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**The Valuation of the
Electronic Money
Institutions (EMI):
The Industry, the
Regulatory Overview and
a Practical Valuation Case**

Supervisor

Ch. Prof. Stefano Bianchi

Graduand

Matteo Barbaro

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838857

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ABSTRACT

The valuation of a company represents one of the key issues in financial management. Determine the value of a business is, in fact, not always a straightforward process as many different valuation methods exist and their end results may deal to different investment decisions by investors or the management team.

The purpose of this dissertation is to provide an overview of the key concepts of valuation by describing the valuation processes and methods and to then apply them to perform the valuation of Revolut Ltd., which is a company operating in one of the fastest growing industries of the last years: the electronic money institution.

In the first part of this work, particular attention will be dedicated to Electronic Money Institutions (EMIs), financial firms which have been authorized by the local authority to issue electronic money, a new type of payment instrument, or that holds an equivalent authorization in another country in terms of the Electronic Money Directive, to the main definitions related to the sector and to the state of the electronic money industry. It will also be analyzed the regulatory framework in the European Union and the main differences between electronic money institutions and traditional banks.

In the second part, it will be discussed the valuation process, its purpose and of the most utilized methods in the financial industry to determine the value of a business.

The topics analyzed in the first paragraphs of the thesis will be then become handful in the last section, where it will be performed the valuation of Revolut. After discussing the company background, the valuation methods previously described will be utilized to determine the value of the business.

The results of the different valuation methods will be then discussed and compared in the final part of the thesis providing also an explanation on which valuation technique should be utilize to determine the value of electronic money institutions.

INTRODUCTION

Information technologies have found more and more application in the financial sector over the last decades. “*They first began to be used in a widespread manner during the 1970s and 1980s in order to increase the efficiency of processing, storing and transmitting money at the wholesale level by large financial institutions. More recently, they have also come to play a vital role in retail financial transactions*”¹. The last disruptive technology introduced in the industry of financial services and electronic payments is represented by the electronic money. Several companies, the so called fintech firms which acronym “*stands for financial technology, combining bank expertise with modern management science techniques and the computer*”² are tried to impose themselves as market leaders by exploiting the popularity of this new technology. Even the more traditional banks have realized the significant momentum gained by these new companies and have “*seem to adopt themselves to this change instead of resisting. [...] Fintechs seem to be disruptive but cannot wipe out banks who have mass number of customers and financial power*”³. This increasing interest in the industry by a multitude of new businesses have also pushed the European Union to regulate the newly born market of the e-money by a series of Directives and rules applicable at the European and local level. With the goal of describing the state of the industry and of providing an overview on the main regulation currently, this work will broach the subjects under a general and a legal point of view.

The second object of this work is to try to evaluate these types of firms by applying traditional approaches used for the valuation of financial firms. The increasing success of some players in the industry, if fact, catalysed the attention of institutional investors and venture capitalist who are funding the activities of these start-ups which gained valuation in the order of billions of dollars. While valuations of these companies are published by market analysts after each funding round, no real studies have been published to try to justify the results of such valuations.

¹ Eric Helleiner, “*Electronic Money: A Challenge to the Sovereign State?*”, Journal of International Affairs Vol. 51, No. 2, Technology and International Policy: Essays on the Information Age, Spring 1998, pp. 387-409

² Abraham Bettinger. “*FINTECH: A Series of 40 Time Shared Models Used at Manufacturers Hanover Trust Company.*” Interfaces, vol. 2, no. 4, 1972, pp. 62–63. JSTOR, www.jstor.org/stable/25058931. Accessed 13 Feb. 2020.

³ Falguni Desai, “*The Evolution Of Fintech*”, Forbes, 2015
<https://www.forbes.com/sites/falgunidesai/2015/12/13/the-evolution-of-fintech/>

In the following pages a detailed analysis of the steps required to perform a valuation process will be provided to then compare the results obtained with the ones shared by specialized researches.

1. ELECTRONIC MONEY INSTITUTIONS (EMIs)

1.1 The Regulatory Framework

In the recent years, thanks to the spreading of technology, electronic money, a new type of payment instrument which allows individuals to transfer money electronically, has found more and more consents among the consumers who are slowly shifting from the typical methods of payments such as cash, debit or credit cards, to electronic ones.

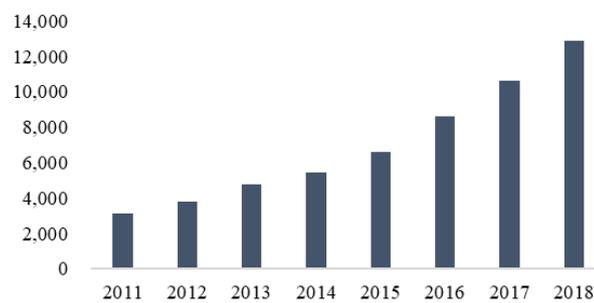


Figure 1.1 - Outstanding Amount of E-Money as of December 2017⁴

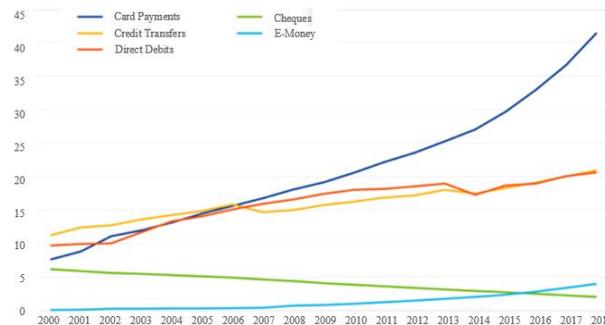


Figure 1.2 - Number of transactions in Europe. Numbers in billions. Source European Central Bank Statistical Data Warehouse⁵

With the increase of the number of transactions and diffusion of the electronic money, the European Union felt the necessity to establish guidelines and to regulate the market of electronic money in order to create a more favorable environment and to facilitate the adoption

⁴ Source: <http://sdw.ecb.europa.eu/>

⁵ Source: <http://sdw.ecb.europa.eu/>

of IT solution in the payment industry. The response was the publication of a series of Directives to regulate credit and electronic money institutions and the newly born payment instrument of the electronic money.

Before analysing the definitions and the distinguishing features of electronic money and of the institutions that are issue this type of payment instruments laid down in the European Directives, it seems noteworthy to identify the core legal and regulatory tools governing the payment services industry across the EU.

Whilst an overview on the EU regulatory approach falls outside the scope of this dissertation, it may be useful to introduce the concept behind the regulatory architecture of the financial service industry within the European Union, the so called Lamfalussy framework, designed to ensure flexible and effective decision making.

The Lamfalussy regulatory approach is designed across four institutional levels of cooperation:

- **Level 1 instruments:** *At Level 1 the European Parliament and Council adopt the basic laws proposed by the Commission, in the traditional co-decision procedure.*
- **Level 2 implementing measures:** *At Level 2 the Commission can adopt, adapt and update technical implementing measures with the help of consultative bodies composed mainly of EU countries representatives.*
- **Level 3 guidelines:** *At level 3, committees of national supervisors are responsible for advising the Commission in the adoption of level 1 and 2 acts and for issuing guidelines on the implementation of the rules.*
- **Level 4 report:** *At level 4 the report advocates a stronger role for the Commission in ensuring the correct enforcement of EU rules by national governments.*⁶

The Lamfalussy process was initially adopted for the development of regulations on the securities sector and was then extended to the banking, insurance, occupational pensions and asset management industries.

⁶ *The Lamfalussy architecture*, https://ec.europa.eu/info/business-economy-euro/banking-and-finance/financial-reforms-and-their-progress/regulatory-process-financial-services/regulatory-process-financial-services_en

The architecture of the framework of the payment services industry may be described as the intersection of three core Level 1 instruments and namely (1) the provisions applicable to the issue and circulation of electronic money, (2) the rules applicable to payment services and payments (cash and electronic), and (3) the rules governing the backbone of EU-generated payments and transactions creating the so called SEPA area, paired with a series of Level 2 and Level 3 initiatives aimed to specify and address certain technical areas touched, only for a superficial part, by the aforesaid general sources.

The E-Money Directive

The main reference for the rules applicable to electronic payments services is the e-money directive 2000/46/EC (EMD), which will be extensively covered in the paragraph 1.4 and 1.5 of this chapter. The regulation sets out the first rules for the business practices and supervision of e-money institutions and was later replaced in 2009 by the second Electronic Money Directive (2009/110/EC) after the outcome of an extensive review by the European Commission on the previous regulation to amend matters on AML and Banking Consolidation directives⁷.

The Payment Service Directive

The second set of rules regulating the electronic payments and e-money industry is represented by the first payment services directive (PSD 1) 2007/64/EC which goal was the creation of a single market for payments in the European Union. The directive was then revised in 2015 with the publication of the PSD 2 (second Payment Services Directive) 2015/2366 that improved the existing rules on payments and establishing new guidelines for the digital payment services.

The payment services directives focus on the limitation of the costs related to the usage of electronic payments, on the clarification of the extent of consumer rights and provider obligations and on enhancing the security measures for the consumers⁸.

In relation to the first point, with the implementation of the two directives, the European authorities imposed the same set of rules on all types of payments, both electronic and non-

⁷ Ruth Halpin, Roksana Moore, “*Developments in electronic money regulation – the Electronic Money Directive: A better deal for e-money issuers?*”, Computer Law & Security Review, Volume 25, Issue 6, November 2009, Pages 563-568

⁸ Mary Donnelly, “*Payments in the digital market: Evaluating the contribution of Payment Services Directive II*”, Computer Law & Security Review, Volume 32, Issue 6, December 2016, Pages 827-83

cash, across the whole European Economic Area (including Iceland, Norway and Liechtenstein). The introduction of the second payment services directive included also the application of a legislative package that also includes a regulation on multilateral interchange fees (MIFs). With the implementation of these two measures, the European Commission imposed a limit on the fees that retailers can charge for electronic transactions by defining a cap as a percentage of the transaction value for debit and credit cards purchases (0.2% for the former and 0.3% for the latter)⁹ and forbid the application of further charges on customers when adopting these types of payments.

A second consequence from the introduction of the first payment services directive was the increase in clients' rights and the improvement the safety measures that merchants need to have in place for electronic payments which translated in a better protection for consumers against frauds and abuses. This element was later strengthened in the revised version of the Directive which introduced stronger requirement checks (Strong Customer Authentication – SCA) for the users of electronic payments. *“When the user wishes to use a payment initiation service or account information service, the providers are obligated to apply strong customer authentication”*¹⁰ systems, with a minimum limit of the adoption of at least two out of the three mandatory authentication requirements. The SCA requirements are defined based on the following characteristics: (1) *knowledge*, intended as information known by the user (i.e. password or personal identification code), (2) *possession*, as something possessed by the user (i.e. token or smart card) and (3) *inherence*, an element that identifies uniquely the person (i.e. fingerprints or other biometric characteristics).

A further element of change introduced by the PSD is the strengthening position of the EBA (European Banking Authority). After the implementation of the first Directive, the European Banking Authority was granted the right to issue guidelines and technical standards in relation to electronic payments with the scope to guarantee security and efficiency of the payments in the EU as well as transparency and fair competitions among the payment institutions across the Europe.

“As PSD2 is a continuation and an updated version of the PSD1, the main objective is still to develop an Internal Market for safe electronic payments across borders that supports the

⁹ Regulation (EU) 2015/751 on interchange fees for card-based payment transactions

¹⁰ P.T.J.Wolters, B.P.F.Jacobs, *“The security of access to accounts under the PSD2”*, Computer Law & Security Review, Volume 35, Issue 1, February 2019, Pages 29-41

growth of the EU economy”¹¹, however the publication of the revised Payment Services Directive not only amended existing rules on the matter of electronic payments, but it also had an impact on the provision regulating electronic money institutions set out in the EMD2. In particular, the PSD2 imposes stronger prudential rules for payment institutions by envisaging a higher level of supervision and competence for the host Member State where a payment institution is passporting its services to another Member State. These guidelines reported in the Payment Services Directive relate to the information to be submitted by the applicant when applying for the license, the conditions to maintain the authorization, the requirements for the outsourcing of operations and record keeping standards.

A further element of conflict between the PSD2 and the EMD2 lays on the identification of the applicable framework for specific products and services. A key issue is represented by the fact that the Payment Services Directive does not regulate transactions based on a specific payment instrument within a limited network (i.e. gift cards or fuel cards), which allows companies to process significant amount of transaction without the need of possessing a license for electronic payments. On this matter, the European Commission declared that such activities do not fit the purpose of the limited network exclusion resulting in higher risks and no legal protection for payment services and in a consequent unequal treatment for regulated payment institutions issuing payment instruments and other players relying on limited networks.

Whilst the second provision on payments services did not offer a concrete solution to the problem, the European Commission decided to establish thresholds for potential payment service providers operating on a limited network or carrying out activities referred in Article 3(k) I or II of the PSD2. *“If a service provider issues payment instruments for the purchase of goods and services in a specific retailer or specific retail chain only in the premises of the issuer or within a limited network of service providers under a commercial agreement with a professional issuer, and the value of the total payment transactions in a given year exceeds €1 million, it will be required to notify the national regulator which will assess whether or not the limited network exemption may be availed of by the service provider. This change is likely to prompt more rigorous enforcement of the limited network exemption than was the case under*

¹¹ Stian Hallum, Jon Stian Gulbrandsen Eide, *“PSD2: A Strategic Perspective on Third-Party Payment Service Providers”*, BI Norwegian Business School, pp. 38

PSD 1”¹².

The SEPA Framework

Since the establishment of the European Economic Community in 1958, a series of events marked the process of establishing a more integrated European financial market. The first attempt to do so were the introduction of the Euro currency in 1999, which was adopted by the first Member States in 2002, and the creation in the same year of the TARGET, the central banks' large-value payment system, replaced in 2007 by the TARGET 2. “*One of the key elements that have impacted the payments landscape, particular in the credit transfer payments in the euro area countries, was the implementation of the Single Euro Payments Area or SEPA project*”¹³ which represents one of the main steps toward the financial integration in Europe. With the goal to harmonize card payments, direct debits and credit transfers, the European banking and payment industry, represented by the European Payments Council (EPC), introduced three statutory instruments which define the SEPA framework:

- Regulation (EC) No 924/2009: with the publication of this regulation, the EPC required banks to apply the equal transaction fees on both domestic and cross-border electronic payments when executed using euro currency, however it also allows Countries outside the euro area to apply this regulation when payments are executed in their national currency.
- Payment Services Directive 2007/64/EC (PSD1): as seen in paragraph 2.3.2, it lays out the legal foundation for SEPA and electronic payments.
- SEPA regulation (EU) No 260/2012: sets the rules and the deadline for all national credit and debit transactions to migrate to the SEPA format. The initial date for the switch was set in February 2014, however it was later postponed to August of the same year 2014 as reported in the Regulation (EU) No 248/2014). The SEPA Regulation also established a uniform legal framework for euro-to-euro transfers outside of the euro area and allowed domestic payments to be executed by using only the IBAN code.

¹² Shane Kelleher, “*The Fintech and Payments Revolution of PSD2: What do I need to know?*”, William Fry, Financial Regulation Group Focus, April 2016

¹³ Vânia G., Silva Esmeralda A.Ramalho, Carlos R.Vieira, “*The impact of SEPA in credit transfer payments: Evidence from the euro area*”, Research in International Business and Finance Volume 38, September 2016, Pages 404-416

1.2 Technology and Payments: The Need for EU-wide Guidelines

Another significant effort by the European Union has been put on the tech-related concerns in relation to the payment industry. In particular, the European Banking Authority, as member of the European System of Financial Supervision, has issued a series of guidelines on aspects of ICT (Information and Communication Technology) security and risk management¹⁴ and on outsourcing¹⁵, with a special focus on cloud-based solutions¹⁶ (EBA-Rec-2017-03). With respect to this last category, the EBA stressed the importance for the applicant to assess the level of dependency on a single supplier and the risk to which it is exposed in relation to the business continuity in the case of weaknesses or system failures of the cloud service provider.

These documents have been issued and designed with the purpose to address some critical considerations arisen on the basis of the integration of tech-solution to payment services. In this respect, the EBA stressed the importance of having adequate safeguards in place, under a technologic standpoint, so to ensure that the flexibility and comfort enabled by tech-powered tools would not be prejudicial to the smooth running of the operations of licensed entities and, in general, the interest of all the stakeholders involved in the industry.

