim to build upon this critique through two avenues. The first is theoretical. We bring GM theory into a conversation with economic geography. This allows us to identify and analyse the nature of scale effects, agglomeration effects, and *city-states* as growth nodes to better augment our understanding of how *global financial flows* shape domestic growth models. The second is empirical, which is provided by the natural experiment of Brexit, and the impact this will have on other financial centres across the European continent.

Brexit, as many commentators have noted, is the first trade agreement in modern history designed to raise trade barriers (Sampson 2017; O’Rourke 2019). It also excludes, for the moment at least, trade in services, which is where the UK has comparative advantage, particularly in financial and business services. This is significant because the *regulatory divergence* that is the essence of Brexit will, by definition, raise border and transaction costs for service firms inside the UK. As Hantzsche et al demonstrate (2019), this will clearly impact UK growth, given that the UK GM is hugely dependent on London’s financial services sector (see also Kalaitzake 2020 and Lavery et al 2019). Finance produces 7 percent of the UK’s GDP, 10 percent of tax revenue, and 5 percent of employment - not to mention its broader impact in financing consumption more generally. If London’s financial firms decide to move to a lower cost environment, or are compelled to do so by a lack of regulatory equivalence post-Brexit, then this will clearly impact the future of the UK growth model.

But that, in turn, brings us to the first issue that we wish to consider. Is the UK's loss someone else's gain? Given the size of the UK economy, if a small percentage of its financial sector moves, for example, to Ireland, as some firms have done already, then that may have a disproportionate impact on the Irish GM. Given that at least one part of the Irish GM (low corporate taxes) is likely to be of declining importance due to global tax changes, 'more finance' could be a fillip for declining corporate tax revenues. But such an augmentation could also further destabilize the current politics of the Irish GM, if it further contributes toward housing inequalities in Dublin City. Similarly, Amsterdam has already taken a large bite out of euro denominated share trading from London, and could build upon this comparative advantage by attracting still more such trading from London (Lavery et al 2018; Heneghan and Hall 2020). While the Netherlands has a similar GM to the UK, in so far as it's a highly financialized economy (Fuller 2020), taking a large bite of the even larger London financial pie could have similar distortionary effects on Amsterdam vis-à-vis the rest of the Dutch economy, as could occur if Dublin reaped their share of the Brexit windfall.

Two other financial centers that also potentially stand to gain from Brexit are Paris and Frankfurt. Both hope to prize euro-denominated derivatives *clearing* trade from London at the end of the period of regulatory equivalence in 2022 (Lavery et al 2019). Doing so would establish either city as a significant global financial center, given the volumes of money involved. Moreover, whichever city wins clearing - which is so central to the movement of money around the world - would probably become the financial regulatory hub for the whole of Europe, which would lead to even greater regulatory divergence with the UK, further undermining the UK's finance-driven growth model.

However, the evidence to date seems to suggest that not even the shock of Brexit can undermine the core comparative advantage of London in derivative trading. In this regard, embeddedness may be the defining feature of *city-level* growth models. As research from

economic geography would indicate, Brexit may result in the fragmentation and relocation of some sub-sectors of finance to other cities, but not in the core value-added sectors that drive growth (James et al 2018; Cassis and Wójcik 2018; Henegan and Hall 2020). But even though firms involved in financial clearing may prefer to remain in London because of the settled regulatory environment, and co-presence network effects to other financial markets (see Kalaitzake 2020), the EU still has two good reasons to want to reincorporate clearing into an EU country, and to develop a competitive global financial centre to rival the UK.

First, as Paris is keen to argue, it sits well with the EU's new concern with 'strategic autonomy.' Why would the EU want its clearing to occur in a foreign country when in a moment of crisis the national interest of that country may not be the same as that of the EU? Second, and related, to the extent that such markets can create systemic risk in moments of crisis, why would you want that risk generated in a country whose regulations increasingly diverge from your own? Given this, it is reasonable to expect that London will have to compete with the emergence of EU-based financial centres. However, what all this also points to is something that GM theory has yet to really consider, and which is the second issue that we wish to investigate. Namely, the reverse impact of scale effects - that not only do global financial flows matter for national GMs, but when we talk about national GM's, what we may actually be talking about are *city-level* GMs.

The Irish GM is effectively Dublin. It generates 50 percent of Irish GDP, and almost two thirds of the foreign direct investment (FDI) that shapes the Irish GM flows to Dublin. The Netherlands is not Amsterdam, but Amsterdam produces one third of Dutch GDP.<sup>[1]</sup> The same is true of Paris in relation to France.<sup>[2]</sup> So any boost to these cities, which is what Brexit augers, could have a disproportionate impact on their underlying *national* GM.<sup>[3]</sup> Turning back to the UK itself, while London is only (sic) 22 percent of UK GDP, it is the only part of the UK that generates positive GVA, the underlying component of GDP. The rest of the country

effectively lives-off transfers from London, hence the current government's desire to 'level up' the country. This poses an interesting theoretical puzzle, with ontological and methodological implications for GM theory. If national growth models are actually, in some crucial cases, regional and city-level growth models, what does that mean for how we should conceptualise and measure the determinants of growth within comparative and international political economy research?

The remainder of the paper is structured as follows: first, we use Brexit to show how and why scale at the city-level matters for global finance. Second, we examine the changing regional geography of financial centres in Europe. Third, we examine the evidence and data on the effects of Brexit on other financial centres in Europe - Paris, Frankfurt, Amsterdam and Dublin. The final section concludes with a discussion on what this means for the growth model research programme in comparative and international political economy.

### **Scale and GMs**

Scale rather obviously matters for growth. Very large consumption driven economies such as the USA can have multiple growth drivers across diverse economic regions. Small open economies face an entirely different set of constraints, given that they are entirely dependent on the consumption habits of other countries. In terms of focusing on cities, large and relatively closed demand-led economies such as the USA and China<sup>[4]</sup> can accommodate multiple cities that do not overly contribute to national income or define the national growth model – Shanghai is not Beijing, and DC is not LA. But for small open economies and for (some) of the consumption-driven economies in Europe, this is not the case. In these cases the major city often defines the GM and generates the GVA that the rest of the country lives off. As such, changes to particular cities that could be wrought by Brexit causing finance to

move its activities could prove materially important to how we understand these ‘national’ GM’s.<sup>[5]</sup> This suggests two claims about national GM’s and the issue of scale.

First, along the line of the literatures on ‘too much finance’ (Baker et al. 2018, Mian 201x) and (appropriately) ‘Dutch disease,’ if national GM’s are really globally interconnected city-level GMs that generate the transfers that keep the rest of the national economy going, can the capture of trading and other activities from London materially alter the domestic growth model? And if it can, should such cities ‘be careful what they wish for?’ Can such windfalls be more distortionary than productive? This would suggest that scale really matters for national GMs, but in an unusual way insofar as the scale effect is *amplified downwards* through the city and not upward to and through the wider international economy. It would also suggest that the effect of financial flows and mobile capital on GM’s in general is strong - they affect the big as well as the small. It’s perhaps not a surprise that Latvia’s GM lives off global flows, but it is more surprising that this may be true for London or Paris.

Second, and contrary wise, what if such financial flows are in fact less ‘mobile’ than we think, especially when they are intermediated at scale? Specifically, what if Brexit results in regulatory divergence and increasing border costs, but the valuable parts of finance do not actually move out of London? What would that tell us about the role of cities in GMs? It would suggest that what makes finance important for growth and what alters GMs are not financial flows *per se*. Rather, it is the wealth that financial assets generate in particular places that matters, and this may be far less mobile than we think. The value added of GDP may be ultimately sunk in high-tech cities. More concretely, what matters is the movement of those sub-sectors of financial activities that significantly augment national GVA; add to the national tax base; and significantly affect national employment and growth patterns.

In the case of rival EU-based financial centres gaining after Brexit, moving front office jobs may matter more than back office in terms of taxes, but not in terms of aggregate employment (see Kalaitzake forthcoming, 2021). So what should be considered a windfall? Similarly, co-presence in high-value added activities within a city matters in activities such as mergers and acquisitions and investment banking. Firms need to be ‘in place’ to make the deal happen, and firms need a stable and embedded ecosystem of deal-making and legal expertise to be able to close and enforce the contract.<sup>[6]</sup> Co-presence in high-value added activities matters much less if you are dealing with automated processes such as EFT trading, crypto exchanges, and derivatives clearing. Such activities are indeed more mobile, but they also add less value insofar as they matter much less for *employment and taxes*.

In addition, as we know from the study of economic geography, the network effects of a dense financial service centre - the quality of regulation, the ability to leverage existing expertise to launch new markets such as carbon trading – matters greatly (see Cassis and Wójcik 2018). If a given global financial center within a city has these assets and networks in place, it is likely to keep them. It is much harder to invent them. In sum, while financial flows may grow over time and jobs may move, and the aggregate numbers may be large in monetary terms, will such liquidity really change or challenge the UK GM? Will other cities within the EU really benefit from Brexit, and develop into competing financial centres?

Brexit gives us an opportunity, albeit with preliminary data, to adjudicate between these positions and hopefully say something useful about scale effects. In what follows we discuss the expected impact of Brexit on the City of London. We examine the data on what has happened to banking and financial services since the Brexit referendum in 2016, and more tentatively, since the shape of the UK’s withdrawal agreement became clear in 2020. It

is our core claim that scale not only matters for GMs when one scales up from micro-states to small open exporters, and from large consumption economies to global regional blocs. It matters on the *way down* too, from the national GM to the level of the city. Clearly a very small open economy such as Ireland can have its GM shaped by such global financial flows, but so can larger states such as the UK and France. But given the embeddedness of high-tech urban cities for national-level growth models, and in line with Manolis (2021), it is our expectation that city-level financial centres will not easily relocate to other jurisdictions.

