Aalto-yliopisto
Aalto-universitetet
Aalto University

Bachelor's Programme in Economics

Buy Now Pay Later (BNPL) and its associated risks: A growth analysis based on the setting of two-sided platforms.

A global review

Hoang Bao Minh Le

Bachelor's thesis
2024

Aalto-yliopisto
Aalto-universitetet
Aalto University

Author Hoang Bao Minh Le	
Title of thesis Buy Now Pay Later (BNPL) and its associated risks: A growth analysis based on the setting of two-sided platform.	
Programme Bachelor's of Science, Economics	
Major Economics	
Thesis advisor Professor Pauli Murto	
Date 29.09.2024 **Number of pages** 22	**Language** English

Abstract

BNPL has grown six-fold in terms of volume of transaction within just 4 years from 2019 to 2023, which is remarkable for a form of credit (Cornelli, G., Gambacorta, L. and Pancotto, L. 2023). When compared with other forms of credit such as credit cards and personal loans, BNPL demonstrates several distinct characteristics that in turn make its nature notably different. These remarkable differences in nature can somewhat explain why BNPL witnessed such an impressive growth.

Despite being different compared to other forms of credit, the operation of BNPL surprisingly bears resemblances with the operation of two-sided platforms. Therefore, the growth of BNPL can somewhat be explained by analyzing the growth and model of these platforms. In short, through reviewing literature and analyzing relevant frameworks, I found out that allowing customers to use BNPL for free helps boost the use of BNPL, which in turn leads to the tremendous growth of this credit method.

Besides answering what are the reasons behind such a tremendous growth of BNPL, this literature review also identifies that BNPL is not free to users as it is often advertised. In fact, BNPL users are vulnerable to many risks such as overspending and overborrowing. This problem is even prominent as due to its special nature compared to other forms of credits, BNPL could be exempt from credit regulations in many cases. Therefore, this literature review also supports the idea that stricter regulations on BNPL need to be implemented to better protect customers and improve social welfare.

.

Keywords Buy Now Pay Later, Consumer Behavior, Two-sided Platforms

Table of contents

Preface and acknowledgements

I want to thank Professor Pauli Murto for giving me helpful feedback.

I want to thank my parents for their support.

I also want to thank my friends (Hoa Chu, Khanh Giang Le, Hoang Mai Dang) for mental support.

Otaniemi, 29 September 2024
Hoang Bao Minh Le

Abbreviations

BNPL	Buy Now Pay Later
CAP	Committees of Advertising Practice
CFPB	Consumer Financial Protection Bureau

1 Introduction

According to Cornelli, G., Gambacorta, L. and Pancotto, L. (2023), the world has witnessed substantial growth in BNPL activities in recent years. Particularly, in terms of GMV (global merchandise volume), BNPL activities have increased globally more than sixfold in just 4 years (from 2019 to 2023). In addition to GMV, the growth of BNPL is also demonstrated by the great increase in BNPL app use since COVID-19.

This surge in the use of BNPL proves that this credit method has brought convenience to customers by allowing them to check out faster and pay for their products. However, besides convenience, BNPL also poses tremendous risks on customers especially the younger and lower income groups.

Therefore, this literature review aims at first answering the research question of why Buy Now Pay Later grows at such a rapid rate through explaining the motivation behinds the use of BNPL from various stakeholders (including customers, merchants, and BNPL providers). After a good understanding of the BNPL industry from different perspectives, we further explore why BNPL users are prone to many risks that they may not even be aware of. Finally, we wrap up with a discussion about limitations and the need for stricter regulation to protect consumers at a wider scope.

1.1 Economic Relevance and Rationale of Study:

In recent years, BNPL has witnessed substantial growth in terms of both the number of users and the volume of transactions. During the years of COVID-19 when consumers face greater credit constraints because of the economic downturn, the growth of BNPL is even more tremendous as it provides consumers with instant, short-term access to more credits. From the merchants' side, BNPL has also been considered an efficient method to boost sales and conversion rates. In short, with its benefits and impressive growth, BNPL has gained impressively wide public acceptance over a short period of time, which makes it a topic that is worth studying. Evidently, in the last several years, there have been many papers about this topic from prestigious institutions such as Havard University and Consumer Financial Protection Bureau (CFPB).

Despite the benefits that BNPL brings to its users, the BNPL industry is still considered a grey zone of regulation due to its different nature compared to other credit methods that are covered by regulations and laws. Due to this lack of regulation, BNPL users are poorly protected from the credit risks associated with this payment method. With awareness of this problem, policy makers have tried to better regulate BNPL and protect consumers by making regulation proposals.

Thus, BNPL is a relevant economic topic as a better understanding of how stakeholders interact and what drives them to act in those ways is a good start to address problems associated with this credit method. Through that, policymakers can have a foundation of how to better regulate BNPL and protect consumers.