Additional guidelines have been issued in relation to data governance and data risk. Applicants shall enhance their information technology systems to prevent unauthorized alteration or losses of sensible data and ensure confidentiality, integrity and availability of the information. The local Authority has to then assess the governance and security framework of the applicant by determine its adequacy and by measuring whether the implemented risk-mitigation solutions are commensurate to the level of risk of the business.

1.3 EMI and Traditional Banks: The State of the Banking Industry and the Factors That Contribute to the Rise of Fintech Companies

During a speech in 1994 at a conference at the Bank Administration Institute, Bill Gates, the at that time chairman of Microsoft, said that “*banks are dinosaurs, they can be bypassed*”. This bold prediction by the American entrepreneur seemed very bizarre as banks were seen as

¹⁴ <https://eba.europa.eu/eba-publishes-guidelines-ict-and-security-risk-management>

¹⁵ <https://eba.europa.eu/eba-publishes-revised-guidelines-on-outsourcing-arrangements>

¹⁶ EBA/REC/2017/03, “*Recommendations on outsourcing to cloud service providers*”, EBA, <https://eba.europa.eu/eba-issues-guidance-for-the-use-of-cloud-service-providers-by-financial-institutions>

scratchproof institutions necessary to conduct any type of economic operation. Less than two decades later, however, this statement looks more true than ever before. As demonstrated by a study from the Harvard Business Review Analytics Services¹⁷, 4 out of 5 financial services firms are struggling with digital initiatives mainly due to the inability to experiment and implement new technological solutions in their operations, the legacy systems which are rarely updated to meet the new market needs and the risk aversion of the management teams which generally give more weight to the threats coming from the introduction of IT solutions due to cybersecurity issues rather than an opportunity to grow. A scenario confirmed also by Gartner, the world leading advisory and research company, which revealed that 69% of US retail banks rank average or below in digital performance¹⁸.

The lag in the adoption of digital solutions as well as the inability to innovate, an old form of conducting the business and increasing numbers of financial crimes exploiting the lack of proper counter-measures, played a pivotal role in the shift of customers from the traditional banking institutions to the utilization of new payment and banking platforms identifiable in the figure of the newly born electronic money institutions. Challengers such as Monzo, N26 and Revolut may have been around for years, but their competition is now becoming a source of stress for global and regional banks which see these once small players getting momentum and increasing their market shares at their expenses. This fact is supported also by the goldrush of investments that fintech¹⁹ companies are experiencing: in 2018 only these businesses raised \$111 billion, more than double of what they managed to collect the year before (\$51 billion).

These new players are challenging traditional banks by leveraging their IT infrastructures to offer their services in competition to the ones offered by established financial players which are usually preferred to classic ones due to a combination of factors that make them more appealing to the majority of the consumers.

The increasing importance of implementing these new tech-based solutions in the financial industry has been highlighted by David Furlonger, VP at Gartner, who predicts that in 2030

¹⁷ “*Accelerating the Pace and Impact of Digital Transformation*”, Harvard Business Review Analytic Services and Genpact Research Institute, 2016. (<https://www.genpact.com/downloadable-content/hbr-full-report-how-financial-services-views-the-digital-agenda.pdf>)

¹⁸<https://www.gartner.com/en/newsroom/press-releases/2019-11-04-gartner-reveals-that-69--of-u-s--retail-banking-brand>

¹⁹ The Financial Stability Board (FSB) of the European Union defines Fintech as “*technology-enabled innovation in financial services that could result in new business models, applications, processes or products with an associated material effect on the provision of financial services*”.

banks will be irrelevant. The research²⁰ shows that 80% of the financial firms will not be able to compete against the other big players in the market or will go out of business, while the remaining part will be able to survive only by reinventing their model of business and embracing new technologies.

The significance of the application of innovative technologies in the payment, investment services and financial services industries has also been captured by several BigTech companies, such as Google and Amazon. They in fact realized that these new technological solutions applied to the payment services, which promise to disrupt the traditional approach adopted for payment transactions among retail clients and, in particular, within the e-commerce space, represent a huge opportunity for the growth of their operations and have moved or are moving towards the integration of such services in their business model.

Not only the inadequacy of the traditional banks to implement new technologies to the financial services is to be reconducted to the growing popularity of the newly born electronic money institutions, but also a series of factors that characterizes these companies. In particular, one of the key advantages for the consumers is the enchanted effort that these digital banks dedicate on the customers experience. The possibility to open an account entirely online in few minutes in conjunction with a less strict KYC procedure and a non-stop online assistance is perceived by clients as a big step forward compared to the traditional procedures required by the other institutional players.

Alongside these elements, another factor that is helping EMIs to spread among consumers is the different way in which the access to the personal account is built and intended to be used. While traditional bank accounts have only recently implemented online banking systems that allow the users to perform the basic operations on their accounts, electronic money institutions, by exploiting the usage of technological solutions, allow clients to access their money from any type of devices that can connect to the internet by a quick and easy biometric authentication or via a PIN code. Once accessed the digital wallet, the user can perform any sort of operation, from the instruction of payments to the exchange of currency to the trading of financial products. The platform can also allow users to execute additional actions that might involve third parties partners such as charities, hotels, restaurants or insurance companies.

²⁰ David Furlonger, “*Digitalization Will Make Most Heritage Financial Firms Irrelevant*”, 2018

The accessibility of a digital wallet that contains the client's funds merely from a phone or a computer poses a question for many potential users on the security of these institutions. However, although in the recent years the increasing number of frauds and online thefts affected negatively the reputation of online payments and banking platforms, the effort from the European Authorities to implement cyber-security measures by imposing specific risk-mitigation measures via the issuing of the EMD2 and the PSD2, helped the reputation of electronic payment systems which are perceived by more and more people safer ways to transfer funds compared to cash payments. Moreover, security systems for online transactions have been heavily improved in the recent years with two main systems being adopted for digital payments: Secure Socket Layer (SSL), which allows "*encryption and decryption of information which are securely transferred between an Internet browser and a server as data cannot be intercepted or changed during transmission*"²¹ and Secure Electronic Transaction (SET) represents "*an alternative, more complex security system based on digital certificates and signatures which needs specific software*"²².

An additional factor that is allowing fintech companies to succeed over the traditional financial institutions is the lower amount of fees charged to customers. Transactions through electronic money, in fact, are cost and time efficient as they can be transferred from one account to another rapidly over the network. This allow to send and receive funds immediately and, the transaction fees applied to payments, are lower to the one applied by banks and credit cards. This characteristic is also beneficial for small business that generally rely on this type of payments. The usage of electronic money not only facilitate the handling of payments for online transactions on their websites, but also by allowing improving their cash flow, guaranteed by the rapid execution of payments by this technology.

Lower fees are not limited to transaction from one account to another, but also to account maintenance fees, which are non-existing for digital wallet opened through an electronic money institution (premium account fees should be not perceived as maintenance fees), but also to forex transactions. While traditional banks generally charge customers with high exchange currency fees in addition to a disadvantageous exchange rate, electronic payment platforms offer very competitive rate, close to the real one, with no additional charges.

²¹ Abhay Upadhayaya, "*Electronic Commerce and E-wallet*", International Journal of Recent Research and Review, Vol. I, March 2012, pp. 41

²² Xu Wei, "*E-Commerce Online Payment Security Issues*", Joint Hefei University Journal, 2000, pp. 23-25.

Although the popularity of electronic money and payment institutions is keep increasing, these new players still have to face a number of challenges when compared to traditional banks. Under the regulatory point of view, the main one is represented by the “regulatory maze” created by the European Union. As seen in this chapter, the rules regulating electronic money and the institutions issuing this payment instruments are the result of a combination of a multitude of directives. This results in an unclear definition of some important points for the definition of payment products, one of which is the definition itself of electronic money, that does not indicate any quantitative or qualitative measures for the identification of such instruments.

From the consumers side, instead, it’s possible to identify other problems that affect EMIs. Reputation is one of these. These platforms exploit their fresh image as a disrupting factor that allows them to be differentiate from traditional banks. However, this represents a double-edge sword as many customers perceived the “being the new kid on the block” as a synonym of inexperience and unreliability. Furthermore, the countless cases of identity thefts, phishing or hacking in the financial industry have badly influenced the level of confidence in the electronic payment industry also affected by the lack of security that these institutions promise to the users’ funds. This issue is also promoted by the fact that, unlike the more established banking institutions in possess of a banking license, EMIs do no participate to the deposit guarantee scheme (DGS). First introduced in 1994, and later amended in 2009 and finally in 2014 with the Directive 2014/49/EU, the deposit guarantee scheme “*ensures that all member States has a safety net in place for bank account holder. If a bank closes down, national DGSs were to reimburse account holders of the bank up to a certain coverage level*”²³ which the Directive imposes to amount to EUR 100,000, funds that has to come from the bank funds and not from taxpayer money. This, however, only applies to e-money issuer that are not credit institutions as the activity is not considered as collecting money from public, which instead falls under the deposit guarantee scheme. For all the other electronic money license holder, the lack of any guarantee for its customers represents a major drawback. From this, the decision of some e-money platforms such as Revolut or Monzo to pursuit, and successfully obtain, the banking license alongside the EMI one, which allow these players to increase customers’ protection.

²³ Francesca Arnaboldi, “*Deposit Guarantee Scheme: A European Perspective*”, Palgrave Pivot, 2014

1.4 Electronic Money Definition

A first non-legal description of electronic money, also called e-money, has been given in a 1994 report of the European Central Bank, that defines it as “*an electronic store of monetary value on a technical device that may be widely used for making payments to entities other than the e-money issuer. The device acts as a prepaid bearer instrument which does not necessarily involve bank accounts in transactions but acting as a prepaid bearer instrument.*”²⁴. With this definition, the European authority pointed out two main characteristics of electronic money: (1) its value and practical use must resemble the ones of the physical money, which allow the owner to pay for goods and services, and (2) that this new method of payment exploits the usage of the technology with a twofold purpose: to store value without relying on the connection with a traditional bank account and to facilitate cashless payments.

The legal definition of electronic money is provided by the first Electronic Money Directive (EMD) issued by the European Parliament in 2001: “*electronic money shall mean monetary value as represented by a claim on the issuer which is: (i) stored on an electronic device; (ii) issued on receipt of funds of an amount not less in value than the monetary value issued; (iii) accepted as means of payment by undertakings other than the issuer*”²⁵. The description of this payment instrument insists more on the legal definition rather than on the technological aspect, leaving to the electronic money institution freedom on which technical solutions to adopt to carry on its operations.

Following the first Electronic Money Directive, the European Parliament introduced a second Directive (EMD2) on the matter, the 2009/110/EC, that amends the definition of electronic money which are now described as an “*electronically, including magnetically, stored monetary value as represented by a claim on the issuer which is issued on receipt of funds for the purpose of making payment transactions [...], and which is accepted by a natural or legal person other than the electronic money issuer*”²⁶.

These two definitions lay the foundations for the requirements which electronic money must have in order to be as so defined. The two Directives identify electronic money as a method of

²⁴ “*Report on Electronic Money*”, European Central Bank, August 1998.

²⁵ Directive 2000/46/EC of the European Parliament and of the Council of 18 September 2000 on the taking up, pursuit of and prudential supervision of the business of electronic money institutions. O.J.E.C. L275/39, 27/10/2002, Art.1.3(b).

²⁶ Directive 2009/110/EC of the European Parliament and of the Council of 16 September 2009 on the taking up, pursuit and prudential supervision of the business of electronic money institutions.

payment that can be used to buy goods or services, which value is *a claim on the issuer*, meaning that, when e-money are issued by an institution in exchange of fiat currency, defined as a government-issued currency backed by a commodity (usually gold), a liability equal to the amount of funds transferred by a customer who deposited the money into his digital wallet arises for the electronic money platform against the user itself. This characteristic allows this type of currency to be exchanged for physical money at any given time.

In addition to the claim on the issuer, the two Directives specify a set of characteristics that electronic money must possess. In particular, these characteristics concern the storage of the value, the monetary value and the acceptance of this type of payment.

The first element is the one that most differentiate electronic money to physical money. While for the latter no requirements are made on the way its value has to be stored, for e-money this can only be kept using an electronic method. Even though this represents a key factor for electronic money, the European Authority did not specify any particular characteristic of these technological solutions. The reasoning behind this decision lies in the fact that the defining specific devices would have meant a constant revision of the Directive in order to keep the pace of a fast-evolving tech world. With regards, to storage solutions, a differentiation on the type of devices involved has been proposed by the European Central Bank which identifies two types of electronic money products depending on the underlying technology used to store their value: hardware-stored or software-stored products.

In the case of hardware-stored products, e-money are stored in physical devices. This type of electronic money is card-based, meaning that the value is stored on a chip card and is generally used by retailers and consumer to process small payments (i.e. gift cards). While on the appearance these transactions might look identical to the one done using debit or credit card, there are some differences. Even though both methods require a card or device reader, this type of product doesn't need an internet connection in order to complete the payment since traditional bank accounts are not involved in the transaction as the e-money are stored directly on the electronic device. Another characteristic of hardware-based products is that it only supports non reversible transaction which translate in the impossibility of reversing a payment even if a legitimate error or fraud is proven.

The other type of e-money storage solution is the software-based products which *“employs specialized software on a personal computer, typically allowing electronic value to be transferred via telecommunication networks and the Internet. The value held by a customer is*

*stored centrally on a server under the control of the issuer and customers access their purses remotely*²⁷. The funds are then not stored on a chip or a computer, but on an issuer's server. The users can access their accounts using internet-connected devices which can be used to operate on their e-money account.

With software-based solutions, every customer has an electronic wallet in which funds are deposited by a transfer from the individual's bank account. With regards to the safekeeping of the funds, this can be viewed under a double perspective, from the customer one and the e-money platform one. From the consumers point of view, they only see the transfer of money from their bank account to their digital wallet. From the electronic money institution perspective, instead, the deposit of funds represents a mere double entry in their system as the money are not directly held by the e-money platform. In particular, when a user instructs a transfer to his personal digital wallet, the funds are received and immediately deposited by the platform on a traditional bank account. This results in a debit to the customer for the amount transferred and credit for the same amount against the banking institution. As opposite of the hardware-based products, the software-based ones allow reversal of payments in case of a dispute (i.e. online platforms such as PayPal guarantee the full reimbursement of the amount paid in case of a proven fraud).

It is also possible to identify a third category, a hybrid solution, that mixes the characteristics of both the hardware and software-based products allowing users to use electronic devices or online accounts to transfer funds. An example is a prepaid debit card linked to a corresponding internet base wallet.

The second distinctive characteristic requires electronic money to store its value “[...] *in an electronic money device must not be any less than the monetary value issued. This means that the value issued should not be superior to the amount paid for*”²⁸. This statement from the European Parliament forbids electronic money to be used as a credit instrument, characteristic which would occur in the case in which the value of e-money issued was higher than the one the user paid for. The Directives, however, does not state whether the money value of electronic money received by an individual can be less than the one he paid. This implies that electronic money institutions are allowed to charge fees for their services when e-money are issued.

²⁷ Phoebus Athanassiou, N. Mas-Gui, “*Electronic money institutions, current trends, regulatory issues and future prospects, legal working paper,*” ECB, 2008

²⁸ A. Guadamuz, Prof. J. Usher, “*Electronic Money: the European regulatory approach*”, 2005

The possibility for EMIs to charge fees on deposits is just one way in which these institutions can monetize their services. E-money platforms can decide to apply subscription and maintenance fees for the access to the platform, issue paid memberships that allow clients to access to premium features not included in the basic plan, include third-party advertisements on their website/application, apply transaction fees on transfers outside their own network (in particular for international banking transfers or withdrawals) and to merchants who utilize the platform to process payments.

The final requirement requires electronic money to be accepted as means of payment. This characteristic fully recognizes electronic money as payment method putting it on the same level as cash and other traditional methods. However, the definition of issuer contained in the first Directive has caused misinterpretations as it does not clearly define whether a particular instrument can be defined as electronic money since it doesn't provide any particular quantitative or qualitative requirements on the third-parties by assessing the number of entities that should accept it or their role in the market.

In order to try to repair this issue, the European Authority published a new definition for the payment instrument in the EMD2 that requires e-money to be accepted not just by undertakings other than the issuer, but by a natural or legal person other than the electronic money issuer. The new wording does not impose any particular limitation on the type of third parties adopting this payment solution. However, the new Directive fails to address the requirement related to the volume of entities which need to recognize the e-money instrument as a payment method.