### ***Brexit and GMs: Scale and Increasing Returns***

Heneghan and Hall (2021:44) make the important observation that when financial centers ‘take a hit’ from a macroeconomic shock they tend to rebound quickly given the support they receive from governments. However, while employment in the core recovers, financial employment outside of the core (in back office functions) declines. This is materially significant for the UK because two thirds of financial sector employment is located *outside* of London, even if almost all the high value added and high tax generating jobs are located inside the City of London. Brexit therefore constitutes a material threat to employment outside of London in one of the few positive GVA sectors of the UK GM. Firms may adjust by remaining in London but allow their back office functions to ‘take the hit’.

Such an analysis presupposes however that Brexit constitutes such a ‘hit’. This is not at all obvious when we examine the UK-growth model through the lens of London finance. In the words of Manolis Kalaitzake (2021) London City has “structural power”. The depth and complexity of its financial system makes it strategically important for *both* the EU and the UK. As such, Brexit may be a shock, but finance is resilient. Kalaitzake’s analysis focuses

on the period between December 2018 and April 2019 when the prospect of a ‘no-deal’ Brexit loomed large. His core argument is that London provides functions for the EU’s non-financial sector that no other EU-based city can replicate. London’s financial ecosystem basically generates increasing returns to scale. This takes place through the centrality of UK common law to the bond market, the physical proximity of markets to large data centers within the UK, and to the transatlantic underwater cables linking London to New York. The implication is that it produces efficiency gains and lower costs than other rival centers on the European mainland. As such, rival centers are ‘paper tigers.’ They never developed the same competencies, and cannot compete with London (Lysandrou, Nesvetailova, and Palan 2017).

Crucially, London is the home of much of the EU’s digital financial infrastructure in the form of Central Counterparty Clearing firms, which “handle 82% of all EU related interest rate derivatives (used by EU firms to hedge risk) and clears a full 70% of Euro-Denominated Trades,” (Kalaitzake 2021: 12). These clearing houses have important secondary functions as regards EU monetary policy given the centrality of Repo markets to EU finance (Gabor and Ban 2017). Similarly, in other high value added areas such as asset management, whereby even if the notional amount of assets under management of Germany and France combined is 75 percent of London’s share, almost 90 percent of total assets are ‘delegated’ back to London in terms of active portfolio management (Kalaitzake 2021: 13).

Recognizing these vulnerabilities for the EU, Kalaitzake (2021: 17-19) argues that the decision by the EU to grant full equivalence to CCPs, the decision to protect delegation of portfolio management to London, and the decision to roll over passporting rights to UK domiciled firms constitutes “decisive evidence” (Kalaitzake 2021: 15) for the structural power of the UK financial sector vis-a-vis the EU. Moving in the same direction are further

EU ‘climb downs’ on share trading, insurance listing, and the whole ‘temporary permissions regime’ offered by the UK to keep EU firms in London. All of this would effectively suggest that London is setting the agenda rather than the EU.

Kalaitzake offers a powerful set of arguments for why finance may shrink in the UK, but that the core value added of London-finance will not fundamentally move in response to Brexit. As such, we can expect broad continuity in the UK finance-driven growth model. But now that the withdrawal agreement has been signed and the extensions granted to finance for the period 2017-2020 are running out, are these ties still so binding, or are they blinding us to ongoing changes in London and the UK-finance driven GM that such structural approaches tend to downplay?

Consider that despite such forces for stability, Amsterdam overtook London as the main share trading hub for the EU in February 2021.<sup>[7]</sup> Despite the impeccable logic for the centrality of CCPs and the immobility of those trades due to the centrality of London as a data hub and cable connections network hub (Casis and Wojcik 2021: 570), derivatives clearing has indeed begun to move out of London. In mid-2020 London cleared 40% of Over the Counter (OTC) swaps. By January 2021 that had fallen to 10% with Paris, London and Amsterdam each taking some of that trade.<sup>[8]</sup>

The UK also seems to be banking on the EU playing hardball going forward on equivalence decisions. Chancellor Sunak announced a set of new equivalence offers in November 2020 to which the EU has yet to respond. The UK has instead responded with new regulatory initiatives on listings and competitiveness,<sup>[9]</sup> and on making London a hub for cryptocurrency trading,<sup>[10]</sup> and climate finance. And while only \$1.2 trillion in assets and 7,500 jobs had left London by October 2020, it is far from clear that this trickle will not

become a major leak, and turn into a flood.<sup>[11]</sup> If this is the case, and our arguments about scale and cities are correct, then while this may have somewhat distortionary effects for other European capitals, such a flood could prove extremely disruptive for the UK GM.

Given this, what if these structural forces are not so structural after all? Perhaps London may lose out in the *long term*? This is what's implied in recent work by James and Quaglia (2019). They suggest that while the City very much wanted 'business as usual' and market access, the politics of Brexit – and the malodor of the financial sector post 2008 – combined to make UK politicians recalibrate what the interests of finance 'really' were (regulatory divergence), and to make UK negotiators more sensitive to aspects of competitive advantage the UK may have in the face of future (likely) regulatory divergence.

Furthermore, the structural dependence of the EU on London may only be short term, as seen in the EU decision of May 4<sup>th</sup> 2017 to make the relocation of Clearing Houses a matter of EU policy, which in turns animates competition for business from Paris and Frankfurt, as each hold rival Clearing houses (Clearnet and Eurex respectively). As such, business leaving London was baked into the withdrawal agreement cake. Given these contending causal stories, it is time to examine the data that is available for tackling these questions and then return to the issue of scale effects and GMs.

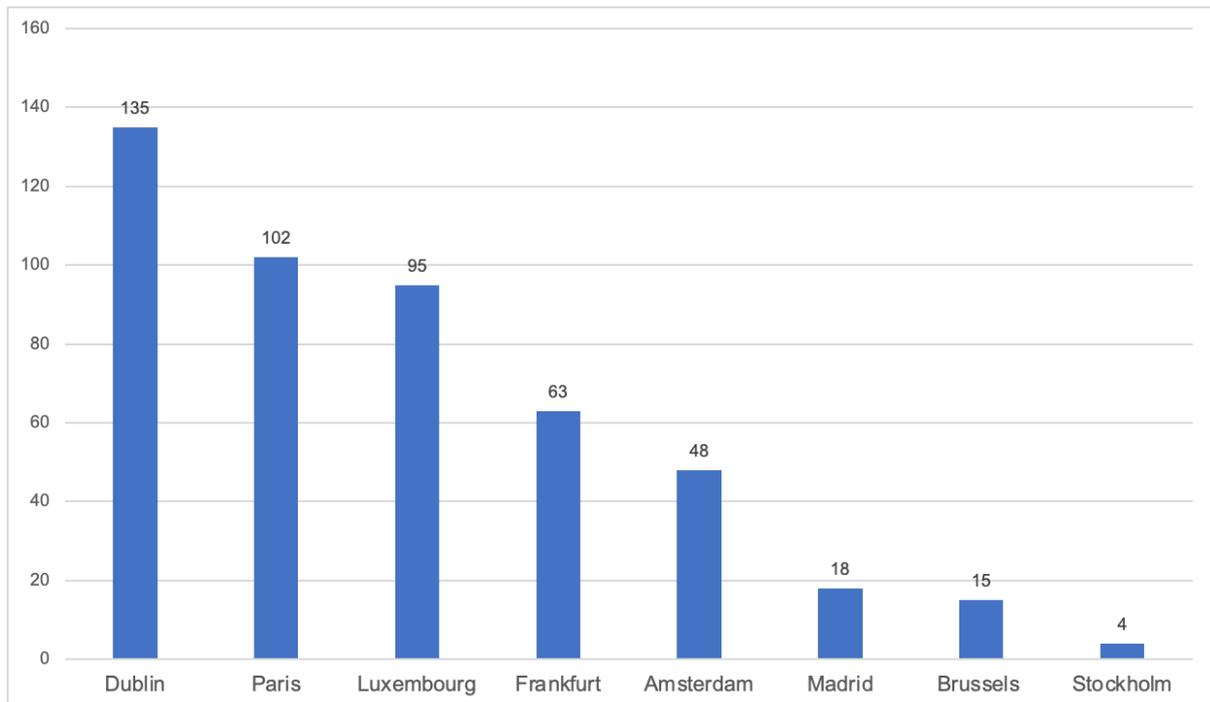
### ***The impact of Brexit on London and EU financial centers: existing evidence***

Since the referendum, a number of studies have attempted to estimate the impact of the Brexit vote on the City by focusing on different variables. Preliminary evidence based on stock market data shows that banking was the sector in the UK that experienced the largest drop in returns ten days after the referendum (Ramiah et al. 2017). However, the Brexit shock was not only a British phenomenon, as it affected EU banks too. Schiereck et al. (2016)

found that for EU banks the short-run drop in stock prices experienced after the result of the referendum was more pronounced than the drop following Lehman's collapse. Berg et al. (2021) show that the Brexit referendum caused a 24 percent contraction in the number and volume of syndicated loans emanating from London. The most striking finding of this research is that the fall in loans mostly stems from *a drop in demand for such loans by UK firms*. According to Berg et al. (2021), this shows that London has not lost its attractiveness as a global financial centre among foreign borrowers, and international investors more broadly.

