1. FEATURES OF FINTECH ACTIVITIES IN LUXEMBOURG: FIRST CONSIDERATIONS

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This contribution aims at providing an overview of the FinTech sector in Luxembourg. After briefly discussing the issue of defining "FinTech", we outline how the BCL's Statistics Department (hereafter "ST") collected data on FinTech entities and activities in Luxembourg and then presents the preliminary results of this data collection together with a proposal on a possible follow-up.

DEFINITION OF FINTECH

The word "FinTech" is simply a combination of the words "financial" and "technology". Nevertheless, owing to the broad ranging activities of FinTech entities, developing a precise definition is challenging and there is no consensus on what "FinTech" means. According to Schueffel, 2016, very broadly FinTech describes the use of technology to improve financial services and products to consumers. Clearly, many companies can fall under this broad definition.

Even though FinTech entities and activities have become an increasing focus of regulatory authorities, these activities are not particularly new. Activities falling under the broad definition of FinTech were first utilized by Citigroup in the early 1990s when a project was developed aiming at facilitating technological cooperation efforts (Arner et al., 2015). However, the internet, combined with the widespread use of devices like smartphones and tablets, means the pace of FinTech innovation has accelerated greatly in recent years.

The Financial Stability Board (FSB) defines FinTech as "technologically-enabled innovation in financial services that could result in new business models, applications, processes or products with an associated material effect on financial markets and institutions and the provision of financial services" (FSB, 2017).

From a statistical point of view, neither the System of National Accounts 2008 (SNA2008) nor the European System of Accounts 2010 (ESA2010) provide a definition of FinTech.

Nevertheless, even if defining FinTech is not straightforward, innovations brought about by this sector could be substantial and potentially alter the financial sector. A better understanding of FinTech entities, activities and their implications for the financial system is therefore required.

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FINTECH COMPANIES IN LUXEMBOURG

As no common statistical definition exists, the "Banque centrale du Luxembourg" has no specific Regulation related to the collection of statistics on FinTech and, therefore, any assessment of the financial stability implications of FinTech is challenging given the limited availability of official and privately disclosed data (FSB, 2017).

To compile a list of FinTech companies, ST has primarily relied on the information published by the Luxembourg House of Financial Technology (LHoFT) and the Association des Banques et Banquiers du Luxembourg (ABBL).

The LHoFT is a joint public-private sector initiative incorporated in 2017 and its purpose is to promote, encourage and support the development of innovative technologies in the financial sector. The LHoFT Board is comprised of senior executives from private sector institutions and representatives from the Luxembourg Government. In particular, some Luxembourg banks (e.g. BCEE, Société Générale, BGL BNP Paribas, etc.) are shareholders of the LHoFT as they want to closely monitor new solutions that are developed for financial services by FinTech companies brought together in the LHoFT building.

The LHoFT aims to foster the most innovative companies that could potentially improve the existing financial system by offering new products, which meet specific financial industry needs. The FinTech companies hosted in the LHoFT's working facility are selected by a Selection Committee partly made up of banks that evaluate the business models of prospective candidates to check whether they are considered as innovative and lasting. Once hosted, the FinTech companies can take advantage of the common environment offered by the LHoFT to grow. According to a LHoFT official, most of the successful FinTech companies hosted by the LHoFT are acquired by a bigger and well-established company at a certain point.

Some of the FinTech companies hosted by the LHoFT are listed on its website.[76] Nevertheless, as the FinTech environment is rather competitive some FinTech companies prefer not to be on this list in order not to disclose the solution they are working on.

The ABBL was established in 1939 and is a professional association representing the majority of credit institutions. While the range of ABBL activities is large, the ABBL created the Digital Banking and FinTech Innovation Cluster (DBFI) in 2016. This Group exchanges knowledge and ideas on how digitalization and the rise of FinTech may affect the Luxembourg financial sector. One of the outputs of the DBFI is a list of FinTech entities published on the ABBL website.[77]

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76   https://www.lhoft.com/en/our-startups accessed on 14 February 2019.

77   https://www.fintechmap.lu/member-category/fintech-firms-and-software-vendors/ accessed on 14 February 2019.

Based on the two exhaustive lists published by both the LHoFT and the ABBL, ST compiled a FinTech database that contains around 200 FinTech companies. This database was enriched by information from the business register for the sectorisation of the units, the centralized balance sheets database as well the Chamber of Commerce register. The aggregated results of this database are shown in the table below:

Table 1:

Broad population of Luxembourg FinTech companies (end of 2017)

ESA10 SECTOR CODE	ESA10 SECTOR DESCRIPTION	NUMBER OF COMPANIES	TOTAL ASSETS (MILLION OF EUR)	AVERAGE YEAR OF INCORPORATION
	Undefined	5	41	2018
11000	Non-financial corporations	6	23	2003
11001	Public non-financial corporations	4	51	2004
11002	National private non-financial corporations	47	189	2011
11003	Foreign controlled non-financial corporations	62	2 612	2010
12203	Foreign controlled deposit-taking corporations except the central bank	3	11 827	2007
12400	Non-MMF investment funds	1		2018
12600	Financial auxiliaries	1	31	1989
12602	National private financial auxiliaries	7	153	2009
12603	Foreign controlled financial auxilaries	19	1 877	2012
12700	Captive financial institutions and money lenders	6	42	2016
12703	Foreign controlled captive financial institutions and money lenders	14	3 348	2011
13110	Central government	1		2012
15000	Non-profit institutions serving households	3		2017
TOTAL		**179**	**20 193**	**2010**

Source: LHoFT, ABBL and BCL computations.