1.5 Electronic Money Institutions (EMIs) Regulation

Moving from the consideration set out in the previous paragraph, firms interested in issuing electronic money and providing services to customers throughout the EU - eventually by complementing their product offer with one or more of the payment services set out in Art. 6 paragraph 1 of the second EMD – started to apply for the EMI license at a growing rate. Notably, few Member States seem to have gained a strong reputation as “EMI hotspots” thanks to a combination of (1) pro business regulatory framework (2) an attractive tax legislation and (3) an approachable and forward-looking regulatory authority. Looking at the data reported in the figure 1.3 the following Member States seem to have taken a lead in the regulatory competition. Whilst the choice of one jurisdiction over another entails several distinctive benefits, the common ground of European e-money license, which makes EU jurisdictions

more appealing compared to off-shore ones, lies on the so-called passporting rights. In this regard, the occurrence of a hard-Brexit would cause UK licensed EMIs to lose their access to the single market with a possible risk of disruption in their operations involving EU States. Whilst Brexit outcome seems yet to be defined, recent data show a growing attractiveness from smaller Member States which are promoting a specialized and electronic money-friendly ecosystem.

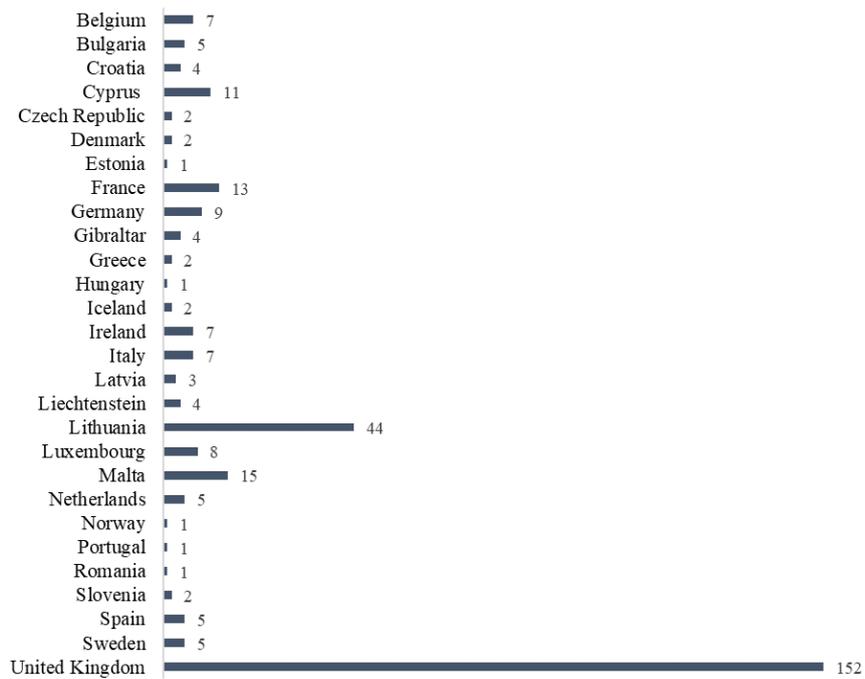


Figure 1.3 - Number of EMI in Europe as of December 2019²⁹

With regards to the Italian EMI market, at the end of 2019, seven institutions were approved by the Italian regulator and allowed to issue electronic money, three in Milan (Cartalis S.p.A., Nexi Payments S.p.A. and Edenred Italia Fin s.r.l.), one in Genova (QUI! Financial Services S.p.A.) and three in Rome (Telepass Pay S.p.A., Postepay S.p.A. and Enel X Financial Services s.r.l.)³⁰.

²⁹ Source: <http://www.thebanks.eu>

³⁰ Italian electronic money institutions are registered on the Italian register of EMIs. Data can be found on Sistema di Organizzazione e Controllo degli Istituti di Moneta Elettronica <http://www.imel-emd.eu/albo-imel.html>

This paragraph will provide an overview of (i) the regulatory definition of EMI, moving then to (ii) the main requirements prescribed by the 2EMD (second Electronic Money Directive) for the purpose of obtaining the relevant license under the aforesaid framework.

The Electronic Money Directive 2000/46/EC discussed in the previous section defines electronic money as an electronic instrument used for payment purposes which value is stored in an electronic device. The notion of e-money appears also in the definition of electronic money institutions (EMIs) in Article 1.3(a): “*electronic money institution shall mean an undertaking or any other legal person, other than a credit institution as defined in Article 1, point 1, first subparagraph (a) of Directive 2000/12/EC which issues means of payment in the form of electronic money*”³¹.

The definition provided by the Directive identifies as an EMI a legal person that has been granted by the local authority to issue electronic money. Other than the credit institutions, which are defined in the directive 2000/12/EC – First Banking Directive (FBD) – and that don’t need an explicit license to issue electronic money, the other institutions that are also entitled to apply to issue e-money are electronic money institutions, Member States, Regional Authorities and European and National Central Banks.

While the issuing of electronic money represents the core business of an electronic money institution, the Directive does not limit the activities of an EMI to it, but also allows the license holder to perform a series of additional services which are listed in Article 6 of the document (also listed in Annex I of the Second Payment Services Directive – PDS2). These activities comprehend the granting of credit (under the conditions outlined in the directive 2007/64/EC, which states that such credit cannot be issued by utilizing funds received from the purchase of electronic money from customers and that it must comply the applicable safekeeping requirements) and the provision of all the operational services with respect to the issuing of electronic money and process of the payments.

A further service prescribed by the Directive is the possibility for EMIs to offer the provision of payments. Given the tight connection between the issuance of electronic money and its usage for making payments and with the purpose of facilitate the usage of this new method of

³¹ Directive 2000/46/EC of the European Parliament and of the Council of 18 September 2000 on the taking up, pursuit of and prudential supervision of the business of electronic money institutions. O.J.E.C. L275/39, 27/10/2002, Art.1.3(a).

monetary transaction, the European authority allows electronic money institutions to provide a wide variety of payment services.

In this regard, EMIs can offer services which enables cash movement to and from a payment account. This is translated in the possibility for the user to operate on his payment account and to deposit and withdraw electronic money from it on his demand. Holders of an electronic money license can also provide the execution of payment transactions allowing the owner of the payment account to transfer funds to a third party using the same or a different payment service provider. These transactions include direct debits, payment via a prepaid card linked to the user account and credit transfer. In addition to the possibility of executing the payments, EMIs are also allowed to act as an intermediary between the supplier of goods and services and the payment service user. Other activities that might be offered by electronic money institutions are money remittance, the issue or the acquisition of payment instruments and the IT services that the user might require to operate on his payment account.

1.6 Application and Requirements in Europe

A company that pursues the license to become an electronic money institution can be incorporated by one or more individuals through a stand-alone company or a subsidiary. The issue of such license is consequent to an authorization process prescribed by the local competent authority which, after the submission of the required documentation from the applicant, will assess the completeness of the information provided and start the reviewing process. With the Electronic Money Directive, the European Union set out the rules lay with the aim to lay the foundations for a single market for e-money services and to provide a clear and uniform framework to facilitate the application for the electronic money license. The requirements for setting up an EMI are reported in the Title II of the Directive which lists the general prudential rules (Art. 3), the amount of initial capital and own funds that the EMI must meet at all time of its operations (Art. 4, 5), the activities it is allowed to perform (Art.6)³², safeguarding requirements (Art. 7) and the relations with third countries and passporting rules.

The initial capital requirement has been included in the Directive as a way for the National Competent Authority to assess the capability of the applicant to conduct its operations in case of losses that generally occur during the first years of activity.

³² Refer to paragraph 1.5

In respect to the amount, Article 4 imposes electronic money institutions to hold, at the moment of the application, an initial capital not less than EUR 350,000. This level has to be maintained, if not increased in accordance to the methods reported in the Art. 5 of the Directive, at any given time of operation. However, in the case the applicant is only applying for the payment institution license, which do not permit the holder to issue electronic money, but just to the execution of payment transactions, the capital requirements are described in the Art.7 of the Second Payment Service Directive:”

- (a) where the payment institution provides only the payment service as referred to in point (6) of Annex I, its capital shall at no time be less than EUR 20 000;*
- (b) where the payment institution provides the payment service as referred to in point (7) of Annex I, its capital shall at no time be less than EUR 50 000;*
- (c) where the payment institution provides any of the payment services as referred to in points (1) to (5) of Annex I, its capital shall at no time be less than EUR 125 000.”³³*

In order to assess the viability and sustainability of the activities of the applicant, the local authority requires the submission of the supporting documents before the starting of the application process which include the bylaws of the company, the shareholding and group structure with attached the know-your-customers (KYC) documentation of the people involved, the programme of operations, the business plan and the declaration of the depositary bank that certifies the effective deposit of the initial capital.

While the memorandum and articles, the KYC documentation (i.e. group structure, source of wealth of the UBOs, personal information of the key persons, etc...) and the proof of payment of the initial capital are information that are generally provided at the moment of incorporation of a new company, for firms that pursuit an EMI license, the programme of operations and the business plan are especially important.

Given the high degree of uncertainty of these new types of institutions resulting from a combination of a lack of historical information, market benchmarks and youth of the technology involved, the local authorities which issue authorizations for the distribution of e-money, require a number of information in relation to the main activities of the company, how these will be conducted, the personnel involved and their roles, the past and future forecasted

³³ Directive (EU) 2015/2366 of the European Parliament and of the Council of 25 November 2015 on payment services in the internal market

financial data and any other additional information that may be requested from the authority in order to determine whether the license can be issued to the applicant.

The programme of operations must report the information on how the applicant intends to carry out the e-money services of issuance, redemption and distribution and detailing all the parties involved by defining which operations are conducted internally and which are outsourced. The document has also to list the technical solutions (such as software and cloud systems) implemented.

The business plan, on the other hand, has to define the strategic plan of the company, its financial forecasts, the organization (both internal and the outsourced functions), the implemented security measures and the internal control mechanisms:

Strategic Plan

In respect of the strategy, the business plan must identify the scope of the activities that are carried out by the firm as well as the reasoning behind the intent of the application. The strategic plan must also outline the business model listing the sources of revenues of the company and by including the target consumers and markets which define the profile of the customers and the region in which the applicant intends to offer its services with eventual restrictions on the types of clients and areas of operations.

Financial Plan

The section of the business plan focused on the financials of the company must report the future budgeted forecasts (usually for a period of 5 years) as well as any potential change in equity that might occur. As pointed out in Art. 4 of the 2EMD, electronic money institutions are subject to a minimum capital requirement of EUR 350,000. This section of the business plan shall include this information as well as eventual increases in the funds requirements, which will be reflected in the equity of the business and reported in the “change in equity” paragraph.

Additional information shall also be included in respect to the liquidity level of the business. The applicant has to guarantee a continuous level of liquidity necessary to meet its financial obligations by holding sufficient cash or other liquefiable assets, securing the matching of cash flows and by complying with the minimum liquidity requirements as may be prescribed by the local authorities.

Internal and External Organization

The business plan should define not only the strategy of the company, but how this is implemented by identifying the people involved in the project. In particular the firm must determine the key figures such as the board of directors, the company secretary and the compliance and money laundering reporting officer. However, given the work required, for the purpose of ensuring a smooth and efficient performance of its activities, the company may rely on the involvement of third parties appointed through outsourcing agreements. As done for the internal personnel, this section shall list all the outsourcing agreement that the company has in place clarifying which functions will be performed by external people.

Security Measures

A key aspect of EMIs is the employment of IT solution to conduct its operation. For this reason, the regulators across the EU have increased their attention on the implementation of appropriate measures to mitigate the risk related to cyber-security menaces, which represent one of the most significant risks faced by the financial industry³⁴. To assess the solutions put in place by the firms pursuing the EMI license, the local authorities require the business plan to have a section which defines the security and cyber-security measures, the operational and technical arrangements and a list of softwares used by the company with particular focus on the ones utilized to minimize and prevent money laundering and financing of terrorism (AML/CFT measures).

Internal Control Mechanisms

An EMI shall implement internal control mechanisms to assure the proper and effective compliance with the requirements of the applicable laws. This can be done by establishing a robust system of internal policies, procedures and controls which shall be maintained and reviewed on an on-going basis. Part of the control mechanisms should also include the measures that the company has in place to identify the circumstances which constitute or may give rise to breaches or operational accidents and the proper procedures to be followed and adopted in order to identify, mitigate, manage and report such risks.

³⁴ Sarah Dahlgren, Executive Vice President of the Federal Reserve Bank of New York, Speech at the OpRisk North America Annual Conference, New York City: The Importance of Addressing Cybersecurity Risks in the Financial Sector (March 24, 2015)

2. LITERATURE REVIEW

2.1 Literature Review on Electronic Money

As outlined in the previous paragraph, electronic money is defined as any amount of monetary value represented by a claim issued on a prepaid basis, stored in an electronic medium and accepted as a means of payment by undertakings other than the issuer, predominantly for small-value transactions. Athanassiou (2008) identifies this type of payment instrument in the same way as banknotes and coins or as ‘fiduciary money’, which value derives not from its intrinsic worth but, instead, from the bearer’s expectation that it can be exchanged for its underlying value. However, unlike other forms of fiduciary money or existing single-purpose prepaid card schemes, e-money payment instruments are the result of an exchange of token into electronic money, intended for use as multipurpose payment instruments.

The versatility of this payment instrument alongside the spread of technology solutions and the creation of a friendly regulatory framework, has guaranteed to the e-money market a significant growth during a very short period. As pointed out by Gormez and Capie (2000) only a few years ago, expectations as to network-based e-money tended to be exaggerated. The early proposals were impressive, in line with popular expectations regarding Internet and network-based virtual life. In the following years, smart card-based solutions to e-money applications became very popular, and nearly all credit companies began to invest in electronic purse technology, parallel to independent start-ups.

Despite the positive effects of e-money reported by Woda (2006) on cost reduction and privacy and the increasing adoption of this payment instrument, the European Central Bank (2005) still recognize the role of electronic money to be marginal in the European Union, with total euro area e-money balances estimated to be no more than 0.1% of the total currency in circulation in December 2007 (increased by 0.04% compared to December 2000) and the number of e-money transactions in 2006 representing 0.7 % of all non-cash payments (from a 0.3% in 2000).

Although the current market size of the e-money payment instrument is still modest, the increasing interest showed by central banks and financial regulators which resulted in the issuing of rules and guidelines aimed to protect the consumers and to create a favorable environment for the e-money industry, made electronic payments solutions widely popular

among customers who increasingly adopted this new type of payment as viable solution to the traditional cash.

However, the impact of this new type of payment is yet to be considered a treat for the traditional currency which still represents the main method in which transactions are performed. According to a survey of developments in electronic money and internet and mobile payment shared by the Bank for International Settlements (2004), to which 95 monetary institutions and banks took part, the influence of electronic money in their balance sheet was nonexistent. This result has been analyzed by Griffith (2004) who stated that as the currency in circulation is a part of central bank's monetary aggregates and balance sheets, the low level of substitute of currency in circulation is proof for the most frequent conclusion for the small, negligible influence of the e-money.

Whilst cash transactions are still predominant, Whitesell (2001) in fact reported that just in the United Kingdom 74% of the total transactions made in 2001 were made using traditional payment methods, although the availability of payment instruments across the country, the European Central Bank identified possible threats represented by this new payment instrument that, in the future, might substitute banknotes and coins. In particular, the ECB (2000) in one of his monthly bulletins stated that electronic money might become an attractive alternative to holding short-term bank deposits if this were to be remunerated and over the long run, developments in consumer prices are closely related to developments in money. In respect to the maintenance of the price stability, the widespread adoption of e-money could raise concerns in the following areas:

- The need to safeguard the role of money as the unit of account for economic transactions;
- The effectiveness of monetary policy instruments might be affected by a widespread adoption of electronic money;
- The emergence of electronic money might have repercussions on the information content of monetary indicator variables with regard to the primary objective of price stability.

For the European Central Bank, the influence of e-money on the monetary policy presents a situation that needs to be monitored and that will be continuously assessed in the future. As per today, however, Popovska-Kamnar (2014) stated that the current usage of e-money still not represents an element of worry for central banks due to the low percentage of transactions operate via this payment instruments. In the coming years, it is reasonable to expect a decrease

in the use of traditional currency, but without reasons for any dramatic changes in the monetary policy.