As discussed above, for the EU, Brexit is considered an opportunity for an EU-based city to attract London-based business. Hamre and Wright (2021) identified more than 440 London-based firms in the banking and finance sector that reacted to Brexit by relocating their business to the EU, moving staff or setting up new entities in the EU's other financial centres - Paris, Frankfurt, Amsterdam and London. Figure 1 shows where London-based firms decided to relocate after Brexit based on data in Hamre and Wright (2021). The numbers in the figure include 'secondary moves,' which are relocations that followed a pre-existing relocation to another EU city. For example, while a number of firms relocated to Frankfurt as their main EU hub, they also expanded to Paris or Madrid in secondary moves. Figure 1 clearly shows that Dublin was the main destination of the Brexit-led financial exodus. Most of the relocation to Dublin does not consist of banks, but asset management firms such as Goldman Sachs, Morgan Stanley or Aberdeen Standard. 37 percent of post-Brexit relocations to Dublin are asset management firms. Only 14 percent are banks. The situation is the reverse for Frankfurt - 38 percent of relocations are banks and 7 percent of asset management firms.

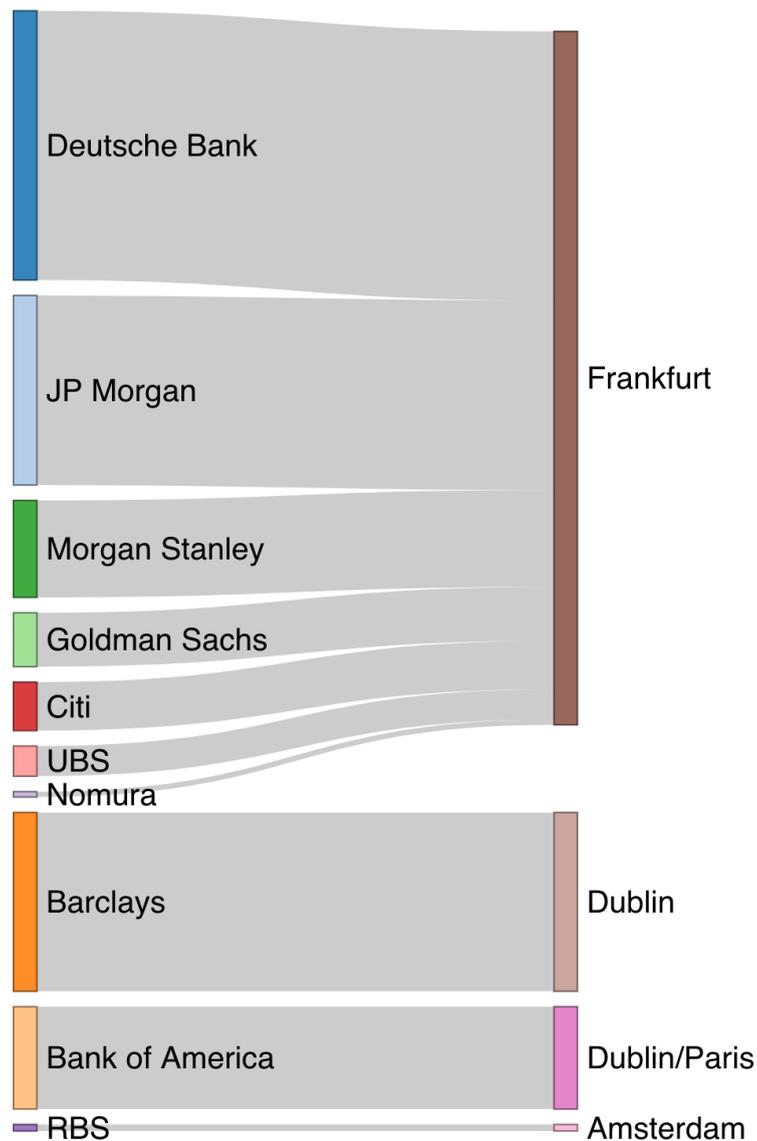
**Figure 1: Number of firms moving from London to EU financial centres, by city**



Source: Authors' elaboration based on data in Hamre and Wright (2021).

It is important to note that the 'number' of firms is not necessarily a proxy of the size of the relocation. If we just look at the share of 'assets' relocated, Frankfurt occupies a prominent position. Figure 2 shows a Sankey diagram of the assets transferred by the ten largest banks from London to other EU financial centres. Out of the £900bn in assets depicted in the chart, £644bn shifted to Frankfurt, whereas the remaining £267bn was distributed between Dublin, Paris and Amsterdam. The largest shifts are represented by Deutsche Bank (£250bn), JP Morgan (£176), and Barclays (£166). In this regard, Frankfurt is the EU-based city that has attracted the most assets, which is arguably the most important variable, given that it is the assets that generate the income, and in turn, the size of the financial centre.

**Figure 2: Assets moved from London to EU financial centres, selected banks, asset value in billion £**



Source: own elaboration based on data in Hamre and Wright (2021). Note: the size of the flows is expressed in billion £ and is proportional to the size of the grey areas for each bank.

### *Growth models and their financial centers*

The influence of financial centers in growth models differ across the countries under analysis. To appreciate these differences, we now look at the concentration of bank-level indicators in each city's financial center vis-a-vis its domestic economy. We extract bank-level data from Bank Focus (formerly known as Bankscope), from the Bureau van Dijk

database. Our sample comprises data from financial institutions located in the United Kingdom, France, Germany, Ireland and the Netherlands. In order to observe changes in institutions depending on their geolocation, we keep only unconsolidated bank statements. Since Bank Focus reports the city where each financial institution is located, we are able to identify those that are located in financial centres and those that are not. Since our focus is the private sector, we drop central banks and public development banks from the sample.

Our database has a total of 4,206 financial institutions for the years from 2004 to 2020. The largest share of institutions is located in Germany (51.68 percent), which is populated by a large number of small cooperative and savings banks. The second largest share is in the UK (22.75), followed by France (14.85), Ireland (5.46) and the Netherlands (5.27). The majority of institutions in the sample are non-life insurance companies (25.22 percent), cooperative banks (20.07), life insurance companies (14.64), savings banks (9.45), commercial banks (7.15) and investment banks (3.42). Given the high share of insurance companies, as a robustness test we will re-estimate the baseline model by excluding non-life and life insurance companies from the sample.

The concentration of banks in financial centres varies considerably across countries. A straightforward indicator to see this is the distribution of observations across cities within the same country. London comprises 59.11 percent of all the observations for the UK. The second city in the UK with the highest share of observations is Edinburgh with 3.84 percent of UK's observations, and which is home, among others, of the Royal Bank of Scotland. Amsterdam covers 20.71 percent of the Dutch sample, followed by The Hague (9.84 percent). Frankfurt is the financial center with the lowest number of observations relative to the rest of its domestic financial sector. The German city, seat of the Deutsche Bundesbank and of the European Central Bank, covers 5.28 percent of the German sample, which is very close to Hamburg, which covers 4.78 percent. The most extreme distribution is in Ireland,

where 92.53 percent of the observations are located in Dublin. The second Irish city in terms of observation is Kildare which covers only 0.82 percent of the Irish sample.

### *Financial centres within national growth models*

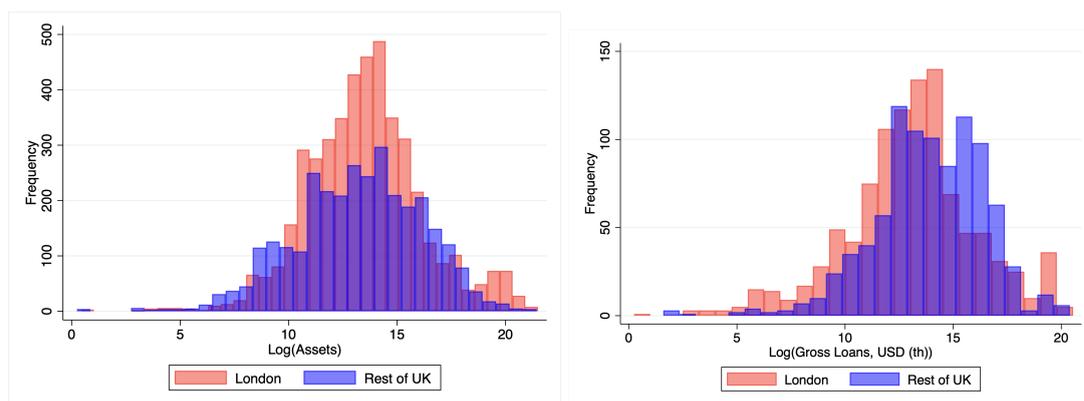
We now investigate the concentration of bank assets in financial centers vis-a-vis the rest of the domestic economy. The distribution of assets provides us with information about the size of the financial sector in financial centers compared to the rest of the country. Credit is another crucial element of national growth models (Baccaro and Tober 2021), and does not necessarily go hand in hand with the distribution of financial assets. In particular, understanding where bank loans originate in a country provides us with a deeper understanding of the role of financial centers within their domestic growth model. Therefore, the allocation of bank assets and credit at city-level allows us to observe more closely the role of cities in shaping growth models. Based on these considerations, in Figure 3 we compare the distribution of bank assets and loans in each financial center vis-a-vis the rest of the country.

Figure 3.A displays the distribution of bank assets and loans in London and in the rest of the UK. The longer tail on the right side of London's asset distribution indicates that larger institutions tend to concentrate in the City compared to the rest of the country. On the contrary, the rest of the UK presents a longer tail on the left-hand side of the distribution, as smaller banks tend to be located outside of London. For example, the commercial banks with the lowest amount of assets in the full sample (including other countries) are located in British cities such as Leicester, York and Wythall. The distribution of credit is notably different. Loans in the rest of the UK are more negatively skewed than in London (Figure 4.A). This discrepancy indicates that, although assets are concentrated in the British financial center, a large share of UK's credit is supported by banks located *outside* of the City.