According to the data collection performed by ST, and based on the information published by the LHoFT and the ABBL, the estimated total assets of the FinTech companies resident in Luxembourg amounts to around 20 billion euros at the end of 2017.

Out of these 20 billion euros, almost 12 billion euros can be attributed to the total assets of three FinTech entities holding a banking license including PayPal Europe, Keytrade Bank and Riverbank. PayPal (11.6 billion euros of total assets in 2017) is the largest entity out of the three banks and is considered a FinTech bank by the ABBL. In particular, PayPal offers an online money transfer service across the world. Keytrade Bank (242 million euros in total assets as of 2017) offers banking and trading services online and is considered a FinTech bank mainly because its clients are partly advised by a robot. RiverBank (more than 1 million euro in total assets at the end of 2017) helps small and medium enterprise (SME) borrowers with their credit applications and optimal financing structure and its business model sits at the intersection of FinTech and traditional banking. As these entities are actually supervised by the Commission de Surveillance du Secteur Financier (CSSF), they can be removed from the list of FinTech entities.

In addition, some companies considered as FinTech were granted a license as Electronic Money Institutions or Payment Institutions by the Ministère des Finances and, therefore, they are supervised by the CSSF. This is the case for Amazon Payments Europe, SIX Payments, MANGOPAY, Mercedes pay,

SnapSwap International and Volkswagen Payments. As these entities are also supervised by the CSSF, they can also be removed from the FinTech population.

Table 1 also shows an average year of incorporation of 2010, which seems to predate the current pattern of FinTech companies being a more recent development. The average year of incorporation of LHoFT companies is 2015 while the average year of incorporation of ABBL companies is 2009, which suggests that the ABBL tends to list more traditional and already well-established companies whose ability of really bringing innovative solutions to the financial services industry may be questioned. In particular, companies in the non-financial sector (ESA2010 sector code S.11) that were incorporated before the year 2000 should be removed from the FinTech population as they are not fully captured under the FinTech definition. The firms eliminated from the population in this step are mainly IT companies offering services to the financial sector, such as Temenos AG[78].

Once all the FinTech companies mentioned above were eliminated from the preliminary FinTech population shown in Table 1, the aggregated data of this reduced population are summarized in Table 2 below:

Table 2:

Population of Luxembourg FinTech companies (end of 2017)

ESA10 SECTOR CODE	ESA10 SECTOR DESCRIPTION	NUMBER OF COMPANIES	TOTAL ASSETS (MILLION OF EUR)	AVERAGE YEAR OF INCORPORATION
	Undefined	2	41	2018
11000	Non-financial corporations	4	1	2013
11001	Public non-financial corporations	3	48	2007
11002	National private non-financial corporations	42	119	2013
11003	Foreign controlled non-financial corporations	49	194	2013
12400	Non-MMF investment funds	1		2018
12600	Financial auxiliaries	1	31	1989
12602	National private financial auxiliaries	5	138	2009
12603	Foreign controlled financial auxiliaries	7	31	2013
12700	Captive financial institutions and money lenders	6	42	2016
12703	Foreign controlled captive financial institutions and money lenders	10	90	2011
13110	Central government	1		2012
15000	Non-profit institutions serving households	3		2017
TOTAL		**134**	**735**	**2013**

Source: LHoFT, ABBL and BCL computations.

As indicated in Table 2 the population of FinTech companies in Luxembourg is currently around 130 but the aggregated total assets are now slightly above 700 million euros at the end of 2017, which is a relatively small amount compared to the total assets estimated in Table 1 and compared to the total assets of the financial sector that equaled 14 853 billion euros at the end of 2017.

Even if this amount is relatively small, ST proposes to regularly monitor the FinTech population in particular because some of these entities may have an effect on credit intermediation and, consequently, may increase financial stability risks associated with FinTech activities. For example, FinTech credit

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78 Temenos AG is a company specialized in enterprise software for banks and financial services, with its headquarters in Geneva, Switzerland.

companies facilitate credit activity by offering online platforms that are not operated by commercial banks and that match borrowers with lenders. These platforms are referred to as "peer-to-peer (P2P) lenders", "loan-based crowd-funders" or "marketplace lenders". For example, Lendinvest, a UK based company with an activity in Luxembourg that is supported by the LHoFT, brings together all types of investors, and connects them with borrowers to provide property finance.

A classification of the Luxembourg FinTech companies into different clusters could also help to facilitate the monitoring of their different activities. The following clusters could be used:

- FinTech credit/lending
- FundTech and investment
- RegTech (address regulatory challenges in financial services)
- InsurTech (improve efficiency from the current insurance industry model)
- Cybersecurity and authentification
- Payments infrastructures
- Big data and Artificial Intelligence
- Cryptocurrency and blockchain
- Finance-related software vendors and IT solution providers

Statistics on the total assets, sector classification, number of companies and main activities of FinTech entities could be produced by cluster.

CONCLUSION

FinTech innovation and activities are expected to become increasingly relevant for national authorities and it is therefore important to address data limitations at an early stage. BCL's data collection exercise has resulted in a list of FinTech firms and has provided a preliminary estimate of the total assets held by FinTech entities in Luxembourg. This data collection represents a first step towards addressing the existing data gaps and provides an initial basis for assessing FinTech activities that could be relevant for financial stability and risk assessment. As for the next steps in the project, ST plans to further enhance the database by providing statistics on FinTech firms at a more granular level using the proposed clusters, which could help to facilitate future, and more detailed, analyses and monitoring of the FinTech sector in Luxembourg.

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