While as stated by Mishkin (2008) a scenario in which e-money will completely replace physical cash is almost certainly impossible, an increase in the adoption of this payment instrument is likely to happen in the coming years, but only if the majority of consumers understand the technology behind this instrument and the main advantages that this can bring. Guadamuz (2003) described the methods of storing the value for e-money by explaining that this is stored in electronic devices that can be software-based or card-based. The first allows consumers to create an electronic wallet and top it up with money from a real bank account, to then use the funds to purchase goods and services via encrypted transactions which keep the identity of the client hidden from the merchant. The second, most viable and promising e-money system is the storage of value on a smart card defined by Newman (1999) as a plastic rectangle containing an electronic chip and holding a certain amount of readable data, which allows users to store a certain amount of value on a chip that is protected by the use of an encryption algorithm and that can only be decoded by an adequate reader. These solutions translate into a much easier and cheaper way to process payments as the execution does not require expensive infrastructures (such as the one used by credit cards) and the need to contact a network facility to conclude the payment, which means, as said by Tether (2013), lower fees for the users and lower costs for the issuing institutions.

With regards to this last category, the number of electronic money issuers have seen their activities increasing due to the expansion of the adoption of electronic money. As mentioned in the previous chapter and referring to the data collected by thebank.ue (2018), some jurisdictions successfully managed to make themselves more appealing in respect to the pursuing of the EMI license, which the United Kingdom and Lithuania far ahead in the number of granted authorizations.

2.2 Literature Review on the Valuation of Financial Firms

This rapid expansion of the fintech sector has caused growing interests from private equity firms and venture capitalists on these new businesses with billionaire investments in the industry and a resulting creation of huge capitalized fintech firms in the span of few years. At the moment of the writing of this dissertation, no deep analysis on the valuation of electronic money institutions and fintech companies have been yet conducted, mainly due to the lack of

information available for the study. However, as stated by Elnathan, Gavius and Hauser (2010) for the purpose of conducting studies on private owned companies, financial statements and comparable companies are usually considered the main source of information when performing a valuation of privately held firm.

Whilst the definition provided by Thako (2019) for fintech companies as firms which exploits the use of technology to provide financial services clearly identifies which companies can be included in such category, the definition of which industry they are more related to it's not so straight forward as they combine tech and financial elements. However, due to the main services that are provided by these businesses, it is reasonable to assume that these companies shall be deemed as financial services firms and so, the same valuation considerations shall be applied.

In this respect, the valuation for the players operating in this industry, which includes not only banks but also and investment firms and insurance companies, represents a daunting exercise due to the difficulty on the measurement of specific parameters. In particular, Damodaran (2013) identified two elements of differentiation compared to firms operating in other sectors. The first element is represented by the cash flows of such firms, since many of the items needed for its determination are cannot be clearly defined. The second derives by the fact that most financial services firms operate under regulatory frameworks that impose strict regulatory constraints on how they run their businesses and how much capital they need to set aside to keep operating. This results in the application of specific minimum capital requirements, restriction in their investments and controls in the issuing of new licenses for conducting these services.

With regards to the difficult to estimate particular elements needed for the valuation, these mainly concern the definition of the weighted average cost of capital and of the free cash flow to the firm, variable required for the valuation using the discounted cash flow model. The main issues lay on the fact that net capital expenditures or non-cash working capital may not be possible to estimate. Although forecasts on the future values can be made, Damodaran (1995) stated that an alternative solution is represented by the valuation using the dividend discount model (DDM) which assumes that the value of a stock is the present value of the expected dividends on that stock. As dividends are often the only tangible cashflow that can be observed, the DDM allows to determine such flows of cash which can then be discounted for the cost of equity as it represents the cash flow to equity of the company.

The alternative approach to the discounted models is the relative valuation, that as stated by Forte, Gianfrate and Rossi (2018) assumes that comparable firms are traded at equivalent prices and that the value should be proportionally linked to the value driver, and this relation must hold for the entire peer group of comparable firms. But while EBITDA/EV or Revenues/EV can be used for this purpose, as argued by Samonas (2015), the majority of the other multiples used in the industry can only be applied to publicly traded companies as the most common method to value financial firms are based on the calculation of the price earnings ratio and the price to book ratio, which require the traded price of the share.

This thesis aims to provide a valuation of a private held electronic money institute by applying the traditional valuation methods used for financial services firms to then compare the resulting values with the valuation proposed by market analysts in the last valuation round.

3. VALUATION PROCESS

3.1 Introduction to Valuation

The valuation of a company is the process that allows to come up with an estimation of the value of a business which “*not only provides the basis for investors and managers for their decision to purchase or sell whole companies or share of a company. It is also indispensable for the application of a sound value based management and successful restructuring*”⁵³.

Other reasons behind the valuation may involve the raise of funds, investment or internal decisions, estate planning, bankruptcy, litigation and valuing employee options.

The valuation of a business plays also a central role in the corporate finance discipline. One of its main goals is, in fact, the maximization of the value of a business through the choice of the best strategy when it comes to selecting the right capital investments, the correct capital financing structure and a proper exit strategy.

The value maximization problem has to consider which are the projects or business in which to invest and which are the investments that present the highest adjusted risk-return. Given the extremely high variety of possible investments that a firm can make nowadays, from the opening of a new factory to research and developing new products, entering a new market or acquiring a new firm, it's necessary to estimate whether an investment is worthwhile. This is usually done by valuing projects using the net present value (NPV) or the internal rate of return (IRR).

When it comes to the correct capital structure, a business has to understand how it should raise funds to finance its activities. There are two ways a company can choose to do so: using equity or debt. The main distinction between the two is the rights that these instruments give to the respective holders. For equity instruments we usually refer to stocks or shares, which are financial securities that entitle the holder to the ownership of the business assets and earnings. For this reason, shareholders can receive payments only after all the creditors of the company have been repaid. However, being the last individuals to get paid is counterbalanced by the right to exercise management control in the business.

On the other hand, debt instruments are fixed income securities that entitle the buyer to receive a predetermined cash flows, generally represented by the interests and the principal. When a business uses debt to finance its activities, it does that by issuing bonds. The main reason is

⁵³ Matthias Meitner, “*The Market Approach to Comparable Company Valuation*”, ZEW Economic Studies, 2006

because the variety of types of bonds gives the company a more flexible and cheaper way to raise new funds compared to other solutions, such as bank loans. The investors who buy corporate bonds are called bondholders and, as opposite of shareholders, they are given “high-priority” when it comes to payments, however these instruments do not entitle the holder to any voting power/management decision.

The combination of debt and equity defines the capital structure of a company which is generally expressed using the debt-to-equity ratio (D/E). A high D/E identifies riskier businesses as these rely more on creditor financing which implies the payment of interests in addition to the total debt. A low D/E ratio, instead, indicates more financially stable companies. Based on the stage of the life of the firm and to its strategy, the management should utilize the proper proportion of debt and equity that minimize the weighted average cost of capital of the firm and maximize its value.

This decision also affects the tax liability of the business. By determine the correct amount of debt and equity, a company can maximize the tax shield which is used to offset the taxable income, resulting in a limitation of its tax liability.

Finally, the ultimate step to maximize the value of a business is to implement a proper exit strategy which consist on the decision on how to return the capital to the investors. The typical exit strategies include the initial public offering (IPO), in which the firm goes public offering stakes of its shares on the market, leverage buyout (LBO) and operations of mergers and acquisitions (M&A). Exit strategies may not only be implemented to return the capital to the initial investors but can also to provide liquidity of the investment (i.e. the possibility to sell shares on the market following an IPO). The exit strategy has to be planned in advance and needs to consider aspects such as the size and type of business, as well as the market conditions.

3.2 The Valuation Process

The valuation process consists on understanding and analysing the past performance of a company in order to make assumptions and forecasts its future results. This is not a straightforward process as, during the valuation process, many different factors have to be taken into consideration, some of which are either hard to estimate (i.e. the forecast of the industry) or which impact is not directly measurable (i.e. the influence that a good management had on the past performances of the company). That’s why, the presence of all these variables, can easily lead different end results when different valuation processes are used.

Although the discipline identifies different methods and approaches to perform the valuation of a business, it's possible to identify some guidelines that can be applied to all of them when it comes to describe the process and the assumptions that need to be made:

- 1) The first step consists on the analysis of the past performance of the business by looking at the historical financial data, reports and financial ratios. This involves retrieving data such as the return on equity, the historic cash flow or the financial statements which can then be used to calculate different performance ratios.

The main documentation that can be used are the balance sheet, the income statement and the cash flow statement. The balance sheet of a company provides information of the wealth of the company in a specific point in time dividing the assets of the company, which are used to generate the revenues, from its obligation (liabilities and equity) to the debt holders and shareholders.

The income statement, instead, shows the economic activity of the company in a specific period of time, usually the course of one year and allows to get information on the net income of the company that can be distributed to the shareholders alongside with information on the revenue and costs faced by the business.

The third source of information is the cash flow statement that shows the cash inflows and outflows of a business in a certain period of time. The cash flow statement analyses the flows of cash occurred due to the company operations, its investments and financial activities. The result of the cash flow analysis is called free cash flow which is the amount of cash available to the investors.

There are also other documents that can be consulted in order to gather information on the past performances of a business, such as independent party reports prepared by consulting companies or expertise of the industry which can provide not only raw data, but also comments on the company or the sector that can become useful later in the process of creating a forecast model

- 2) Once the historical data reported in the financial statements have been analysed, it's then possible to forecasts the future revenues, profitability and cash flow of the company by considering historical patterns and trends or by implementing statistical models. However, a further step consists on considering the internal and external factors that can influence the estimated figures.

When it comes to assess the internal factors that influence the operation of a business, the key elements to consider are the human capital, the competitors, the customers and the

suppliers. These elements are the ones on which the company has the control and which are linked to the firm specific risk (alpha risk). Generally, the internal factors are outlined using the SWOT analysis that allows the business to identify its strengths, weaknesses, opportunities and treats.

To assess the external factors affecting the current and future operations, the PEST analysis is the instrument that is generally utilized as it allows to understand which are the best strategic decision to take given a particular political, economic, social and technological situation.

All these factors need to be considered when assumptions on future values are made.

- 3) The third step in the construction of a valuation model consists on adjusting the forecasted data based on the factors identified in the previous phase. By understanding the impact of these elements, it is possible to tweak the forecast model to derive more precise data.

Additional sources of information can be used in this step, such as the professional reports retrieved in the first part of the analysis, to determine more reliable outcomes. Moreover, these documents might provide themselves forecasts of particular industries.

- 4) In the final stage of the valuation process, all the previous pieces are put together and a valuation method is chosen. Given the number of different approaches that exists, it is possible to utilize two or more valuation methods in order to forecast a more precise ending result.

3.3 Enterprise Value vs Equity Value

Enterprise Value and equity value are two ways in which we can express the value of a business and that can be utilized to determine the value of a company. However, it's important to remember that these two values do not represent the same thing. While the enterprise value indicates the current value of a business, the equity value tries to combine not only the current value of the company, but also its potential future one.

Enterprise Value

The enterprise value (EV), which is also defined as firm value, “*represents the total value of the operations of a company including both tangible and intangible assets*”⁵⁴, and is calculated

⁵⁴ Ian Ratner, Grant T. Stein, John C. Weitnauer, “*Business Valuation and Bankruptcy*”, Wiley, November 2003, pp. 30

as the total value of the assets of the business that are used to generate a cash flow. Given its definition, the enterprise value gives an accurate calculation of the value of the company based on the total assets of the company, excluding the amount of cash in the calculation, since this is an asset that does not produce a cash flow for the company.

The result of the value provided by the enterprise value gives a similar result of what can be read on the asset part of the balance sheet. Given its characteristics, the enterprise value is often used in the stock market by investors to estimate the value of a business in a quick and easy way.

With the enterprise value approach, “we add the market value of the debt to the market value of the equity and then subtract cash. This is the enterprise value”⁵⁵:

$$(1) EV = (\text{Share Price} \times \text{Number of Shares}) + \text{Total Debt} - \text{Cash}$$

Or, as the number of shares multiplied for the unit price is equal to the equity value:

$$(2) EV = \text{Equity Value} + \text{Total Debt} - \text{Cash}$$

If we define net debt as:

$$(3) \text{Net Debt} = \text{Short Term Debt} + \text{Long Term Debt} - \text{Cash}$$

Then we can conclude that the enterprise value is defined as:

$$(4) EV = \text{Equity Value} + \text{Net Debt}$$

The assumptions behind the deduction of cash from the calculation of the net debt are:

- cash can be used to repay the outstanding debt of the business;
- cash is not an operating asset that can generate cash flow for the company, hence this is not included in the asset of the company.

In case the value of net debt is negative, the company is said to be in a net debt position. If the opposite scenario occurs, so if the amount of cash exceeds the amount of debt, the company has a net cash position.

⁵⁵ Bruce C.N. Greenwald, Judd Kahn, Paul D. Sonkin, Michael van Biema, “Value Investing: From Graham to Buffett and Beyond”, Wiley, January 2004

Share Price (€/share)	5.00 €
No. of Shares	10,000
Equity Value	50,000 €
Short Term Debt	20,000 €
Long Term Debt	30,000 €
Cash	15,000 €
Net Debt	35,000 €
Enterprise Value	85,000 €

Alternatively, a different way to derive the enterprise value can be obtained by referring to the accounting equation which states that the assets of a company always need to match the amounts of its liabilities and equity:

$$(5) \text{ Asset} = \text{Liabilities} + \text{Equity}$$

The enterprise value can then be defined as follow:

$$(6) \text{ EV} = \text{Assets} - \text{Cash}$$

Equity Value

The equity value, net asset value or market capitalization in case of public traded companies is the value that remains for the shareholders after any debts have been paid off.

The equity value “*is the value represented by a given company’s basic shares outstanding plus ‘in-the-money’ stock options, warrants, and convertible securities – collectively, “fully diluted*

shares outstanding. It is calculated by multiplying a company's current share price by its fully diluted shares outstanding"⁵⁶:

$$(7) \text{ Equity value} = \text{Number of fully diluted shares} \times \text{share price}$$

A different approach to calculate the equity value is to use as a starting point the enterprise value. This method of calculation is generally utilized when the enterprise value is forecasted using the comparable method or the discounted cash flow method. By recalling the formula (4) for the calculation of the net debt, the value of equity can be described as follow:

$$(8) \text{ Equity value} = \text{Enterprise Value} - \text{Net Debt}$$

Enterprise Value	85,000 €
Short Term Debt	20,000 €
Long Term Debt	30,000 €
Cash	15,000 €
Net Debt	35,000 €
Equity Value	50,000 €

By further breaking down the formula (8), we can express the Equity Value by also including the non-controlling interest and the preferred stocks as reported below:

$$\text{Equity value} = \text{Enterprise Value} - \text{Debt} - \text{Non-controlling Interest} - \text{Preferred Stocks} + \text{Cash and Cash Equivalents}$$

Basic Equity Value vs Diluted Equity Value

When calculating the equity value of a public traded company, it's possible to identify two different values: the basic equity value and the diluted equity value. The main difference between these two consists on the types of shares used to compute the final value. The basic

⁵⁶ Joshua Rosenbaum, Joshua Pearl, "Investment Banking Valuation, Leveraged Buyouts, and Mergers & Acquisitions", Wiley, 2013, pp. 27

equity value is equal to the total number of outstanding shares multiplied by the company share price.

To determine the diluted shares, instead, to the number of the basic shares must be summed any potential dilutive effect from outstanding stock options, convertible preferred stock, warrants and convertible debt. To obtain the number of the total diluted shares outstanding, the number of basic shares has to be summed to the number of shares created due to the dilutive effect of securities.

Between the two values, the diluted value should be used when it comes to determine the equity value of a business since, when a buyer acquires a business, he must include the cost of all money securities. Moreover, once these securities are paid off, they convert into additional shares for the buyer.

3.4 Valuation Approaches

A valuation approach is a methodology used to determine the fair value of a business.

As market conditions change all the time, the value of a company is not fixed. For this reason, the process of valuation needs to capture all the different factors that influence the value of a firm. It's possible to identify several different methods that can be grouped into three categories: the cost approach, the market approach and the discounted cash flow approach.