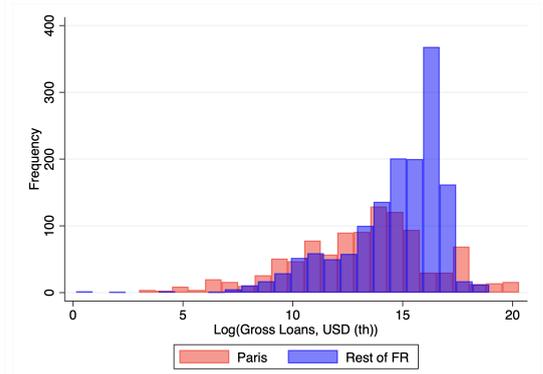
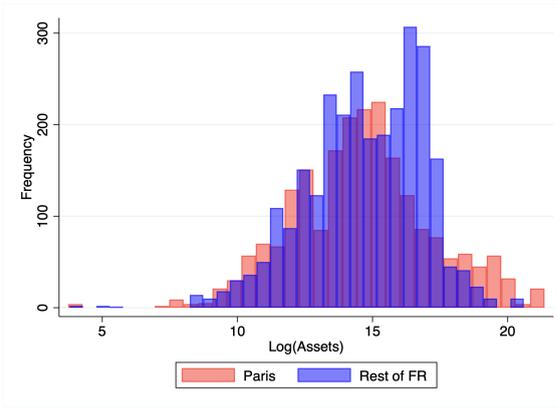
Similar to London, the distribution of assets in Paris is negatively-skewed, as larger banks are located in the capital city (Figure 4.B). However, the high frequency of assets in banks located outside Paris around the mean points to a more geographically balanced banking system. In other words, while large banks are located in Paris, average-sized banks are evenly distributed between inside and outside Paris. France also displays a similar model to the UK in terms of credit: the distribution of loans issued by banks outside Paris is negatively skewed, whereas the financial center presents a normal distribution. Overall, this suggests that France, similar to the UK, relies less on its financial center for the issuance of domestic bank loans, despite the comparatively high amount of assets concentrated in both financial centres. It should be noted, however, that both London and Paris show a peak in the end of their tail, indicating that very large loans (compared to the ones issued in the rest of the country) are more frequent in financial centres than in the rest of the economy.

**Figure 3: Bank assets and loans in financial centers and in the rest of their countries**

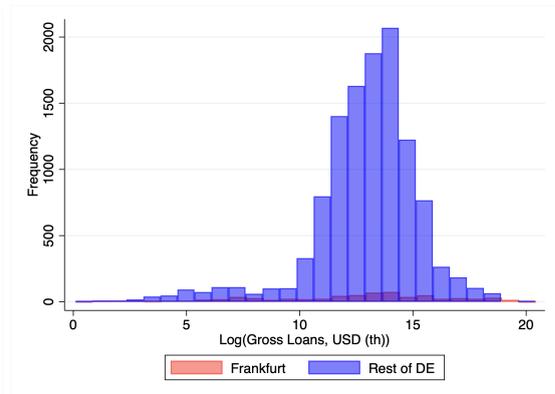
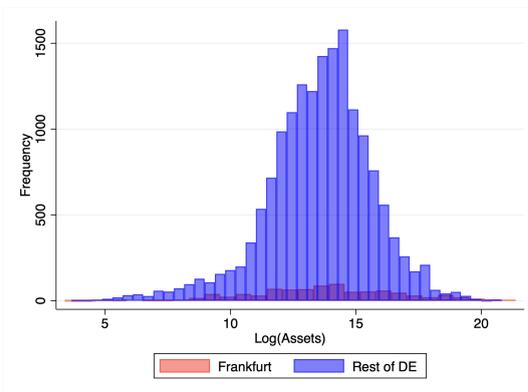
*A. London and the UK*



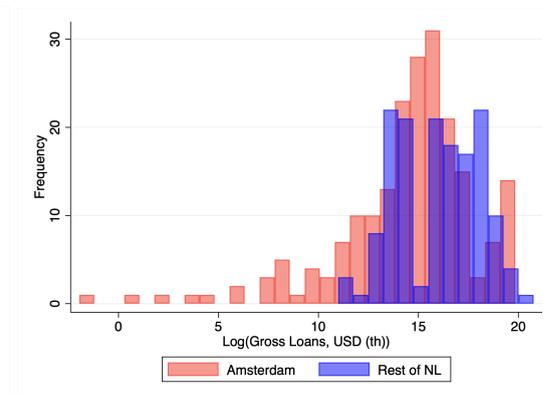
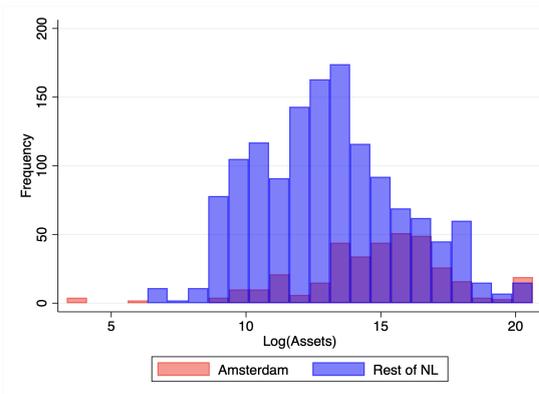
*B. Paris and France*



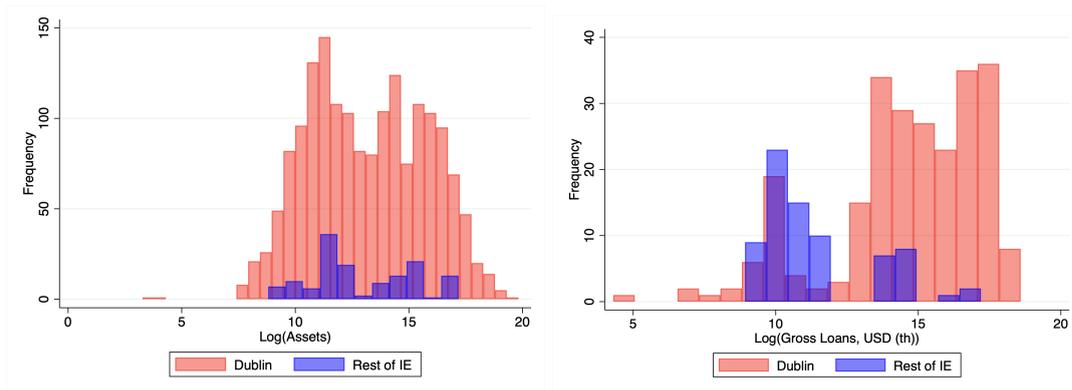
### C. Frankfurt and Germany



### D. Amsterdam and the Netherlands



### E. Dublin and Ireland



The German model differs substantially from the first two. The constellation of small local cooperative and savings institutions that characterize the German banking sector is clearly visible in Figure 3.C. The histogram on the left of Figure 3.C shows that a considerable number of banks are located outside Frankfurt. Still, the role of Frankfurt as a financial center is evident in the end tail of the asset distribution. This is not surprising as the largest banks in Germany, such as Deutsche Bank and Commerzbank AG, are headquartered in Frankfurt. Nevertheless, the gap between Frankfurt and the rest of the country around the end of the distribution is considerably smaller in comparison with the other financial cities and their respective countries.

The distribution of gross loans in Germany (right-hand panel of Figure 3.C) is somewhat similar to the one of assets, and seems to reflect the role of German banks as described in the Varieties of Capitalism literature (Hall and Soskice 2001). In coordinated market economies, such as Germany, banks act as lenders and investors for the financing needs of domestic firms. This allows firms to access patient capital and engage in long-term investment strategies (Deeg 1999; Vitols 2001; Allen 2006). However, Braun and Deeg (2021) have recently noted that this model has evolved, redirecting bank lending to international borrowers, hence reducing the power and relevance of German banks over their domestic growth model.

The Dutch model displays a similar geographical allocation of assets to the German model, but with a higher concentration of large banks in the financial center relative to the rest of the country (Figure 3.D). Amsterdam, like Frankfurt, hosts a number of institutions of different sizes, including the largest banks in the country, such as ING and ABN AMRO. This is reflected in the negatively-skewed distribution of assets in Amsterdam compared to the rest of the Netherlands. Nevertheless, the tails of both distributions show that large entities are not all concentrated in the financial center. For example, the second largest bank in the country, Rabobank, is based in Utrecht. The picture is different when we look at credit. On the one hand, large loans are issued by institutions located both inside and outside Amsterdam. On the other hand, small loans appear to be concentrated in banks located in the financial sector.

Ireland represents an opposite case to the German model, as the Irish banking sector is dominated by its financial center (Figure 3.E). Most banks are concentrated in Dublin, leaving a very low share of assets outside of the capital city. In addition, Dublin hosts the largest institutions in the country in terms of assets. The reliance of the Irish financial sector on the capital city is also reflected in the distribution of loans. Credit is mostly issued by institutions located in Dublin, regardless of the size of the loan. Based on this, it is fair to assume that the vast majority of finance-banking jobs are located in Dublin.

We use the location of financial *assets and loans* in London, Paris, Amsterdam, Dublin and Frankfurt to create a two-dimensional model of European financial centres - summarized in Table 1. Frankfurt is the financial center that displays the lowest degree of concentration in terms of both assets and loans. While Frankfurt remains Germany's financial center, a relevant amount of assets and loans are located in different German cities, such as Munich, Berlin and Stuttgart, among others. On the other extreme, we have Ireland, which relies heavily on its financial centre: assets and loans are highly concentrated in Dublin

compared to the rest of the country. London, Paris and Amsterdam are located in a midway between these two extreme cases. While bank assets in the UK and France tend to concentrate in the capital cities (even if to a lesser extent than in Ireland), banks outside London and Paris provide a relatively large amount of credit to the domestic economy. Amsterdam is on the opposite side. Large Dutch banks are located not only in the financial center, but also in cities such as Utrecht, The Hague and Rotterdam. While these cities also provide credit, especially large loans, most lending is concentrated in the financial center.

**Table 1: Four models of financial growth**

|              |   | <b>Assets</b>                                    |   |
|--------------|---|--|---|
|              |   | <i>Low concentration<br/>in financial center</i> | <i>High concentration<br/>in financial center</i> |
| <b>Loans</b> | <i>Low concentration<br/>in financial center</i>  | Frankfurt  | London<br>Paris                                   |
|              | <i>High concentration<br/>in financial center</i> | Amsterdam  | Dublin  |

### ***Empirical model***

We now aim to understand whether banks in London and in the rest of the UK experienced a change in assets and loans before and after Brexit. Furthermore, we explore whether the other EU financial centres analysed above reacted similarly compared to London, and to the rest of their economies. We examine the impact of Brexit on a number of bank-level variables (assets, loans, number of employees and derivatives) by comparing banks located in Europe’s financial centres with banks located in the same country but outside those centres. To this end we use a hierarchical linear model (HLM) and combine it

with a difference in differences approach. There are a number of advantages of HLMs over traditional fixed effect regressions. First, as banks are nested in cities, which are nested in countries, observations might not be independent (as assumed in traditional OLS), but may rather be affected by their membership in these groups. For example, the lending behavior of a bank could vary depending on whether the bank is located in a financial centre or depending on the country's financial regulation and supervision. In contrast to traditional panel data regressions, HLMs do not assume observations to be independent, but take into account the multilevel structure of the data by estimating an intercept and a slope for each group (e.g. for each city). For this reason, HLMs have been extensively applied to banking data (Mourouzidou-Damsta et al. 2019; Doumpos et al. 2015; Li et al. 2013; Kayo and Kimura 2011).

Moreover, since HLMs decompose the variance attributable to banks and cities, they model the conditional mean of the dependent variable to vary at different group-levels. This allows us to compare the estimates of banks located in different regulatory environments. Another advantage is that, by including group-level random effects, HLM controls for the mean across that group. This feature is particularly helpful when subsamples have different sizes, as in our case, where the number of banks in the UK is substantially higher than the number of banks located in Ireland. Formally, we estimate the following equation for each bank  $i$  located in city  $c$  and country  $j$  at time  $t$ :

$$Y_{icjt} = \alpha + \beta \text{Brexit}_t + \gamma D_{icjt}^{\pi} + \lambda(\text{Brexit}_t \times D_{icjt}) + X'_{icjt} \phi + \mu_t + \theta_j + \tau_c + \psi_{ic} + \varepsilon_{icjt}$$

$D$  is a dummy that equals 1 if bank  $i$  is located in a financial centre  $\pi$ , where  $\pi = \{\text{London, Frankfurt, Paris, Dublin, Amsterdam}\}$ .  $\text{Brexit}$  is a dummy that equals 1 for the years from 2016 (the year of the Brexit referendum) onwards, and 0 otherwise. Our

coefficient of interest is  $\lambda$ , which captures the variation in  $Y$  in financial centres *after* Brexit. As in standard difference-in-differences models,  $\lambda$  is defined as the difference in the average outcome of the treated group before and after the treatment (Brexit) and the average outcome of the control group before and after the treatment:

$$\lambda = \{E[Y_{icjt} | D_{icjt} = 1, Brexit_t = 1] - E[Y_{icjt} | D_{icjt} = 1, Brexit_t = 0]\} - \{E[Y_{icjt} | D_{icjt} = 0, Brexit_t = 1] - E[Y_{icjt} | D_{icjt} = 0, Brexit_t = 0]\}.$$

Our set of dependent variables,  $Y_{icjt}$ , includes bank assets, loan growth, number of employees and derivatives. Following the literature on banking, we measure assets as the natural logarithm of bank assets, which are reported in thousands of US dollars. Based on Micco and Panizza (2006), we measure loan growth by computing the difference of the logarithm of total gross loans (reported in thousands of US dollars) at time  $t$  and at time  $t - 1$ . Formally, we compute the following:  $LoanGrowth \equiv \ln(Loans_t) - \ln(Loans_{t-1})$ .

The random variables  $\tau_c$  and  $\psi_{ic}$  allow the intercept ( $\alpha + \tau_c + \psi_{ic}$ ) to be unique and random for each bank and city. We control for year- and country-specific characteristics, which are captured respectively by the dummy variables  $\mu_t$  and  $\theta_j$ .  $X$  is a vector of bank-level controls. Depending on the dependent variable, we control for bank assets, lending (measured with loan growth), number of employees, solvency (measured as the share of equity over assets), net income, and efficiency (measured with the cost-to-income ratio). While we include the total amount of derivatives as a dependent variable, we do not include it as a control due to the high number of missing values.

## Results

The results of the hierarchical linear model are presented in Table 2. Each column displays the estimates of the baseline model with a different dependent variable. Under each specification, we include the set of bank-level controls described in the previous section alongside country and year fixed effects.

The first column shows the estimates for bank assets, measured as the natural logarithm of total assets. The coefficient of the interaction between Brexit, London and other EU-based financial centres indicate the change in assets in a specific city following the referendum. The sign of the estimated coefficients indicate that assets declined in banks located in financial cities after 2016. Interestingly, this result does not concern solely London, but extends to the other financial centres. This estimate likely points to an overall decline of bank assets, which affected all countries in the sample. Frankfurt is the only city where this association is not significant. The result for Frankfurt might be explained by the high inflow of bank assets from London depicted in Fig. 2, which could have compensated for the general post-Brexit decline in bank assets for the German city.

Bank loans display similar results to bank assets, but in a somewhat more differentiated way across cities (Column 2). After Brexit, loans declined significantly in London (of 14 percent) and Amsterdam (of 23 percent). The drop in loans in London is in line with evidence in Berg et al. (2021), who show that Brexit caused a decrease in the issuance of syndicated loans. As they highlight in the paper, the decline in syndicated loans stems from a reduction in demand from *UK firms*, and not from cross-border lending. It is therefore likely that the decline in lending observed in our estimates reflects the same fall in the *domestic demand* for bank loans in the UK.

Column 3 shows the results for the growth in the number of employees per bank. After Brexit, *all financial centres*, including London, experienced an increase in the number of individuals employed in banks. However, the magnitude of this growth differed across

cities. Employees in London increased by 6 percent. Banks located in Frankfurt and Paris experienced a similar increase, with a growth rate of 5 and 4 percent respectively. Amsterdam experienced almost double the growth of London, with an increase of 11 percentage points post-Brexit, while Dublin outperforms other cities with a growth of 37.4 percent.

The results on derivatives, displayed in Column 4, rely on a smaller number of observations due to the high number of missing values. The coefficient for London post-Brexit is not significant, indicating that no statistically significant change has taken place since the referendum. This result can be explained by the current context of the Brexit negotiations. Since moving euro-denominated derivatives clearing from London to the EU would destabilize the financial sector, negotiators agreed on an extension for derivatives clearing houses in London to continue clearing derivatives for their EU customers until mid-2022 (Reuters 2021). Despite this arrangement, we observe a significant post-Brexit growth of derivatives in banks located in Amsterdam and Dublin.

**Table 2: Hierarchical Linear Model Panel Estimates**

|                             | (1)           | (2)                | (3)                   | (4)                |
|-----------------------------|---------------|--------------------|-----------------------|--------------------|
| <b>Dependent variables:</b> | <b>Assets</b> | <b>Loan growth</b> | <b>log(Employees)</b> | <b>Derivatives</b> |
| Brexit × London             | -0.046**      | -0.141***          | 0.060***              | 0.252              |
|                             | (0.018)       | (0.035)            | (0.021)               | (0.199)            |
| Brexit × Paris              | -0.038**      | -0.013             | 0.043**               | -0.985             |
|                             | (0.016)       | (0.033)            | (0.018)               | (0.619)            |
| Brexit × Amsterdam          | -0.228***     | -0.233***          | 0.107**               | 0.784**            |
|                             | (0.041)       | (0.077)            | (0.046)               | (0.314)            |
| Brexit × Dublin             | -0.343***     | -0.024             | 0.374***              | 0.587**            |
|                             | (0.039)       | (0.071)            | (0.044)               | (0.281)            |
| Brexit × Frankfurt          | -0.029        | 0.015              | 0.053**               | 0.104              |
|                             | (0.019)       | (0.038)            | (0.022)               | (0.341)            |
|                             |               |                    |                       |                    |
| Observations                | 13,369        | 13,369             | 13,369                | 1,247              |
| Number of groups            | 1,214         | 1,214              | 1,214                 | 95                 |
| Year FE                     | YES           | YES                | YES                   | YES                |
| Country FE                  | YES           | YES                | YES                   | YES                |
| Controls                    | YES           | YES                | YES                   | YES                |

Notes:

\*p&lt;.05; \*\*p&lt;.01; \*\*\*p&lt;.001

**Discussion**

Our findings show that London has not, so far, experienced a drop in bank assets different from other financial centers, with the exception of Frankfurt, whose bank assets remained unaffected after Brexit. Similarly, the fall in bank lending experienced by London does not differ substantially from the one experienced by banks in Amsterdam. The growth in the number of employees in financial institutions was positive both in London and all EU-based financial centres, suggesting that there has not been a massive relocation of employees from London to other EU-based cities. However, it should also be noted that the growth of employees in Dublin is significantly larger than in every other financial center. Finally, derivatives remain unaffected by Brexit, probably as a consequence of the current negotiations. The only exceptions are Amsterdam and Frankfurt, where derivatives grew.