3.4.1 Cost Approach

The cost approach identifies a category of valuation methods that “*seek to determine the value of an asset by aggregating the costs involved in its development*”⁵⁹. These valuation methods are normally used to value individual assets rather than companies as they take into consideration the costs faced to build or develop them. However, the cost approach methods can also be applied to the valuation of a business. With this respect, the cost approach is used to determine the value of a company by analysing the market value of its assets. The result of this valuation method should not be considered as the real value of the company, but rather as a “floor value”, since almost every company has a greater value as a going concern rather than if it's liquidated. The difference between the value obtained with the cost approach and the real

⁵⁹ W. Anson, D. Drews, “*The Intangible Assets Handbook: Maximizing Value from Intangible Assets*”, American Bar Association, 2008

value of the business is defined as the goodwill which is the cost to purchase a firm minus the fair market value and that capture the value of all the intangible assets such as the brand or the customer base.

The value resulting by using the cost approach is also defined as the book value of a company. The book value is defined as the value of a business according to its books that is reflected through its financial statements. The book value is calculated as the difference between a company total assets and total liabilities and it's the amount the creditors and the investors are expected to receive in case all the assets are liquidated and its liabilities are paid back.

$$\text{Equity} = \text{Total Assets} - \text{Total Liabilities}$$

However, “*The book value [...] is in most cases a rather artificial value. It is assumed that if the company were to liquidate, it would receive in cash the value at which its various tangible assets are carried on the books.[...] As a matter of fact, if the company were actually be much less than their book value as shown on the balance sheet. An appreciable loss is likely to be realized on the sale of the inventory, and a very substantial shrinkage is almost certain to be suffered in the value of the fixed assets*”⁶⁰.

An additional consideration on the book value of a company is that generally, for healthy companies, the equity value exceeds their book value. The reason is that the company share price normally appreciates over the years. Moreover, contrary to the equity value that can only assumes values equal or greater than zero, as the number of outstanding shares and their price cannot be negative, the book value can be negative, in the case in which the liabilities are bigger than the assets.

A different type of book value is represented by the net book value, which is calculated by deducting the intangible assets from the capital:

$$\text{Net book value} = \frac{\text{Net tangible asset}}{\# \text{ of shares}}$$

⁶⁰ Benjamin Graham, S. Meredith, “*The Interpretation of Financial Statements: The Classic 1937 Edition*”, Harper Business, 1955.

There are several limitations on using the book value of equity to determine the value of a company. The first reason of that is that the book value is reported on an annual basis in the financial statements, making impossible to determine the value of the business on the day when the valuation is made. Secondly, since the assets reported in the accounts of a company are subject to adjustments, such as depreciation and amortization, determine the exact value of the business using this method might deal to misleading results.

Other reasons why the book value shouldn't be use as a direct way to valuing a business is due to the difference in the real value of the assets and the affective amount for which they can be sold for, the wrong valuation of the assets caused by the accounting practices and the inability of this method to capture the value of the human capital of a business.

3.4.1.1 Replacement Cost

A specific cost approach method is represented by the replacement cost. *“The replacement cost simply reflects the cost of duplicating assets in their present form at a particular point in time”*⁶¹. The underlying assumption is that the new asset will have the same function and is built utilizing the same materials and building process of the one which is replacing. The same approach can be utilized for the valuation of a business by considering the costs that need to be sustained to create a similar company in the same industry with the same characteristics. For this reason, the replacement cost is mainly used to evaluate companies that operates in expanding and viable industries as these would allow the new companies to stay in business last for a long time, rather than firms active in stable or declining sectors. Characteristics of these type of industries is the high competition and the lack of barrier to entry. Therefore, when the replacement cost method is used to value a business, the presence of intangible assets affect the final result of the process as, in order to obtain the same market position for the newcomer, the company has to invest money and time in research and development, clients and customers relations and brand image.

⁶¹ David T. Larrabee, Jason A. Voss, *“Valuation Techniques: Discounted Cash Flow, Earnings Quality, Measures of Value Added, and Real Options”*, John Wiley & Sons Inc, October 2012, pp. 263

3.4.2 Market Approach

The market approach, or the relative value approach, consists on the valuation of a company based on the comparison with other businesses operating in the same industry. With the market approach we can identify two main valuation methods: the comparable companies analysis and the precedent transactions.

The comparable companies method, also called the valuation multiples analysis, allows to derive the value of a business by using metrics of other businesses of similar sizes that operate in the same industry. The underlying assumption of this technique is that, similar companies have similar valuation multiples.

The precedent transactions technique, instead, consists on looking at previous mergers and acquisitions of similar businesses to “*derive an implied market valuation for a company, either public or private, in an acquisition context. [...] Precedent transactions look at recent acquisitions in the relevant sector from which valuation multiples can be derived by dividing the transaction value by the target company’s financials. These valuation multiples are applied to the company being valued in order to give a theoretical value of a business*”⁶². The precedent transactions technique also allows to include in the valuation the premium paid by the acquirer to take over the target.

3.4.2.1 Comparable Companies Analysis

The comparable companies analysis allows to evaluate a business by comparing the target characteristics to the market benchmark and can be utilized for the valuation of private companies as well as check the value of public firms. “*Unlike the Dividend Discount Model (DDM), the Discounted Cash Flow (DCF) approach, or the Residual Income Model (RIM) Model, the MVM does not require detailed multi-year forecasts of dividends, free cash flows or residual incomes. Instead, the firm being valued gets associated with a peer group of firms considered to be comparable*”⁶³. Characteristic of the comparable companies analysis is that the end result reflect the current value of the company, which is influenced by market conditions and trends.

⁶² Corporate Training Group, *The Investment Banker’s Handbook: Accounting, Valuation and Modelling*, ILX Group, 2009.

⁶³ Andreas Schreiner, Klaus Spremann, “*Multiples and Their Valuation Accuracy in European Equity Markets*”, August 2007

As opposite to the cost approach previously analysed, which is based on a company balance sheet, the comparable companies method uses the data reported in the income statement. This approach, in fact, utilizes financial ratios, the liquidity profile, the risk level and the performance of a company are calculated and then compare with peers operating in the same industry.

Since the multiple analysis can be performed only between similar companies, the first step consists on identify the correct companies to put against the target for then retrieve the necessary financial information that will be used to calculate the key ratios and multiples to conduct the analysis.

The most important factors to take into consideration when researching for peer companies are both external and internal factors such as the business activity, the geographic location, the size and growth perspectives, the profitability, the accounting policies and the capital structure.

Once these information are collected, the following step consists on calculating the financial ratios. It's possible to identify two main categories of ratios: price ratios and enterprise value ratios. While price ratios, such as price-to-earnings ratio or equity value ratio are calculated after interest expenses, the enterprise value ratios, like the EV/EBITDA, EV/EBIT, EV/Revenue, are calculated before deducting the interest expenses, hence they include both the cash available to the shareholders and the debt investors.

Price ratios

The first category of ratios can only be used for listed companies as it uses the last available share price to determine the value of the company in relation to other financial items. The most used price ratio is the price-to-earnings ratio (P/E ratio) which links the current share price of a company to its earnings-per-share (EPS).

$$Price-to-Earnings = \frac{Share\ Price}{Earnings\ per\ Share}$$

The price-to-earnings ratio is driven by the growth perspectives of the business as well as its risk and cash flow generation. The rule of thumb to value companies using this ratio is that when a business has a high P/E ratio, it is considered a growth stock. Growth stocks are stocks which generally shows positive future performance and growing earnings since investors are willing to pay more per dollar of current earnings. The downsides of growth stocks are that these types of stock are usually more volatile, and investors' expectations are high, which may

result in a drop in price if these expectations are not met. Moreover, stocks with high P/E ratios can be considered overvalued by some investors.

The opposite is represented by those companies which are characterised by a low P/E ratio. These stocks are considered value stocks and investors usually perceive these stocks undervalued relative to their competitors.

A main issue however arises when considering the valuation using the P/E ratio that “*concern the time period over which share prices and earnings are measured. The price in a P/E ratio is usually the current market price of the stock or index, such as the weekly or monthly average of the daily closing prices. The timing of the earnings in the calculation, on the other hand, may vary quite a bit*”⁶⁴. This problem is usually addressed by computing the ratio as an average of the past few years or by estimating the current performance and using such prediction to estimate the P/E

Other popular price ratios include the Price-to-Book Ratio and the Price-to-Sales ratio, which put in relation the price of the stock of a company with its book value and sales respectively.

The upsides of these types of ratios are that can be quickly calculated and that can be easily used for mature and stable businesses with steady earnings, however for smaller and cyclical businesses with unstable revenues these ratios might not be as effective. Moreover, changes in the accounting policies, non-recurring exceptional items and profit or losses on properties can affect the result of these ratios.

Enterprise Value Ratios

The second category of valuation ratios are the enterprise value ratios. These ratios allow to compare the total value of a company to its revenues and operating income. The most commonly used enterprise value ratios are the EV/EBITDA, the EV/EBIT and the EV/Revenue. A distinctive factor of these ratios is that they are calculated using the firm earnings before interest expenses which allow to include in the computation the cash available to both the equity and debt investors.

The EV/EBITDA ratio is the most utilized enterprise value ratio and it allows to compares a company value (EV) to its earnings before interest, taxes, depreciation and amortization (EBITDA) meaning that all non-cash items such as depreciation and amortizations are excluded from the purpose of calculating this ratio. The EV/EBITDA is used to compare the

⁶⁴ Pu Shen, “*The P/E Ratio and Stock Market Performance*”, Federal Reserve Bank of Kansas City, January 2000

value of different businesses by comparing their prices. In particular, companies that has lower multiple are considered undervalued, while the presence of high multiple values might indicate that a business is overvalued.

An important characteristic of the EV/EBITDA is that it can only be used for firms operating in the same industry as different sectors might have different capital requirements.

A relative similar ratio is represented by the EV/EBIT ratio. In the same way of the EV/EBITDA ratio, this ratio it's used to compare the relative value of different businesses. *“At first glance the two ratios look alike, but they tell very different stories about a company. As depreciation and amortization reflect a company's capital expenditure in previous years, they give investors better guidance on profit growth and future sustainability”*⁶⁵. This multiple is then useful when calculating the value of businesses characterized by high capital costs where depreciation has a significant impact on the economic results of the company.

A third enterprise value ratio is represented by the EV/Revenue or EV/Sales ratio. In the opposite way of the other two enterprise value ratios previously analysed, this ratio is mostly used for companies that are not generating profits or have negative EBITDA as it utilizes the first item of the income statement which does not include the operating expenses.

The decision on which comparable multiple to utilize for the valuation, not only depends on the type of business, but also by the stage of life of the company. When it comes to analyse newer firms, the price ratios should be used as these metrics are good indicators of a firm future growth potential. On the other hand, for businesses in the latest part of the growth stage or for mature ones, the enterprise value ratios are more appropriate.

The resulting financial ratios of the comparable companies are then used to determine the value of the target company by first calculating their average to then multiply it for the financial data of the firm.

Table 2.1 illustrates how to calculate the multiples for a target company by computing the average of the metrics of peers operating in the same sector. Starting from the market data, the enterprise value can be computed by adding the market capitalization to the net debt. The value obtained is then divided by the sales or the EBITDA in order to obtain the firm multiple.

The values obtained by calculating the average of the industry multiples can be utilize to estimate the enterprise value of the target company by multiplying the metrics for the available financial data.

⁶⁵ Ronald W. Chan and Brian C. Lui, *“EV/EBIT Ratio: The Best of Both Worlds”*, Better Investing, 2011, pp. 27

Company	Market Data					Financial Data			Multiples		
	Share Price	# of Shares	Market Cap	Net Debt	Enterprise Value	Sales	EBITDA	Earnings	EV/Sales	EV/EBITDA	P/E
	€	M	€M	€M	€M	€M	€M	€M			
A	€ 15.20	50	€ 760	€ 33	€ 793	€ 490	€ 312	€ 251	1.6x	2.5x	6.1x
B	€ 9.67	185	€ 1,789	€ 200	€ 1,989	€ 274	€ 126	€ 100	7.3x	15.8x	9.7x
C	€ 7.20	44	€ 317	€ 6	€ 323	€ 122	€ 86	€ 75	2.6x	3.8x	9.6x
D	€ 10.39	160	€ 1,662	€ 80	€ 1,742	€ 576	€ 412	€ 299	3.0x	4.2x	3.5x
Average									3.6x	6.6x	7.2x

Table 2.1 – Calculating the multiples

The valuation using multiples results useful not only to estimate the price investors are willing to pay for a business by looking at the amount the same group of individuals might pay for a comparable one, but also to assess the quality of the valuation obtained using different methods and to identify the difference between peer companies. However, the presence of significant differences with values resulted from other approaches might be caused by misjudgements or errors in the selection of the comparable firms.

One more factor to be considered when valuing a firm using this approach, is that no perfect comparables exist as every company is different to another. These discrepancies require adjustments to be made on the end result of the valuation in order to reflect the impact of factors such as different growth perspectives, the management, the strategic decisions. However, it is not always simple to measure how these elements affect the determination of the enterprise value.

This challenging problem causes the comparable companies method to provide very different results for each single analysed firm as demonstrated by Pablo Fernandez, professor of Corporate Finance at the IESE Business School, states that “*multiples nearly always have a broad dispersion, which is why valuation with multiples is highly debatable*”⁶⁶.

3.4.2.2 Precedent Transactions

The precedent transactions valuation method, also known as M&A comps method, consists on derive a company value by analysing the price paid for a similar company by a buyer during an acquisition happened in the past. Starting from the price paid and adjusting it based on the characteristics of the company, it is possible to estimate the fair price of a business.

⁶⁶ Pablo Fernandez, *Book Valuation and Common Sense – Valuation Using Multiples*, Social Science Research Network (SSRN), 2013.

Precedent transactions analysis relies on the availability of public information that the investors can utilize to get a rough estimate of the multiples or premiums that other buyers have paid for public-traded companies.

Unlike the comparable company analysis, this market approach valuation method is not based on the traded market value of a business, but on the price paid by a previous buyer during an acquisition. This characteristic allows to include in the final valuation not only the value of the firm, but also the value of the synergies and the takeover premium⁶⁷. *“Additionally, Precedent Transaction Analysis tends to focus on the value of a business as of the time an acquisition of the business can be completed, rather than today. This is because deals take time to close, whereas current market values for a business can be assessed on any day.”*⁶⁸ These two factors are fundamental when it comes to mergers and acquisitions transactions or restructuring transactions.

This type of analysis, however, presents a series of cons, especially when it comes to get the data needed to perform the valuation. Sometimes data can be hard to find as not many transactions might have happened in the specific industry or, even if there is a big number of accessible information, they are stale dated as valuation of businesses occurred years ago might not be relevant anymore.

Moreover, during the process of retrieving the data, it's important to choose the information wisely by consider factors such as the business type, the type of buyer, the size and the growth perspectives of the acquired business and all the other internal and external factors that might have influenced the final price of the acquisition.

Identify a proper group of companies that can be utilize for this analysis is the first and most important step that needs to be undertaken. In this first phase, a deep screening of potential comparable acquisitions is performed in order to assess which business acquisition are suitable to be considered a proper precedent. The list of acquisitions is drawn up by looking at specific databases, the M&A history of the target company, public research reports on the company or consulting merger proxies.

Only after this initial phase a more detailed research is performed to retrieve deal-related and financial information that can then be used to calculate the relevant multiples for each transaction. If this valuation approach is used for public company, it's relatively easy to gather

⁶⁷ Takeover premium: the difference between the estimated real value of a company and the actual price paid to obtain it (<https://www.investopedia.com/terms/a/acquisitionpremium.asp>)

⁶⁸ <http://www.streetofwalls.com/finance-training-courses/investment-banking-technical-training/precedent-transaction-analysis/>

information. On the other hand, for private companies is more challenging to get all the necessary information to perform an accurate analysis as most of the information are not publicly disclosed. Once the relevant information have been retrieved, a further analysis is conducted to pick the best proxies for the valuation and the valuation multiples are calculated. These multiples mirror the ones used in the comparable company analysis, however, differ since they also take into account the premium paid by the acquirer.

Usually, with the precedent transactions valuation method the multiples of the selected comparable acquisitions are used to determine a range of the value of the target rather than a unique value. A high and a low valuation are generally presented as the final valuation result with the mean and the median of the calculated multiples used to determine the most likely valuation.

3.4.3 Discounted Cash Flow

The discounted cash flow (DCF) approach in a form of intrinsic valuation, which means that the result of the valuation does not depend on the amount already invested in the company or the value of similar businesses. This approach represents an alternative method to the market one as this last one is easily influenced by a variety of factors. Using DCF approach, the company is valued by considering the forecasted future cash flows, in particular, the Free Cash Flow to Firm (FCFF) which is defined as *“the amount of cash that a company has left over after it has paid all of its expenses, but before any payment or receipts of interest or dividend, before any payment to or from providers of capital and adjusting tax paid to what it would have been if the company had no cash or debt”*⁶⁹.