These findings support the line of argument proposed by Kalaitzake (2020; 2021). While we may observe a contraction in the UK's financial sector, this may not necessarily translate into an exodus from London to other EU financial centers. Rather, the effect may be more observable in other English cities. As we expected, the evidence presented suggests that the London-based UK growth model has, for the moment, remained largely unaffected by the Brexit referendum. The ties shaping the London-centred UK growth model are therefore still binding, even if the process appears somewhat more fragmented in the rest of England. Nevertheless, this does not necessarily mean that the growth models of other EU countries will remain unchanged, or that Brexit will have no longer-term effects on London and the UK. It may be that, as was once erroneously noted about the French revolution, it is just simply too soon to tell.

Importantly however, our estimates suggest that financial centers across the EU have responded differently to the Brexit shock depending on their *domestic* growth model, and the sub-sectors of finance that they specialise in. Frankfurt has been less affected than other cities, probably because of a more equal distribution of bank assets and lending across other

German cities. Germany is less reliant on Frankfurt as a financial center for its domestic growth compared to other countries. Amsterdam and Paris seem to share a more similar path to London. They have a large concentration of assets and loans in their financial centers. Finally, Dublin is the city where the first signs of a “Brexit reaction” are much more visible. Dublin has benefited from the relocation of asset management firms out of London. The determinants of this are perhaps related to the fact that Ireland has an English speaking common-law legal system. The question that remains is whether this windfall proves to be a net-positive to the Irish GM.

What does all this mean for our understanding of the GM research program in comparative and international political economy? We think there are two key takeaways. First, in terms of scale effects, the role of ‘city-states’ in shaping national growth models clearly varies between countries. The financial centres of Dublin, Paris and London are key nodes in production of the gross value added of their countries national GDP. In these countries, the growth model is *amplified downwards* through the capital city, which has important implications for the politics of redistribution within these countries. It basically means that large parts of their ‘domestic economy’ depends upon, and lives-off, the transfers and resources generated in the city. This intra-regional inequality is likely to feed into political discontent, and manifest itself at the ballot box. However, this dependence on the ‘city’ is much less obvious in Germany and the Netherlands, where bank loans and financial assets are more widely spread across regions and cities. This would suggest that unlike France and the UK, the Dutch and German growth models are much less dependent on what happens in their key financial centres - Frankfurt and Amsterdam. This raises interesting political and economic geography questions that would benefit from being integrated into the GM research program.

Second, although it is still too early to make a definitive inference, the fact that the shock of Brexit has not significantly affected employment in London-finance would suggest that global financial centres are sticky, adaptable and do not move easily. Rather than seeing London, Dublin, Amsterdam, Paris and Frankfurt in competition, therefore, it may be better to conceptualise them as complementary city-nodes in a global wealth chain (GWC). They service different parts and sub-sectors of global finance (Seabrooke and Wigan 2014; 2017). These are the ‘ties that bind’ but also blind us insofar as our national level models discourage us to view networks of cities as a GM of a peculiar type in its own right.

This perspective is complementary to the economic geography argument of Iversen and Soskice (2019), who argue that the future of capitalist democracy is likely to be determined by high-tech and high-growth growth cities, and in particular, the cluster effect of high-skilled graduates that these cities tend to generate. On the basis of this observation, Iversen and Soskice (2019) argue that capitalist democracy is stable, because an aspiring urban middle class of graduates will vote for liberal-centrist governments that defend their economic interests. We could draw the opposite conclusion - namely, that because growth is so concentrated in urban high-tech cities, the intra-regional winner/loser dynamic that this generates within countries is likely to create a *destabilising* effect (see also Le Gales and Pierson 2019). The cases of the Netherlands and Germany however, suggest perhaps a third outcome - countries with a more geographically even dispersal of positive GVA components may not need to follow the ‘winners take all’ logic of core cities driving the politics of growth. Future GM research within the study of comparative political economy would benefit from analysing these political dynamics and distributive conflicts much more closely.

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[1] <https://www.oecd.org/regional/NETHERLANDS-Regions-and-Cities-2018.pdf>

[2]

<https://ec.europa.eu/growth/tools-databases/regional-innovation-monitor/base-profile/ile-de-france-0>

[3] While Frankfurt's financial center is much smaller and of less importance to the German export-led GM, systemic risk, if brought home to Frankfurt, may have a similar, but downside, risk.

[4] The US is relatively closed in terms of overall openness ( $x+m/CGDP$ ) while China is relatively closed on the capital account given the presence of extensive controls.

[5] Breznitz (2021) suggests a similar effect with the growth of technology sectors whereby the wealth generated creates no spillovers for the broader economy and may even be net negative against it.

[6] That is, agglomeration effects matter, but agglomeration is a function of specialization as well as scale.

[7] <https://www.ft.com/content/3dad4ef3-59e8-437e-8f63-f629a5b7d0aa>

[8] <https://www.ft.com/content/2f0b8870-c382-494e-afbe-4c56713fc78d>

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## Appendix

**Table 3: Hierarchical Linear Model Panel Estimates including other terms of the interaction**

|                             | (1)           | (2)                | (3)                   | (4)                |
|-----------------------------|---------------|--------------------|-----------------------|--------------------|
| <b>Dependent variables:</b> | <b>Assets</b> | <b>Loan growth</b> | <b>log(Employees)</b> | <b>Derivatives</b> |
| Brexit                      | 0.875***      | 0.173              | 0.224**               | 0.770              |
|                             | (0.088)       | (0.178)            | (0.099)               | (0.919)            |
| London                      | 0.730**       | 0.075**            | -0.749***             | 0.538              |

|                    |           |           |           |            |
|--------------------|-----------|-----------|-----------|------------|
|                    | (0.339)   | (0.031)   | (0.133)   | (0.442)    |
| Brexit × London    | -0.046**  | -0.141*** | 0.060***  | 0.252      |
|                    | (0.018)   | (0.035)   | (0.021)   | (0.199)    |
| Paris              | 0.283     | 0.010     | -0.771*** | -2.960**   |
|                    | (0.238)   | (0.027)   | (0.109)   | (1.323)    |
| Brexit × Paris     | -0.038**  | -0.013    | 0.043**   | -0.985     |
|                    | (0.016)   | (0.033)   | (0.018)   | (0.619)    |
| Amsterdam          | 1.131**   | 0.061     | -1.389*** | 0.038      |
|                    | (0.552)   | (0.076)   | (0.325)   | (0.937)    |
| Brexit × Amsterdam | -0.228*** | -0.233*** | 0.107**   | 0.784**    |
|                    | (0.041)   | (0.077)   | (0.046)   | (0.314)    |
| Dublin             | 2.675***  | -0.117    | -1.453*** | 0.370      |
|                    | (0.513)   | (0.084)   | (0.336)   | (1.651)    |
| Brexit × Dublin    | -0.343*** | -0.024    | 0.374***  | 0.587**    |
|                    | (0.039)   | (0.071)   | (0.044)   | (0.281)    |
| Frankfurt          | 0.467*    | 0.063**   | -0.209**  | 2.458***   |
|                    | (0.273)   | (0.028)   | (0.104)   | (0.698)    |
| Brexit × Frankfurt | -0.029    | 0.015     | 0.053**   | 0.104      |
|                    | (0.019)   | (0.038)   | (0.022)   | (0.341)    |
|                    |           |           |           |            |
| Constant           | 10.986*** | 0.108     | -3.155*** | -16.066*** |
|                    | (0.098)   | (0.179)   | (0.137)   | (1.493)    |
|                    |           |           |           |            |
| Observations       | 13,369    | 13,369    | 13,369    | 1,247      |
| Number of groups   | 1,214     | 1,214     | 1,214     | 95         |

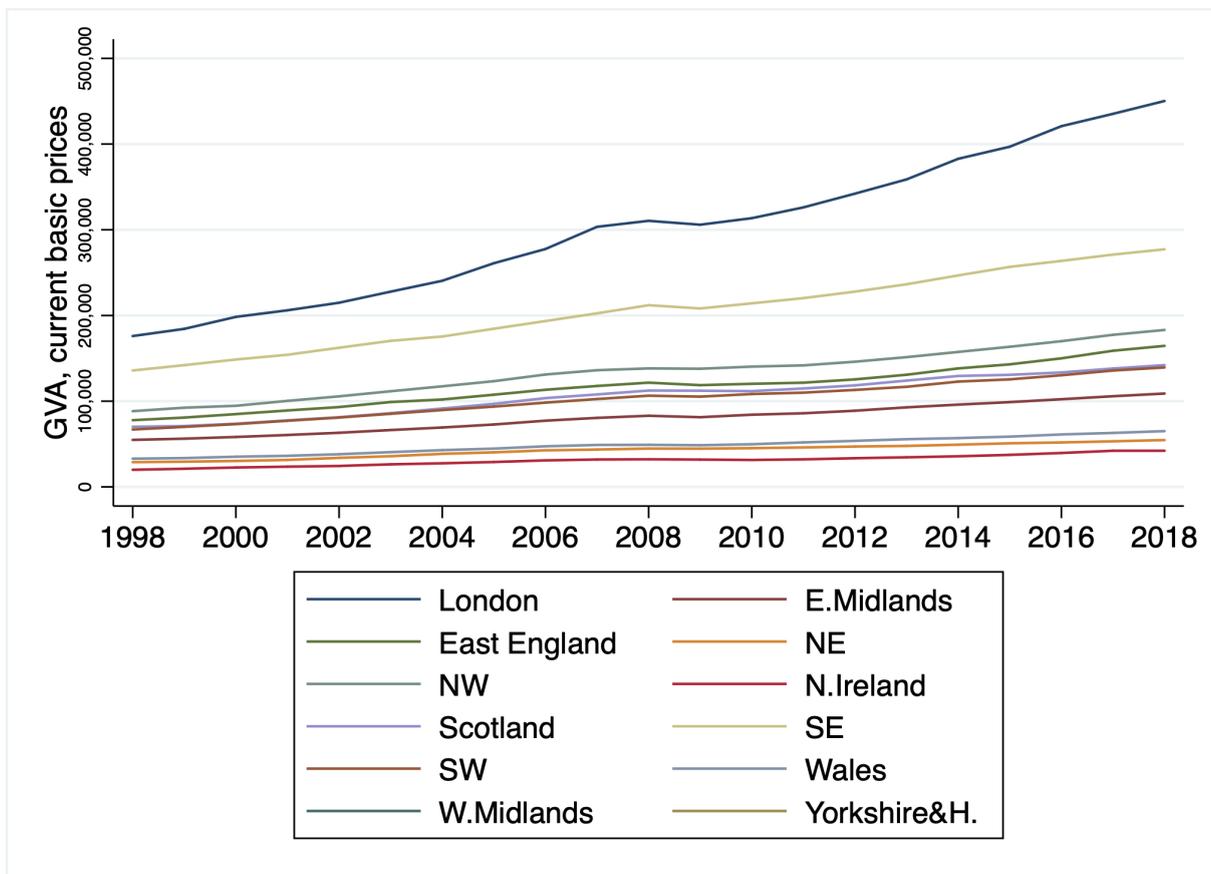
|            |     |     |     |     |
|------------|-----|-----|-----|-----|
| Year FE    | YES | YES | YES | YES |
| Country FE | YES | YES | YES | YES |
| Controls   | YES | YES | YES | YES |

Notes:

\*p<.05; \*\*p<.01; \*\*\*p<.001

How much do cities weigh on their domestic GMs? From a descriptive perspective, London clearly outweighs other British regions in terms of GVA. This is evident in Figure 1, which plots the gross value added at current basic prices for the different NUTS 1 areas of the UK. In 1998 London represented around 20 percent of the UK's GVA, which grew to 24 percent in 2016, a share that remained stable in 2018.

**Figure 1:** UK Gross Value Added, by region (NUTS-1 level), 1998-2018, £m



Source: own elaboration on data from the ONS.

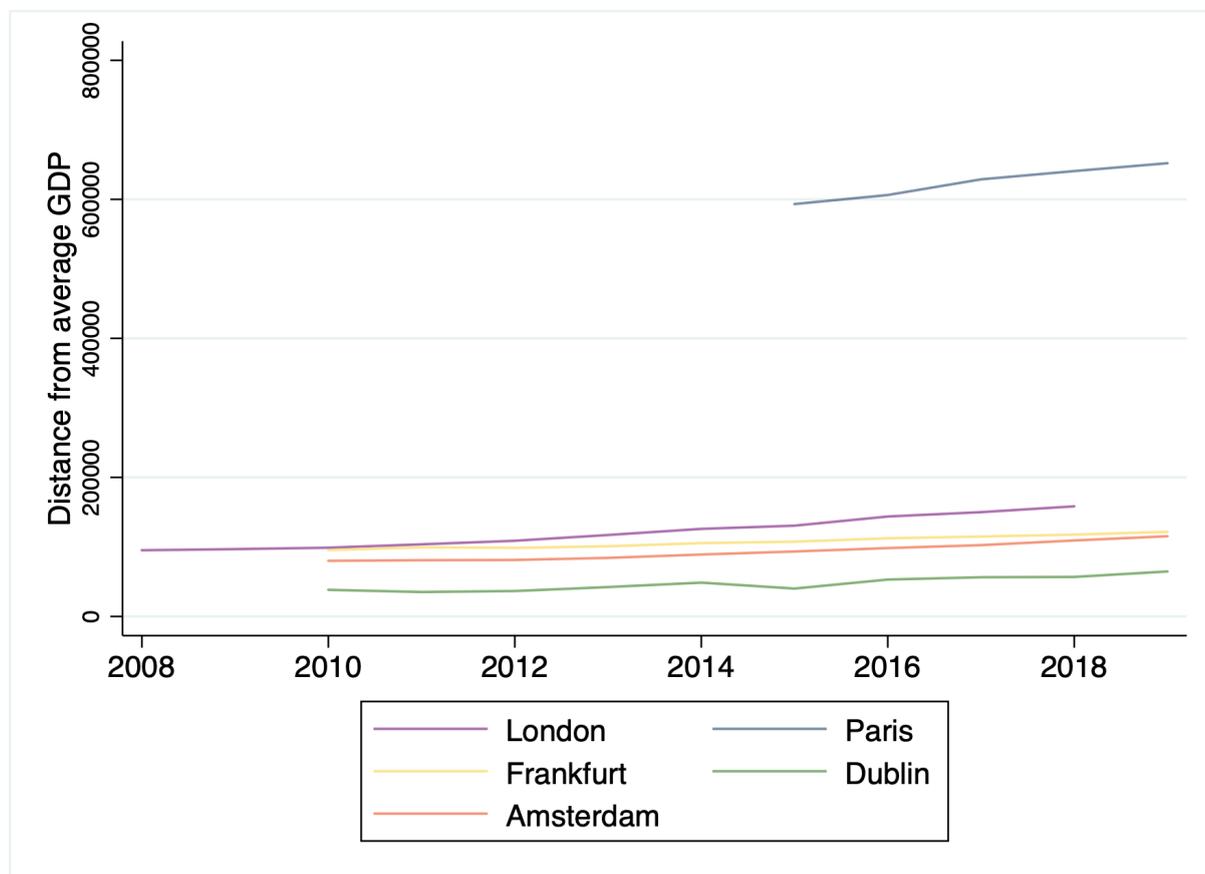
The first challenge lies in describing the relevance of financial cities on the growth of their country. We introduce an empirical indicator to compute the weight of a city in the GM of its national, which we compute as follows:

$$CityWeight_{ict} = X_{ict} - \bar{X}_{ct}$$

Where  $X_{ict}$  is the value of a variable (GDP or GVA) for city  $i$  in country  $c$  and year  $t$ , and  $\bar{X}_{ct}$  is the country average of the same variable in year  $t$ . For example, for the UK we select the NUTS2-level GVA of “Inner London”. Then, we compute the average GVA of all the NUTS2 subunits in the UK. Finally, we calculate the difference between the GVA of the City and the UK average GVA, as described in the previous equation. We compute  $CityWeight_{ict}$  under two different specifications of  $\bar{X}_{ct}$ . First, we define  $\bar{X}_{ct}$  as the average GDP of all the NUTS2-level GDP values in a country. Second, we define it as the average GDP of all the regions excluding the region of the financial center. As the results do not change substantially, we report only the estimates for the first specification.

Figure A1 plots the city-weight scores for each financial center under the first specification. The lines describe the distance between the GDP produced by the NUTS2 region of the financial center and the GDP average of the country where the city is located.

**Figure A1:** City weight of financial centers measured as the distance in GDP of the financial center from the country average, 2008-2019



Source: own elaboration using Eurostat and ONS data. GDP is measured in millions of Euros at current market prices.

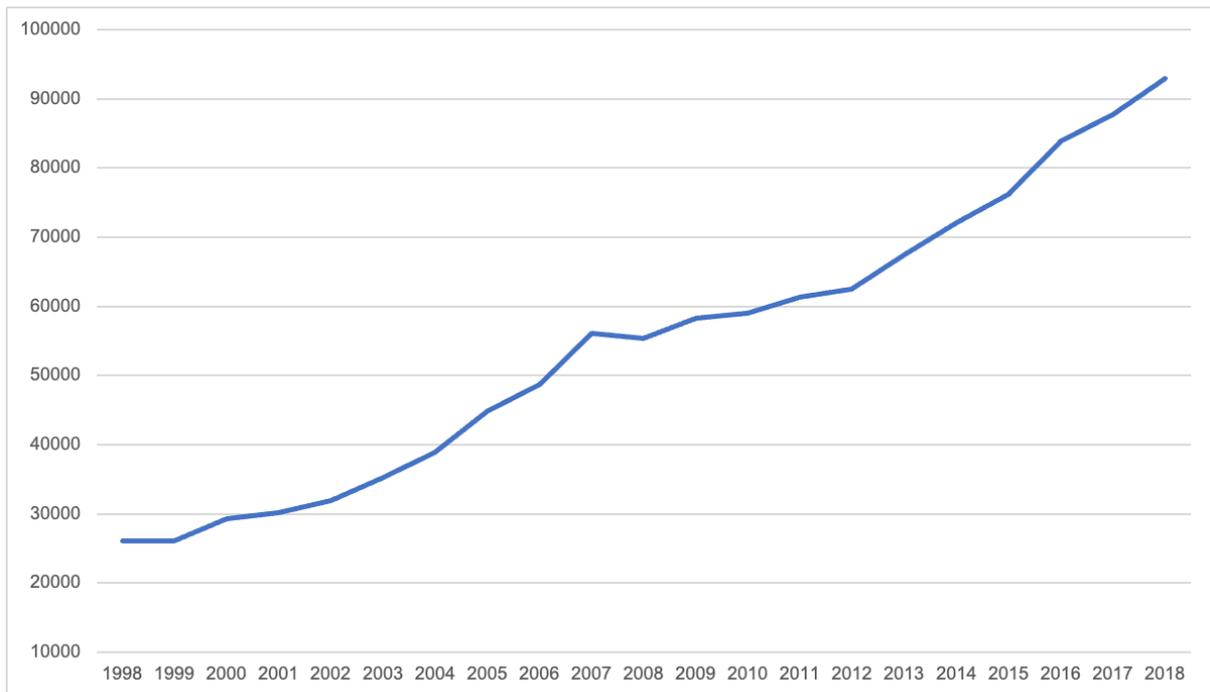
Paris is the financial center that displays the highest weight on its domestic economy compared to the other financial centers. The average annual GDP produced in the Ile de France across the time period is EUR 706,426 millions, that is by far higher than the second most productive French region, Rhone-Alpes, which reports an average GDP of EUR 227,746 millions. London is the second most relevant financial center. We define London geographically as Inner London - West, which is the area that comprehends the City of

London and Camden among other central areas of the capital (e.g. Westminster, Hammersmith...).