A different valuation using the DCF method can be obtained by using the free cash flow to equity (FCFE), which is obtained by calculating the cash from operations, deducting the capital expenditures and adding the net debt issued. With respect to the dividends, these

The valuation model which uses the FCFE as input provides a more reliable estimate of the equity of the company and represents a valid alternative to the dividend discount model (DDM) which states that the value of a business can be calculated by summing all the present values of the future dividend payments. However, since the free cash flow to equity is calculated after the issued net debt, in case of changes in the leverage of the business over time, the calculation

⁶⁹ Corporate Training Group, *“The Investment Banker’s Handbook: Accounting, Valuation and Modelling”*, ILX Group, 2009.

of the value of the equity might results difficult. For this reason, the free cash flow to firm is generally preferred for the calculation of the total value of a company.

Cash flows are generally forecasted for a period of five years, which can be extended depending on the nature of the business and on its status. Given the unpredictability of determining the cash flows after this initial period, to capture the additional value left on top of the one calculated by discounting the cash flows of the first years, the terminal value (also defined as residual value) is used. This variable represents the value derived from the sale of the company or its perpetual growth. All the forecasted values are then discounted to the today's value using a discount rate (the weighted average cost of capital), which reflects the flow risk of the business. The discounted values are then summed to determine the net present value of the company.

3.4.3.1 Free Cash Flow to Firm

The first step of the DCF valuation method consists on determine the cash flow of the business for the following years, which will be then discounted using the appropriate discount rate. The cash flow utilize for the analysis is the free cash flow to firm which is “*the legitimate cash flow for the purpose of business valuation in that it reflects the cash flows generated by a company's operations for all the providers (debt and equity) of its capital*”⁷⁰ as it is computed after having paid all the cash expenses, taxes, capital expenditures and working capital, but before the interest expenses. Main characteristic of the free cash flow is that it is independent from the capital structure used by the company as it represents the total amount of cash available to the debt holders and shareholders.

For the determination of future cash flows of public traded companies, the starting point is represented by the analysis of historical data that is then used to formulate predictions on growth and estimates of the future value. However, for private companies, this process is more complicated as these information are not available to the public. For this second group of companies, estimates of historical data of peer companies are usually used.

Once all the elements needed to calculate the free cash flows have been estimate, the following step consists on putting all the pieces of the puzzle together and proceed with the calculation using the following formula:

⁷⁰ Khan & Jain, “*Financial Management*”, Tata McGraw-Hill Education, May 2007, pp. 13

$$\begin{aligned}
& \text{Earnings Before Interest and Taxes} \\
& - \text{Taxes (at the Marginal Tax Rate)} \\
& = \text{Earnings Before Interest After Taxes} \\
& + \text{Depreciation \& Amortization} \\
& - \text{Capital Expenditures} \\
& - \text{Increase/(Decrease) in Net Working Capital} \\
& = \text{Free Cash Flow}
\end{aligned}$$

Starting from the EBIT (Earning Before Interests and Taxes), the amount of estimated taxes has to be deducted, which returns the Earnings Before Interest After Taxes or NOPAT. The NOPAT can be obtained by multiplying the EBIT by $(1-T)$ where T is the marginal tax rate. Once NOPAT is calculated, the next step consists on adding back the depreciation and amortization, which are the non-cash expenses related to the reduction of the book value of the fixed assets of the company and deducting the capital expenditures and the increase in net working capital. Capital expenditures refers to the expenses face by the company to acquire new assets. Net working capital is defined as the non-cash current assets (i.e. receivables and inventories) less non-interest-bearing current liabilities (i.e. payables) and it measures how much cash a company needs to fund its operations on an ongoing basis and is calculated as follow:

$$\begin{aligned}
& (\text{Accounts Receivable} + \text{Inventory} + \text{Prepaid Expenses and Other Current Assets}) \\
& - (\text{Accounts Payable} + \text{Accrued Liabilities} + \text{Other Current Liabilities})
\end{aligned}$$

The change in the net working capital is then computed at the net working capital of the current year minus the one of the previous year.

The final result of the calculation gives back the value of the cash flow of the year, which will be then discounted to derive one of the key components used for the final valuation of the business.

As the valuation process requires to forecast the future cash flows of the company to then discount them at the proper discount rate, it's important to understand which are the key elements that drive the cash flow to the firm. A good estimate of the future cash flows can only be obtained by fully understand the company business model and the market it operates in. By understanding these factors is possible to come up with appropriate forecasts for the growth in

sales, the operating margin, the capital expenditures and the working capital requirements for the following years.

3.4.3.2 Discount Rate

The calculation of the free cash flow is just the first part of the process of the valuation using the DCF valuation method. A second element needed for the calculation is the discount rate. There are different types of discount rates that can be used with the DCF approach. The choice depends on the cash flow that is used for the valuation, however for the valuation of companies, the broadly accepted method envisages to discount the free cash flow to the firm (FCFF) by the weighted average cost of capital (WACC) that “*calculates a company’s cost of capital, where each category of capital (equity, bonds, and any other debt and/or hybrids) is weighted proportionately*”⁷¹. An alternative method consists on discounting the equity cash flow of the company, defined as the amount of cash available to the shareholders after all the expenses have been paid, by the return on equity (k_e).

The weighted average cost of capital is the weighted average of the required return on the invested capital, by both the debt and equity holders, in a company. A different definition of the WACC is that it is “*an opportunity cost of capital or what an investor would expect to earn in an alternative investment with a similar risk profile*”⁷².

The reason behind the usage of the weighted average cost of capital in the valuation of a business has to be found in the definition of the free cash flow to the firm. Since this is the amount of cash that is available to all the investors, the WACC has to include all the returns required by these individuals. As a result of this, weighted average cost of capital not only includes both the return on debt and return of equity, which are the returns expected respectively by the bondholders and shareholders, but it also weight them in relation to the amount of equity and debt used by the company to finance its activities. In addition, the weighted average cost of capital is calculated after taxes, as the free cash flow to the firm does not include any tax shield in its computation.

To include all these factors in the value of the weighted average cost of capital, three key elements need to be determined: the capital structure of the company, its cost of equity and its after-tax cost of debt.

⁷¹ Robert B. Dickie, “*Financial Statement Analysis and Business Valuation for the Practical Lawyer*”, ABA Book Publishing, 2006, pp. 261

⁷² J. Pearl, J. Rosenbaum, “*Investment Banking Valuation, Leveraged Buyouts, and Mergers & Acquisitions*”, Wiley, 2013.

After these components are obtained, they can be used to calculate the weighted average cost of capital using the following formula:

$$WACC = \frac{E \times k_e + D \times k_d(1 - T)}{D + E}$$

Where E and D represent respectively the levels of equity and debt (or market value of equity and debt) of the company, k_e is the cost of equity, k_d is the pre-tax cost of debt and T is the marginal income tax rate.

Capital Structure

The first component to be determined for the calculation of the weighted average cost of capital is the capital structure of the company. This will provide the weights to be used in the formula to attribute the correct importance to the respective rates of return. The fraction of equity and debt used by the firm can be computed by using the values reported in the company financial statements. In the balance sheet is in fact indicated the amount of debt and equity utilized by the company.

The determination of the capital structure is a key element to calculate the weighted average cost of capital, but it also plays a central role in the maximization of the value of a business. This is done by adopting the optimal capital structure, or in other words, to find the perfect balance between equity and debt to finance the activities of a company can be expressed using the debt-to-equity ratio (D/E).

While it's true that debt financing might results the cheaper way to raise new capitals, it also increases the risk level of the firm resulting in a demand of higher returns from the investors and consequent higher costs for the company. However, a too low level of debt can cause the company to have high tax liabilities which can be lowered by issuing debt.

There are several ways to determine the optimal capital structure. The first is represented by the operating income approach which allows to measure the maximum amount of debt a business can issue for a given level of probability of default. The second method, the cost of capital approach, consists on choosing the level of debt-to-equity ratio that minimize the cost of capital. Similarly, with the adjusted present value approach the value of the company is maximize by adding the value of the unlevered firm to the present value of tax benefits and then netting out the expected bankruptcy costs. The last method, called the comparative

analysis, states that the optimal capital structure can be determined by averaging the capital structure of the competitors.

Cost of Debt

The second term required to determine the weighted average cost of capital is the cost of debt which “*measures the current cost of financing faced by the firm from borrowed funds. It is a common misconception amongst naïve investors that debt financing is risk free and that the risk free rate should be an appropriate proxy for a company’s cost of debt*”⁷³. Corporate bonds carry a greater risk for bondholders compared to the ones issued by a government. For this reason, corporate debt investors demand a higher rate of return compared to the one assured by the treasury bond (the difference is called debt risk premium).

The starting point to determine the correct cost of debt of a company is by looking at the company itself. For large public traded firms, the process is quite straight-forward. On a regular basis, credit rating agencies such as Moody’s, Standard & Poor’s or Fitch, assign a rate to assess the financial strength of these companies based on their ability to pay the interests on the debt and the principal. By looking at these rating, it’s possible to estimate the debt risk premium of a specific company. For small firms which do not have a public credit rate, the debt risk premium can be determined by examination the borrowing history of the company (i.e. at what rate the firm borrowed money from a bank) or by estimating its rate. This is done by assessing its default risk by analysing the company ratios to measure the financial health of the business.

Once the debt risk premium is obtained, it is then summed to the risk-free rate. The resulting rate is the pre-tax cost of debt, which is the effective interest rate that a business pays on its debt and reflects the current cost of long term borrowing to the firm. However, when referring to the cost of debt in the formula of the weighted average cost of capital, this is defined as the cost of debt after-tax. The reason why is that, in contrast to equity, debt has tax advantages which need to be included in the calculation of the weighted average cost of capital. The usage of debt to finance the company activities allows the business to lower its taxable income since interests are tax deductible expenses. The reduction in the taxable income resulting from the application of the deduction is called tax shield.

If the cost of debt before taxes and the marginal tax rate are known, the cost of debt after taxes can be obtained by as follow:

⁷³ Corporate Finance Institute, “*Investment Banking Manual*”, 2018, pp. 201

$$k_{d \text{ after-tax}} = k_d(1 - T)$$

Cost of Equity

The cost of equity is defined as “*the rate of return that investors require to invest in the equity of a firm*”⁷⁴. As stock investments are received riskier than the ones in debt instruments, individuals require an additional return (equity risk premium) compared to the one promised by a bond.

In order to determine the cost of equity of a company, asset pricing models are generally utilized. These models allow to express the relationship that exists between risk and return. “*The Capital Asset Pricing Model (CAPM) is the most widely used model in finance. And that is for a very simple reason: it yields an essential magnitude, the return investors should require from an asset given the asset’s risk*”⁷⁵. Some other pricing models are the Arbitrage Pricing Theory (APT) and the Fama-French model. While the underlying assumption of the first model is that the return of an asset is the result of a linear relationship between its expected return and a number of macroeconomic variables that capture the systematic risk, the second is an expansion of the CAPM model which includes the size risk and value risk factors when determining an asset return by combining three portfolios (market portfolio, a portfolio based on the size of the companies and one on their book-to-market value).

Given its popularity, in this section will be discussed the capital asset pricing model and its implementation in the DCF valuation method.

The capital asset pricing model defines the return of an asset as the sum of the risk-free rate and the risk premium, which is the additional rate of return that investors require in order to hold a stock rather than a bond, multiplied by a beta factor:

$$r_i = r_f + \beta(r_m - r_f)$$

In the determination of the return of a security, the risk-free rate and the market return (and consequentially the market risk premium) do not change from one company to another. These values usually refer to proxies rather than the real values, as these are cumbersome to calculate. Generally, the risk-free rate is identified by the 10-year US bond rate, while the market return

⁷⁴ Aswath Damodaran, “*Applied Corporate Finance*”, John Wiley & Sons, October 2014

⁷⁵ Javier Estrada, “*Finance in a Nutshell: A No-nonsense Companion to the Tools and Techniques of Finance*”, Financial Times/ Prentice Hall, August 2005

is the historical rate of return of the Standard & Poor's 500 Index, the market-capitalization-weighted index of the 500 largest public companies in the United States.

The beta term, instead, assumes different values as it varies from firm to firm. The β , in fact, “represents a stock’s incremental risk to a diversified investor, where risk is defined by how much the stock covaries with the aggregate stock market”⁷⁶. By looking at the value of the beta factor, it’s possible to determine how sensible is the expected return of an asset compared to the return of the market. A beta factor equal to 1 means that the asset return changes as much as the market return. A beta lower than 1 identifies assets that have returns less sensible to changes compared to the market one, while a beta higher than 1 indicates a more volatile price.

3.4.3.3 Terminal Value

As explained in the previous sections, the DCF method aims to compute the present value of a company based on its future cash flows. However, the determination of these cash flows, after a certain period of time, can be difficult and inaccurate. “Note that it is theoretically possible to use a long explicit forecast period instead of the terminal value technique. [...] However, there are obvious difficulties with doing exact and explicit forecasts so far into the future”⁷⁷. A different assumption is that the business ceases to operate after the forecasted periods and its assets are worthless, for which case the current firm value is simply the sum of the value of the cash today. However, in the scenario its assets are still retain a value after the analysed period, which is generally the one reported in the balance sheet of the company, their value has to be discounted to obtain a relative reliable estimate of how much they will be worth (savage value). A different scenario, is that, after the initial period, the firm will still operate and their assets will still be worth something. For this reason, the value that is not captured by the discounted cash flows of the first years as to be computed in order to determine the total value of the business. This is done by calculating the terminal value. This term, also defined as the residual value, can be obtained by using the perpetuity growth, which is a flow of cash that has no end. A simplified version of a perpetuity is described by the formula below:

$$\text{Perpetuity} = \frac{CF}{r}$$

⁷⁶ T. Koller, M. Goedhart, D. Wessels, “Valuation: Measuring and Managing the Value of Companies”, McKinsey & Company, 2015.

⁷⁷ David Frykman, Jakob Tolleryd, “Corporate Valuation: An Easy Guide to Measuring Value”, Pearson Education Limited, 2003, pp. 82

There is also a more complex way that can be utilized in order to determine the residual value of a company which includes the growth rate (g), a term that indicates the increase in the cash flow of the business over time. A perpetuity adjusted for the growth rate is calculated as follow:

$$\text{Terminal Value} = \frac{FCFF_n(1 + g)}{r - g}$$

A third way to calculate the terminal value is the so-called exit multiple method (EMM). This method is based on the last 12 months (LTM) of the company financial activities and it consists on multiplying the EBIT (or EBITDA) of the company for a number defined as the exit multiple. The exit multiple, as described in the market approach paragraph, is computed by analysing comparable companies and the industry. With the calculation of the exit multiple, is possible to come up with a range of values indicating the possible valuations of the firm given predetermined scenarios.

$$\text{Terminal Value} = \text{EBITDA}_n \times \text{Exit Multiple}$$

3.4.3.4 Determination of the Enterprise Value

Calculating present value centres on the notion that a dollar today is worth more than a dollar tomorrow, a concept known as the time value of money. This is due to the fact that a dollar earns money through investments (capital appreciation) and/or interest (e.g., in a money market account).

As stated in the previous paragraphs, in the DCF valuation method the free cash flows of the company and its terminal value are discounted using the WACC in accordance with the time value of the money to derive the enterprise value. Each year's cash flow is discounted by considering the time in which the cash flow will be received in the future in order to determine the present value of a future amount.

By putting all together, we can derive the formula to calculate the enterprise value using the discounted cash flow method for the following n years is:

$$EV = \sum_{t=0}^n \frac{CF_t}{(1 + r)^t} + TV = \frac{CF_1}{(1 + r)} + \frac{CF_2}{(1 + r)^2} + \dots + \frac{CF_n}{(1 + r)^n} + TV$$

Where, r represents the discounting rate and TV is the residual value after the year n .

$$\textit{Enterprise Value} = \textit{Cash Flow for the predictable period} + \textit{Terminal Value}$$

4. VALUATION OF AN EMI: THE REVOLUT CASE

4.1 Description of Revolut

Following the introduction on the topic of valuation set out in the previous chapter of this thesis where an overview of the different approaches that exist for the purpose of the determination of the value of a business was provided, this section will utilize such notions to perform a real case valuation on Revolut Ltd., a UK-based fintech startup licensed by the Financial Conduct Authority (FCA) to operate as an electronic money institution, established in 2015 by Nikolay Storonsky and Vlad Yatsenko.