**\*\*\* Older part**

Figure 2 plots the results of the city-weight indicator for the City of London. The figure displays a positive trend that is not interrupted by Brexit. The positive trend was temporarily interrupted between 2007 and 2008, with the occurrence of the financial crisis. This indicates that, following the financial crash, the weight of London over the average UK GVA decreased. This loss was however swiftly regained. It is interesting to notice that with Brexit the weight of the City seems to have increased compared to all other UK regions, rather than decreased.

**Figure 2:** GVA difference between the City and the UK NUTS-3 Average, 1998-2018



Source: own elaboration on data from the ONS.

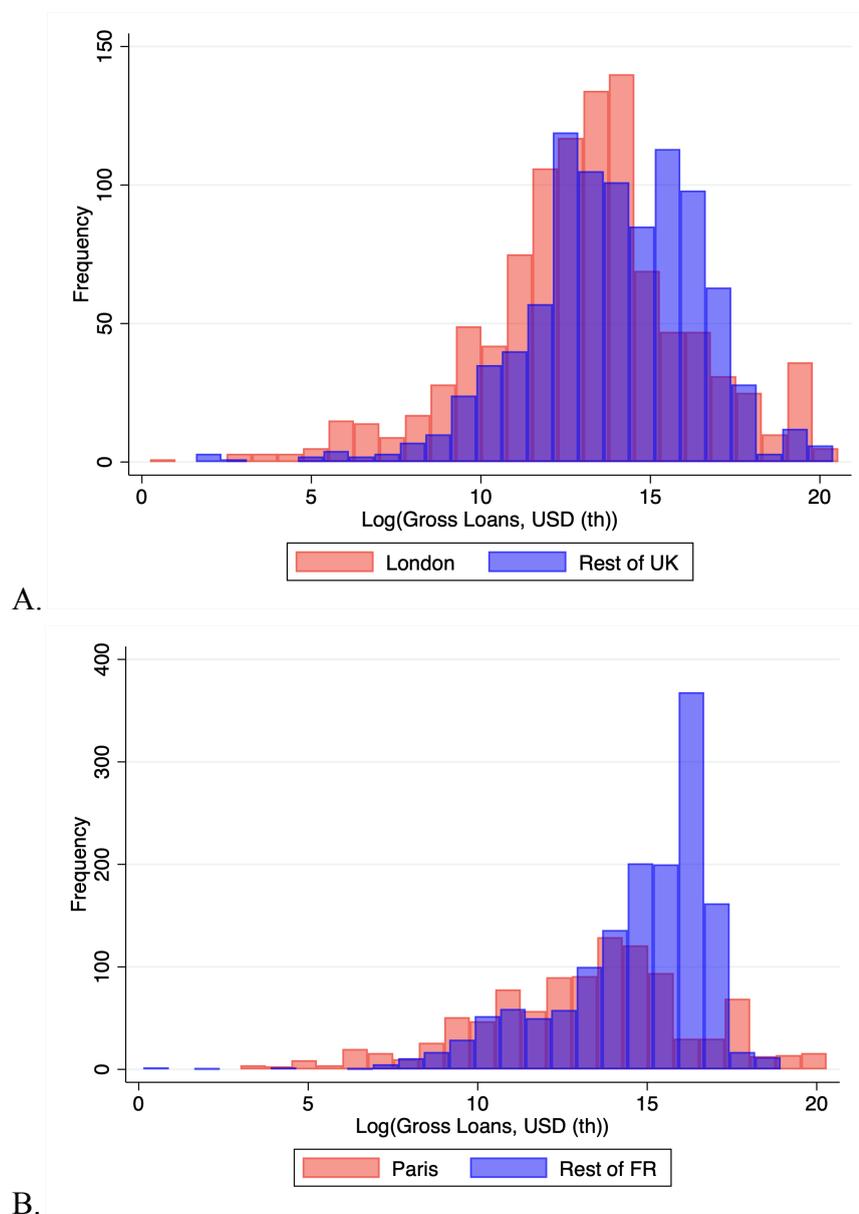
An alternative method to explore the concentration of economic value in a country is the Herfindahl-Hirschman index. The Herfindahl-Hirschman index is a measure of market concentration generally used to estimate the degree of competition of an economic sector based on the distribution of market share across firms in that sector. Using GDP data at NUTS-2 level, we can estimate to what extent GDP is distributed across different regions of each country. Formally, we compute the following for each country  $j$ :

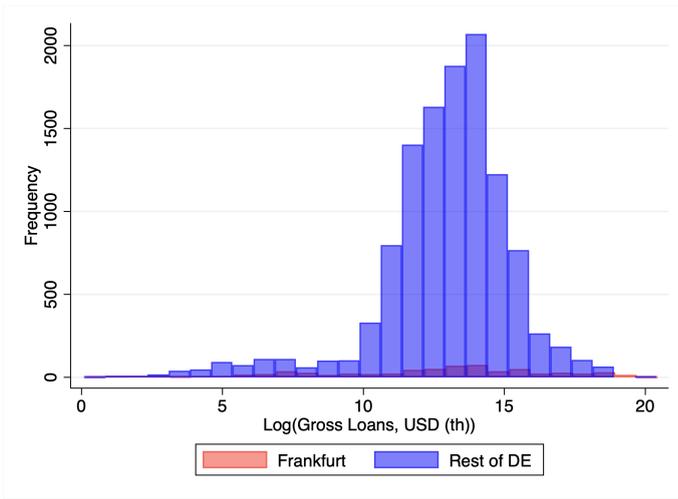
$$H_j = \sum_{r=1}^R GDP_{rj}^2$$

Where  $r \in \{1, \dots, R\}$  is a NUTS-2 level region located in country  $j$  (e.g. Inner London).  $GDP$  is the share of total GDP that  $r$  contributes to. Given this equation, if a country is composed of ten identical region that have the same identical level of GDP, then the index would be  $H_j = 0.1$ . This scenario would indicate a growth model where GDP is evenly distributed across regions and is not concentrated in a single geographical area, such as a financial

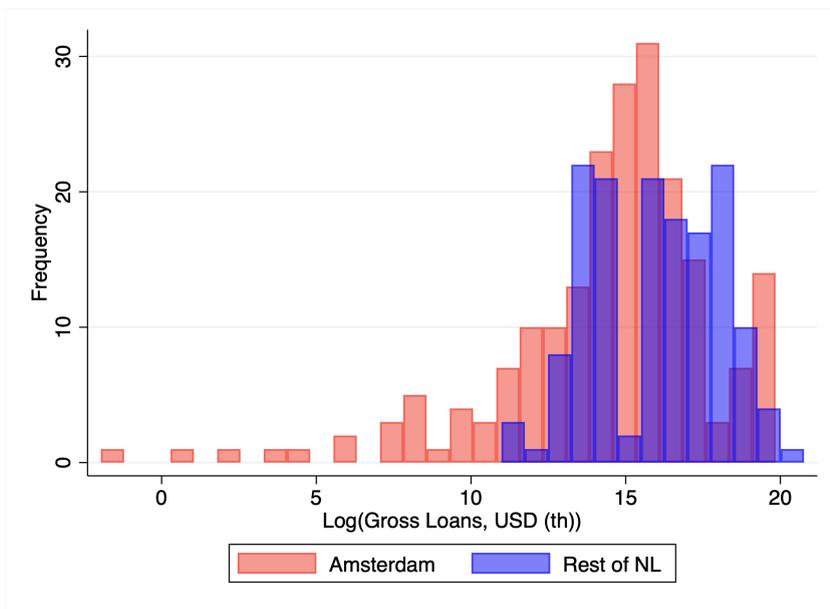
centre. If GDP production was to be concentrated all in a financial centre (or another region), then we would have  $H_j = 1$ .

**Figure 7:** Bank Loans in Financial Centers and in the rest of their countries

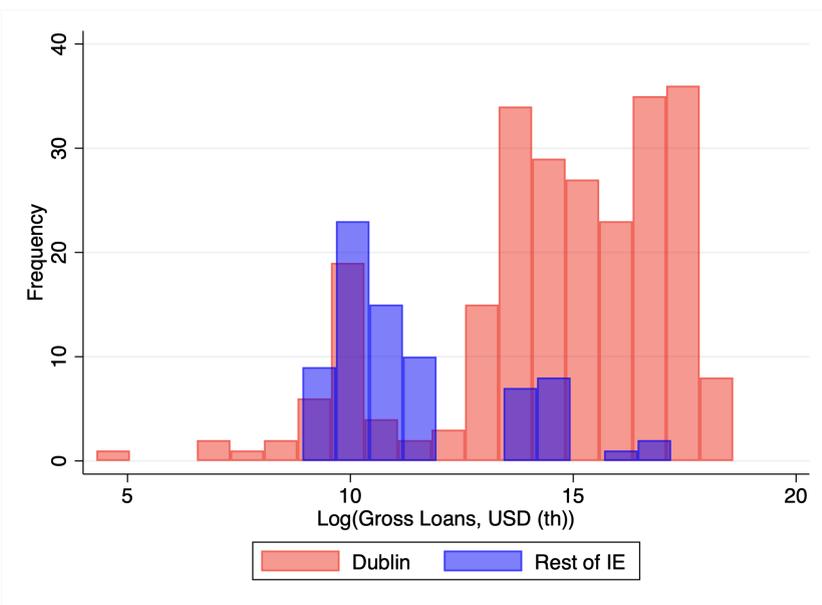




C.



D.



E.

GDP NUTS-2 level in France (FR10: Paris - Île de France)