The company is part of the group of innovative start-ups that are challenging the traditional banks by offering a wide variety of online banking services. Aside from the possibility to access and operate your personal account from any digital device, Revolut, with the goal to group on “*a single platform all the financial needs of its customers*”⁷⁸, also provides to its customers several ancillary activities such as fiat and cryptocurrency exchange, peer-to-peer payments and money management⁷⁹

Thanks to the investments in new technology infrastructures, the UK start-up allows individuals and businesses to open a digital account in minutes via a quick onboarding procedure that requires the user to verify his identity (or the one of the key persons and UBOs in the case of a corporate account). This guarantees the client to benefit of a free current account with an IBAN number and the possibility to request prepaid credit cards linked to the person’s digital wallet. Revolut also provide premium plans for his customers which include additional services including crypto-exchange and free unlimited stock trading.

In order to issue electronic money, the company had to apply for a EMI license, which was granted by the English authority, the FCA, following its incorporation. With the increase in its operations and users, Revolut submitted in 2017 the application for a banking license in the United Kingdom, which at the moment of writing has not been granted yet. However, due to the uncertainty related to of Brexit and the consequent loss of the possibility to passport its services in the European Union, the company has also applied in 2017 for a banking license in Lithuania which was granted by the local authority the following year, in April of 2018. With

⁷⁸ Business review included in the 2018 Revolut financial statements

⁷⁹ Revolut on its website advertises services to manage the user money that include built-in budgeting, account movements analysis, savings on spare change, instant notifications, free ATM withdrawal, setting-up of recurring payments, debit card controls to freeze the card, set spending limits and adding additional layers of protection.

the obtainment of such license, Revolut not only managed to increased its customers' protection by assuring a regular continuation of its operations once the United Kingdom will leave the EU, but also by guarantee users deposits as envisaged by the European Deposit Insurance Scheme⁸¹.

The rationale behind the selection of Revolut for this study relies in the fact that the company is among one of the most successful and fast growing fintech firms in Europe both in terms of number of customers, which reached 8 million during 2019, and in terms of fund raised. The company, in fact, during the three funding rounds has managed to collect from investors a total of \$336 million for a post-money valuation of \$1.7 billion⁸². With the first round, the company assured capitals for \$8.69 million (£6.75 million) mainly from venture capitalists and private equity firms, while a further million pound (roughly 1.3\$ million) was collected via crowdfunding platforms. Although the funding partners were hoping to raise around £10 million, due to Brexit concerns, the expectations were not matched, however they managed to reach a valuation after the series A round of 54\$ million (£42 million). Just a year after, in July of 2017, Revolut raised additional \$66 million mainly from London-based venture capital firms which backed the start-up in the first round and \$5 million through crowdfunding, with a resulting valuation of \$386 million. In the final funding round, Revolut, after only three years from its incorporation, surpassed the billion-mark valuation earning the title of unicorn, which identifies the privately held businesses that are valued over \$1 billion⁸³.

According to Technology Crossover Ventures (TCV), the lead investor in the fintech startup and backer of other tech firms such as AirBnb and Spotify, with the next round of valuation set to happen in 2020, the UK-based firm is expected to reach an even higher valuation estimated to be at over \$5 billion⁸⁴. More optimistic is the view of the founding partners that, with the goal of expanding the services offered by their platform to clients outside Europe, are aiming for a valuation between \$7 and \$8 billion.

The results obtained in the fundraising phases are partially supported by the financial performances of the company. According to its financial statements, from its incorporation, Revolut revenues skyrocketed from \$158,000 (£120,000) to \$76.6 million (£58 million) at the end of 2018. Even the number of customers supports the staggering amount raised in just three

⁸¹ Directive 2014/49/EU of the European Parliament and of the Council of 16 April 2014 on deposit guarantee schemes. Refer to chapter 1.3

⁸² Data available on <https://www.crunchbase.com/organization/revolut>

⁸³ Data on capital raised available on <https://craft.co/revolut/funding-rounds>

⁸⁴ <https://www.fintechfutures.com/2020/01/revolut-valued-at-5bn-by-investors-ahead-of-new-fundraising/>

years, with 8 million unique users and 350 million total transactions operated via the platform as at December 2019.

On the other hand, the higher revenues were also followed by an increase in the costs, with cost of goods sold (COGS) and administrative expenses passed from the initial \$2.4 million (£1,8 million) in 2015 to \$121 million (£92,3 million) in 2018, leaving negative profits in the company from its inception. This, however, shouldn't surprise too much since profits lag sales and costs with resulting losses and negative cash flows and in the first part of the life of the company.

	2015	2016	2017	2018
Revenue	£ 120	£ 2,363	£ 12,832	£ 58,240
Cost of Sales	-£ 1,542	-£ 7,803	-£ 19,417	-£ 68,319
Administrative Costs	-£ 267	-£ 1,684	-£ 8,567	-£ 23,975
Operating Income	-£ 1,689	-£ 7,124	-£ 15,152	-£ 34,054
Interest Received	£ -	£ 6	£ 59	£ 1,107
Interest Paid	£ -	£ -	-£ 22	-£ 16
PBT	-£ 1,689	-£ 7,118	-£ 15,115	-£ 32,963
Tax	£ -	£ 128	£ 303	£ 132
Net Income	-£ 1,689	-£ 6,990	-£ 14,812	-£ 32,831
Other Income	£ -	£ -	-£ 2	-£ 40
Total Income	-£ 1,689	-£ 6,990	-£ 14,814	-£ 32,871

Table 4.1 - Revolut income statement (amounts in GBP)⁸⁵

The perspective of conquering a significant portion of the market thanks to be first mover as well as the opportunities given by the increasing adoption of electronic payments solutions and of the popularity of electronic money instrument, created a race among the new players in the industry. Past data show that electronic payments transactions in Europe have grown consistently at 3.9% CAGR from 2013 to 2018 and that e-money purchase transactions have registered a progressive and constant growth from 2 billion purchases to over 4 billion from 2010 to 2018. Due to the results achieved by the sector, market analysts have positive view on the development of the digital banking industry for the coming years. The market size of

⁸⁵ Data as per last available financial statements

<https://www.gov.uk/government/organisations/companies-house>

FinTech companies operating in the personal finance field is, in fact, expected to grow at a rate of 46.5% CAGR globally reaching a valuation of almost 400 billion dollars in 2026 with the global digital payments market reaching \$132.5 billion by 2025, based on a compound annual growth rate of 17.6% over the next five years and an estimate growth of the demand for FinTech services between 25% and 30% CAGR during the next five years⁸⁶.

Supported by this strong outlook of the industry, alongside Revolut, many other startups in the last decade entered, and some are still considering entering, the market of electronic money and digital payments: Monzo, N26, Monese to name a few. In addition to these, some other more established players decided to embrace the changes in the market and renovated their business models by focusing their effort on the online banking services, such as Transferwise or PayPal.

For the purpose of the valuation of Revolut, however, only the first category of companies will be considered, as their stage of life, business model and market in which they operate are far more similar to the ones of the more traditional firms operate. All these new companies share similar characteristics that play a central role in their success: slick and appealing digital interface, a clear target customer base, optimal revenue modeled to properly monetize the existing customer base and a continuous innovation of their services in order to differentiate the value proposition from competitor.

4.2 Relative Valuation: The Multiple Approach

The first of the two approaches that will be used to compute the valuation of Revolut is the comparable companies method. As stated in the first chapter, the most common used multiple utilized for the determination of the value of a business is the EV/EBITDA, however given that these companies have negative EBITDA, due to their early stage, for the purpose of their valuation two other ratios will be used: the EV/Revenues and EV/Customers. While the former allows to valuating businesses that are not generating profits or have negative EBITDA, the latter is used to determine the value of a company in relation to the number of its clients.

The table below sums up the key information that will be utilized to determine the value of Revolut. While for public traded companies the determination of multiples begins from the calculation of the market capitalization which is done by multiplying the number of shares by

⁸⁶ McKinsey & Company, “*Global Payments Report 2019: Amid sustained growth, accelerating challenges demand bold actions*”, September 2019.

their prices, for private traded firms, the computation of the enterprise value it's more complicated. Due to the lack of detailed information on how the enterprise value has been computed, for the purpose of the valuation using multiples, the valuations published by the companies after the fundraising rounds will be considered as the appropriate values.

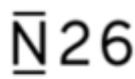
			
Customers (Jan 2020)	2 M	3.5 M	5 M
Revenues (as for last available data, 2018)	7.72\$ M	26.2\$ M	57.2\$ M
Value (as for last financial round)	1.3\$ B (Jan 2020)	2.7\$ B (Jun 2019)	3.5\$ B (Jul 2019)
Fund Raised	80.4\$ M	433\$ M	692.8\$ M

Table 4.2 – Financial Information for Revolut Competitors⁸⁷

EV/Revenues

The determination of the value of Revolut by using the EV/Revenues is a quite straightforward process. The information on the revenues of the competitors can be found on the income statements of the respective companies, which are published annually and can be retrieved online from the companies registries of the countries in which they are incorporated. As, at the time of writing, the 2019 reports are not available, the valuation will be performed by using the last available data on the revenues, which have been used as bases to compute the values of the other startups.

By referring to the values reported in table 4.3, the multiples obtained for Monese, Monzo and N26 are respectively x168, x49 and x61, calculated as the ratio between the enterprise value and the amount of revenues generated. The average and median values of these three multiple ratios are x653 and x628. The values obtained can be then used to calculate the value of Revolut.

⁸⁷ Data on the number of customers (finder.com, techcrunch.com). Valuation (ft.com, techcrunch.com). Fund raised (crunchbase.com).
Revolut main competitors: “*Monzo vs Starling, Revolut and N26: The leading digital banks compared*”
<https://www.wired.co.uk/article/monzo-vs-revolut-vs-starling-vs-n26-best-challenger-bank>

			
Value (as for last financial round)	1.3\$ B (Jan 2020)	2.6\$ B (Jun 2019)	3.5\$ B (Jul 2019)
Revenues	7.72\$ M	52.6\$ M	57.2\$ M
EV/Revenues	x168	x49	x61
Average multiple		x93	
Median multiple		x61	
Revenues as per financial statements		76.6\$ M	
Valuation using the average		7,098\$ M	
Valuation using the median		4,673\$ M	

Table 4.3 – EV/Revenues computation⁸⁸

By using the average of the multiples, the valuation of Revolut is set to be \$7.1 billion, while using the median it amounts to \$4.7 billion. The slightly higher valuation obtained computing the average of the of the multiples is due to the high multiple of Monese derived by the significantly different amount of revenues generated compared to the one of its competitors. By excluding Monese from the analysis, the resulting multiple would be x55, for a valuation of 4.2\$ billion.

Although the last official valuation of Revolut done at the beginning of the 2018 set the value of the UK-based fintech company to an amount of \$1.7 billion, venture capitalists, in particular Technology Crossover Ventures, are estimating that the company is no worth around 5\$ billion, which confirms the results obtained using the EV/revenues ratio.

EV/Customers

The second ratio that can be used to evaluate Revolut is the EV/Customers. Information on the actual number of users of these digital banks may not be disclosed directly form the companies

⁸⁸ Data as per last available financial statements (Revolut, Monese, Monzo: UK Company House <https://www.gov.uk/government/organisations/companies-house> N26: Company Register Germany <https://www.unternehmensregister.de/>)

themselves, however several online databases and specialized websites provides reliable estimates of the total amount of clients of these businesses. The rational behind the value express by the EV/Customer ratio is how much revenues a single client generate for the business. By calculating the average and median of the market, and then multiply it by the number of users actively using the platform, it's possible to determine a valuation range for Revolut.

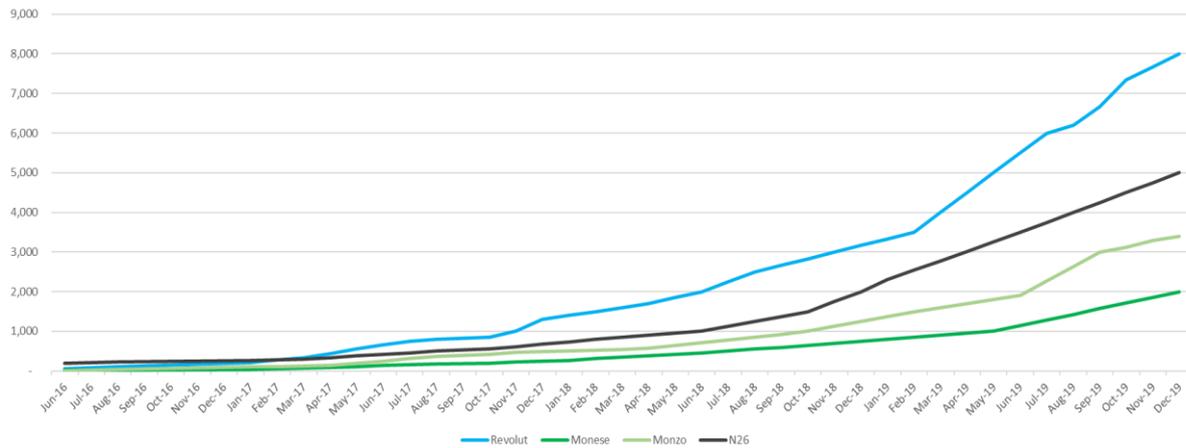
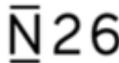


Table 4.4 – Number of active users

As highlighted by the graph above, Revolut results to be the most popular choice among consumers, for this reason it's logical to expect the valuation of the company to be higher than the ones of its competitors.

			
Value (as for last financial round)	1.3\$ B (Jan 2020)	2.6\$ B (Jun 2019)	3.5\$ B (Jul 2019)
Customers (Dec 2019)	2 M	3.5 M	5 M
EV/Customer	650\$	743\$	700\$

Average multiple	698\$
Median multiple	700\$
Number of Revolut users	8 M
Valuation using the average	5,581\$ M
Valuation using the median	5,600\$ M

Table 4.5 – EV/Customer computation

As expected, the value of Revolut is bigger than the ones of its competitors, with a valuation using the EV/Customers of around 5,6\$ billion.

By looking at the results obtained and comparing it with market analysts' expectations, we can conclude that, with the multiple methods used, Revolut total value is in the region of 5\$ billion and a half, with the average of the three valuations being of 5,492\$ billion.

	Average	Mean	Valuation
Market Analysts	-	-	5,000\$ M
EV/Revenues	4,672\$ M	7,098\$ M	5,885\$ M
EV/Customer	5,581\$ M	5,600\$ M	5,591\$ M
			5,492\$ M

Table 4.6 – Valuations with multiples results

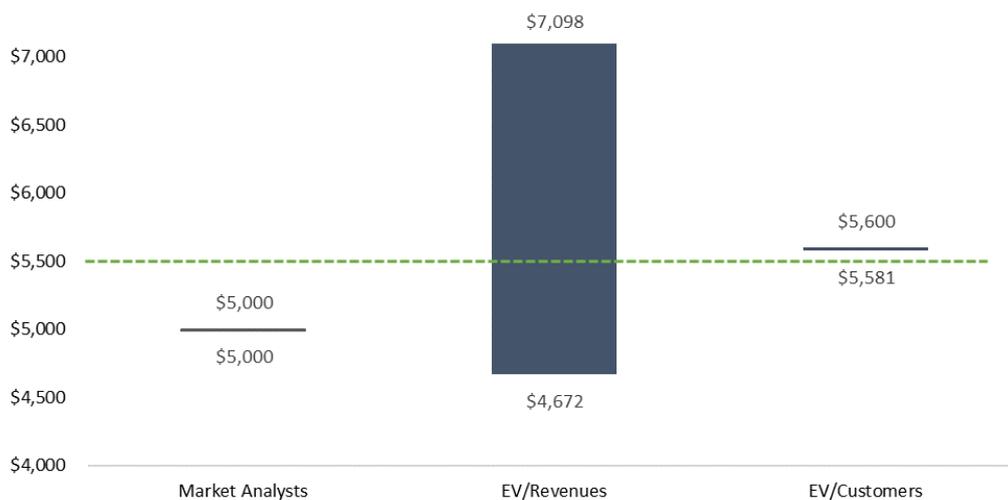


Figure 4.7 – Valuations with multiples results

4.3 Discounted Cash Flow Valuation

Alongside the market valuation approach, the other main technique to determine the value of a business is the intrinsic methodology which includes the dividend discounted model or the discounted cash flow. The implementation of such mechanisms, however, may result complicated in the case of private owned companies like Revolut due to the lack of available information on the industry and on the other comparable companies.

With the goal of trying to determine the real value of Revolut, this chapter will set some realistic assumptions that will then be implemented to calculate, using the DCF method, how much this new fintech firm is worth.

As described in the first chapter of this dissertation, the discounted cash flow method requires several variables to be used as inputs. Given the uncertainty on the measurability of some of these value, reasonable assumptions will be made, however a different result of this valuation compared to the ones previously conducted should not come by surprise.

In particular the main impact of these assumptions is reflected in two key components of the DCF valuation: the determination of the future financial metrics and the appropriate discount rate.

With regards to the first element, past performances of the target as well as of the peers can be used to forecast future results. In the case of Revolut, only three years of data are available which drastically limits the possibility of forecasting revenues and costs for the following years which are needed to estimate future earnings. The same can be said by looking at its competitors which all have less than five years of data published.

However, given the increasing popularity of the company and the need to maximize the amount of funds to be raised, the management of the company and third parties have released estimates on future performances. In particular, in September of 2019, the Chief Operating Officer of the company, during an interview with the Financial Times⁸⁹ stated that revenues are expected to grow by three times compared to 2018.

These information disclosed and the ones reported in the financial statements in the previous years, can be used to forecast future performances, in particular the net earnings which is used as a starting point to calculate the cash flows from operations. The DCF model, in fact, requires the determination of the free cash flows to the firm, which can be computed by using the profit before taxes to then adding up the non-cash expenses (depreciation and amortization) and

⁸⁹ Nicholas Megaw, “*Revolut points to ‘viability’ after increasing revenues*”, Financial Times, October 2019.

deducting the capital expenditures (CAPEX), net changes in the net working capital and the tax shield. However, a variation of this formula can be utilized to calculate the free cash flow which, starting from the cash flow from operations, simply requires to add the interest expenses at net of taxes and deducting the capital expenditures.

$$\begin{aligned}
 & \text{Free Cash Flow from Operations} \\
 & + \text{Interest Expenses (1 - Tax Rate)} \\
 & - \text{Capital Expenditures} \\
 & = \text{Free Cash Flow to the Firm}
 \end{aligned}$$

As Revolut was founded in 2015, the analysis for the determination of the future free cash flows can be done by going through the statements from the year of its incorporation to the end of 2018. The table below reports the calculation of the free cash flows to the firm for the aforesaid period:

	2015	2016	2017	2018
Cash Flow from Operations	-£ 1,438	-£ 8,302	£ 183,067	£ 708,769
Net Income	-£ 1,689	-£ 6,990	-£ 14,812	-£ 32,831
Depreciation	£ 5	£ 33	£ 90	£ 478
Interest Paid	£ -	£ -	£ 22	£ 16
Interest Received	£ -	-£ 6	-£ 59	-£ 1,107
Tax	£ -	£ -	-£ 128	-£ 303
(increase) in Inventories	£ -	-£ 421	-£ 171	-£ 2,961
(increase) in Debtors	-£ 207	-£ 1,186	-£ 19,182	-£ 20,239
Increase in Creditors	£ 453	£ 265	£ 10,359	£ 35,058
Increase in e-money Issued	£ -	£ -	£ 201,720	£ 702,671
Net Fair Value Losses Recognized in P/L	£ -	£ -	£ 4,911	£ 26,501
Corporate tax	£ -	£ -	£ 283	-£ 350
Share-based Payments	£ -	£ 4	£ 8	£ 1,868
Loss on Disposal on Fixed Assets	£ -	£ -	£ 22	£ -
Exchange Differences on Fixed Assets	£ -	£ -	£ 4	£ 13
Exchange Differences	£ -	£ -	£ -	-£ 45
Interest Expenses (1-T)	£ -	£ -	£ 18	£ 13
CAPEX	-£ 30	-£ 124	-£ 19,666	-£ 53,092
Free Cash Flow to the Firm	-£ 1,468	-£ 8,426	£ 163,419	£ 655,690

Table 4.8 – Cash flows from operations forecasts (amounts in GBP)

One main assumption has to be made for the calculation of both the future cash flow from operations and the capital expenditure: as the business increases its activities, these two values will grow accordingly. This is also true for interest expenses, however as the company is not expected to issue any debt instruments in the near future, the amount of this item will have a negligible impact on the free cash flow, hence for the purpose of this analysis, it's value will be considered equal to zero.

With regards to the cash flow from operations, the main elements that are expected to grow in the coming years are the net income, the net working capital, the amount of interests received from bank deposits and landings to clients and, more significantly, the amount of electronic money issued.

The starting point of the cash flows from operation is the net profit, which can be found in the income statement (table 4.1 of this chapter).

A reasonable assumption for the future period is that the company will start generating profits. operating income. A conservative approach suggests that this will not happen in 2019, even though the management team Revolut is expecting the revenues to increase by 350%, but more likely from 2020. Moreover, the increase in revenues will also be matched by an increase in both cost of sales and administrative costs.

With a final consideration on the taxes on profits, a positive income will result in the taxation on the results of the ordinary activities of the company, in the United Kingdom equal to 19.25%, with expected overall results showed below:

	2019	2020	2021	2022	2023
Revenue	£ 250,000	£ 725,000	£ 1,600,000	£ 3,100,000	£ 6,400,000
Cost of Sales	-£ 200,000	-£ 550,000	-£ 1,200,000	-£ 2,300,000	-£ 4,200,000
Administrative Costs	-£ 60,000	-£ 160,000	-£ 350,000	-£ 700,000	-£ 2,000,000
Operating Income	-£ 10,000	£ 15,000	£ 50,000	£ 100,000	£ 200,000
Interest Received	£ 2,000	£ 3,000	£ 5,000	£ 8,000	£ 13,000
Interest Paid	-£ 50	-£ 70	-£ 100	-£ 125	-£ 150
PBT	-£ 8,050	£ 17,930	£ 54,900	£ 107,875	£ 212,850
Tax	£ 100	-£ 3,452	-£ 10,568	-£ 20,766	-£ 40,974
Net Income	-£ 7,950	£ 14,478	£ 44,332	£ 87,109	£ 171,876
Other Income	-£ 80	-£ 160	-£ 320	-£ 640	-£ 1,280
Total Income	-£ 8,030	£ 14,318	£ 44,012	£ 86,469	£ 170,596

Table 4.9 – Forecasted income statements (amounts in GBP)

The forecasted incomes are then used in the calculation of the cash flow from operations. The main assumptions on the elements for which the future cash flows deriving from the operating activities needs to be adjusted are that the company will register an increase in the net working capital, defined as the difference between the sum of the increase in inventory and debtors and the increase in creditors, in the amount of electronic money issued, on the taxes paid on the profits of the year and on the interests received on deposits.

These increases are not only detected in the cash flows from operations but also in the ones from investments, which are reflected in a higher value for the capital expenditures.

By applying such considerations when forecasting the future cash flow, the below estimated results are obtained:

	2019	2020	2021	2022	2023
Cash Flow from Operations	£ 906,988	£ 1,206,178	£ 1,641,283	£ 2,090,342	£ 2,478,352
Net Income	-£ 8,030	£ 14,318	£ 44,012	£ 86,469	£ 170,596
Depreciation	£ 1,000	£ 2,000	£ 4,000	£ 5,000	£ 6,000
Interest Paid	£ 50	£ 70	£ 100	£ 125	£ 150
Interest Received	-£ 2,000	-£ 3,000	-£ 5,000	-£ 8,000	-£ 13,000
Tax	-£ 132	-£ 100	£ 3,452	£ 10,568	£ 20,766
(increase) in Net Working Capital	-£ 4,000	-£ 5,000	-£ 5,000	-£ 6,000	-£ 7,000
Increase in e-money Issued	£ 900,000	£ 1,200,000	£ 1,600,000	£ 2,100,000	£ 2,700,000
Corporate tax	£ 100	-£ 32,110	-£ 40,280	-£ 147,820	-£ 449,160
Interest Expenses (1-T)	£ 40	£ 57	£ 81	£ 101	£ 121
CAPEX	-£ 88,000	-£ 132,000	-£ 220,000	-£ 330,000	-£ 465,000
Free Cash Flow to the Firm	£ 819,028	£ 1,074,235	£ 1,421,364	£ 1,760,443	£ 2,013,473

Table 4.10 – Forecasted free cash flows to the firm (amounts in GBP)

The second element needed in the discounted cash flow valuation is the rate to which the free cash flows and terminal value have to be discounted. The computation of the weighted average cost of capital requires the estimation of the cost of debt, cost of equity and the capital structure of the business. While the amount of debt and equity can be computed by referring to the data reported in the financial statements, the determination of the cost of debt and cost of equity are more complicated. For the former rate, the easiest way is to assume that the company is lending money at the borrowing market rate, however different agreements might have been put in place. More complicated is, instead, the calculation of the second rate. As described in the first chapter, the cost of equity is determined by using the capital asset pricing model, which requires

a series of factors, in particular the market and risk-free rates and the beta. The first two elements can be easily obtained by using proxies such as broad-based indexes for the market and government bonds for the risk-free rate which can be found on online database. In this specific case, the last 10 years historical return of the S&P500 and the 10-year US treasury will be considered which are respectively 13.48%⁹⁰ and 1.92%⁹¹. With regards to the beta, this is normally calculated by running a regression on the market returns of the stock of the target, however, given that the company is currently privately owned and that its shares are not traded on the stock market, this analysis cannot be conducted, making the direct determination of the beta of Revolut impossible. An alternative way would be the calculation of the unlevered beta of the sector of EMIs, however, even by recurring to this solution, a problem arises: none of the main competitors of Revolut is currently listed on the market, hence a beta of the industry is not measurable. The most accurate estimate of the value of the beta for fintech companies would then be the average of the unlevered betas of the sectors which have been affected by the e-money institutions due to the services that they offer.

The table below⁹² shows the unlevered betas of the banking and IT industries:

Sector	Unlevered Beta
Banking and Financial Services	0.43
Information Technology	1.45
Average Beta	0.94

With the considerations made earlier on the data used for the calculation of the cost of equity of Revolut, an estimation of its value results from the application of the following formula:

Market return (r_m): 13.48% (10-year average annualized return)

Risk-free return (r_f): 1.92% (10-year US treasury bond)

Beta (β): 0.94 (calculated as indicated above)

⁹⁰ Period January 2010 – December 2019. Source: Bloomberg

⁹¹ Treasury Yield Curve Rates in December 2019. Data available on the U.S. Department of the Treasury website: <https://www.treasury.gov/resource-center/data-chart-center/interest-rates>

⁹² Extract of the “Beta by Sectors (US)”, Aswath Damodaran, New York University, January 2020 <http://pages.stern.nyu.edu/>

$$k_e = r_f + \beta(r_m - r_f)$$

$$k_e = 1.92\% + 0.94 (13.48\% - 1.92\%) = 12.79\%$$

The third element needed for the calculation of the weighted average cost of capital is the capital structure of the company, which is usually determined from the last version of the financial statements. In the case of Revolut, the assumption is that only equity has been used for financing the activity of the company as no loans to third parties or notes regarding the issuing of debt instruments are included in the financial statements of the company.

In consideration of the assumptions made above, a theoretical value of the weighted average cost of capital for Revolut can be computed as follow:

$$WACC = \frac{E}{D + E} k_e + \frac{D}{D + E} k_d (1 - T)$$

And, as the company is considered to be financed entirely by equity, which makes the value of D equal to zero, the weighted average cost of capital matches the cost of equity of Revolut:

$$WACC = k_e = 12.79\%$$

The finale step before computing the value of Revolut is the determination of the terminal value, the amount which has not been captured by the discounting of the cash flow in the first five years of the forecast. The formula for the terminal value includes the free cash flow to the firm at the final year of the forecast as well as the discounting rate r used in the first periods (the WACC) and the growth factor. Although the basis about the expansion of the industry laid out in chapter two would suggest that the growth rate of Revolut could be higher than the average value used normally for expanding sectors (usually around 2%), the initial boom together with the high competition due to the low barriers to the entrance and decreasing technology costs, suggests to use a slightly more conservative growth rate, hence a value of 1.5% will be utilize for this study.

By applying these values to the terminal value formula

$$TV = \frac{FCFF_n (1 + g)}{r - g}$$

$$TV = \frac{2,013,473 \times (1 + 1.5\%)}{12.79\% - 1.5\%} = 18,102,926 \text{ £}$$

With all the elements being estimated, the final valuation of Revolut using the discounted cash flows method can be obtained by adding up the discounted cash flows calculated in table 4.9 and the terminal value.

$$EV = \frac{FCFF_{2019}}{(1+WACC)} + \frac{FCFF_{2020}}{(1+WACC)^2} + \frac{FCFF_{2021}}{(1+WACC)^3} + \frac{FCFF_{2022}}{(1+WACC)^4} + \frac{FCFF_{2023}}{(1+WACC)^5} + \frac{FCFF_n(1+g)}{r-g}$$

$$EV = \frac{819,028}{(1+12.79\%)} + \frac{1,074,235}{(1+12.79\%)^2} + \frac{1,421,364}{(1+12.79\%)^3} + \frac{1,760,443}{(1+12.79\%)^4} + \frac{2,013,473}{(1+12.79\%)^5} + \frac{2,013,473 \times (1+1.5\%)}{12.79\% - 1.5\%} =$$

$$= 22,855,016.62 \text{ £}$$

By using the discounted cash flow method with the assumptions made in this paragraph of the future performance of the company, the valuation of Revolut appears to be of around 23£ billion or 30\$ billion.

The difference between this valuation and the ones performed by the market analysts and the ones conducted in the previous paragraph using the market multiples are quite significant. The reasons behind the gap is due to a number of factors, in particular the forecasted expected financial results and the values of the cost of equity and beta used to determine the weighted average cost of capital.

The uncertainties on the calculation of these elements are due to the lack of historical data both on the company itself and on the competitors, which are necessary to come up with reliable models to determine the value of a company.

5. CONCLUSIONS

5.1 Conclusions

The previous chapters of this dissertation have provided an analysis of the electronic money industry and the key concept behind the valuation process. Starting from the overview of the current legal framework in the European Union was then offered a detailed analysis of the main challenges and opportunities for the newly born electronic money institutions, as well as, a deep study of the characteristics of the payment products and of the players entitled to issue them.

Following the examination of the EMI industry, it was provided a description of the motivations of the valuation, of the main elements used to conduct the analysis and the different approaches generally utilized in the financial industry.

The topics addressed in the first two chapters were then reviewed in the last part of the thesis to perform the valuation of Revolut Ltd. With the collection of data from the financial reports of the company and its competitors, it was possible to determine that, by using the multiple approach, the business is currently valued roughly 5\$ billion and half, in line with the valuations shared by the market analysts, which allows to consider this to be the theoretical real value of the firm. By using, instead, the discounted cash flow model, which is generically used for publicly traded companies, the final result showed a value of 30\$ billion, much higher than the one obtained with the other method. This result derives from the fact that, although many assumptions have been made to try to determine the most realistic values of the cost of capital, the beta and the financial performances, the real values cannot be determined due to a variety of factors: (1) the information disclosed by the company are not sufficient to calculate precisely the discount rate, (2) clear trends cannot be determined due to the lack of historical information on the company and on the industry and (3) the beta and the cost of capital can only be determined by analyzing the performances of the business in the stock market.

While the multiples valuation used past data to determine the value of Revolut, the discounted cash flow model relies on future estimated data. Due to this fact, one additional consideration should be made, which might justify the outcome of the analysis: the rapid past growth of the EMI industry created high expectations for the future. If this will be confirmed, and a higher number of users will shift to the platform, Revolut will see its profits increase thanks to the scalability of the technology, and a sequential increase of the current market valuation, that in few years might match the one obtained using the forecasted data. In conclusion, it's fair to say

that considering the early stage of the fintech industry and the assumptions made in the fourth chapter, the market approach, and in particular the EV/customers, represents the most suitable valuation method to determine the value of electronic money institutions. This is also true because clients can be considered the real value driver of electronic money institutions as the potential creation of value is directly connected to the acquisition and retention of new customers.

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