1.2 Research Approach

This paper will use literature review as the research approach. I believe using literature review is suitable because this method would enable me to have an overview of what is the current research situation regarding this topic. Particularly, using literature review helps me to understand BNPL's impacts on multiple stakeholders in the market including customers, merchants, and BNPL providers. Additionally, through literature review, I can also have an overview of what are the regulatory issues regarding this credit method that policymakers all around the world are trying to solve. In short, choosing literature review as the research approach enables me to have a general and inclusive viewpoint and summarization on the current situation of BNPL and its associated issues. This benefit makes literature review a better approach compared to others such as empirical studies as with empirical studies, the analysis normally focusses on one side of the market, mostly ignoring other related stakeholders. However, this study method also poses a limitation as it heavily depends on the availability and quality of relevant papers on the topic. For instance, if there is only a limited number of papers on the topic, using literature review may not give an appropriate overview of the current situation. Furthermore, if papers on the topic are of low quality, the validity of findings and analysis from the literature review can also be challenged.

1.3 Scope of Study

This literature aims at providing a global overview about the BNPL industry with the focus on four markets which are the USA, Germany, Australia, and China. I believe these four markets are representative of the global situation as they are all large markets with millions of BNPL users. Besides, they include both developed and emerging markets and are located on four different continents, which makes the study both economically and geographically representative and relevant.

1.4 Challenges

As BNPL is a new economic topic and has only started to receive great attention in the last few years, many papers used in this literature review are working papers, which means that results from these papers are still under review by scholars and researchers. This suggests that the results from these papers may not be the final results. Furthermore, besides the fact that most studies are still working papers, the number of studies available for review is also limited.

Moreover, as BNPL is different from other traditional forms of credit, this credit method is also currently exempt from several regulations. This possibly leads to the insufficiency or inaccuracy of transaction and user data reports, which in turn can cause biases in empirical results from relevant papers.

Regarding analyzing the growth of BNPL, there has not been a study that has a proper framework to analyze what drives BNPL to grow at such a rapid pace. Therefore, in this literature review, I apply a published framework on two-sided platforms to explain the growth of BNPL. Although there are similarities between BNPL and two-sided platforms, using the framework of two-sided platforms to explain the growth of BNPL can still have limitations as this framework probably fails to address some unique characteristics of this credit method.

1.5 Structure

This literature review has the structure as follows: section 2 will introduce the definition of BNPL and how the BNPL industry operates. At the end of this section, there is also a comparison of BNPL and two-sided platforms, setting the motivation for the main growth analysis. Section 3 will start with a theoretical setting of necessary frameworks and economic principles. Then, we continue with an explanation of how BNPL's nature has led to such tremendous growth. Section 4 will summarize typical characteristics of BNPL users as well as address the inherent risks associated with this payment method that users may not be aware of. Section 5 will discuss the findings and need for further regulation which aims at social welfare maximization. Section 6 will conclude.

2 Institutional Background

2.1 An Overview of Buy Now Pay Later (BNPL)

2.1.1 Definition

To understand why Buy Now Pay Later can lead to such a great increase in consumer spending and growth substantially in recent years, we must first understand what Buy Now Pay Later is. According to the Consumer Financial Protection Bureau (the USA), Buy Now Pay Later is a type of installment loan that enables consumers to purchase something immediately with little or even no initial payments. The balance will be split into smaller payments which will be paid off later.

The Australian Securities and Investment Commission (ASIC) (O'Brien, L., Ramsay, I. and Ali, P. 2023) defines BNPL as "an arrangement that allows consumers to buy and receive goods and services immediately from a merchant, and repay a buy now pay later provider over time". Under this plan, the BNPL providers pays the merchant at the time of the customer's purchase. Afterwards, the customer will repay the BNPL provider in several instalments. With this BNPL plan, customers are normally not required to pay any fee to BNPL providers while merchants do.

From the two definitions above, we can see that different institutions somewhat define BNPL differently, but they all place an emphasis on BNPL's nature as an instant credit method that allows consumers to immediately purchase what they want with no extra fees.

2.1.2 BNPL's differences from other credit methods

In the part above, we have had an initial understanding of what BNPL is. However, to fully explain such tremendous growth that has never been seen before, we must see how BNPL is special compared to other credits methods.

Specifically, regarding credit cards, the Bank for International Settlements (BIS) has also emphasized on BNPL's differences from credit cards which are short-term credit for a specific purchase, soft credit check with no negative impact on credit score from late payments, and interest-free instalments for the given repayment period.

Furthermore, Soni (2023) also compared BNPL with two other types of instalment loans which are layaway plans (which were commonly used in the time of Depression) and payday loans. Particularly, layaway plans only allow customers to receive the goods after they have fully paid for them while BNPL customers can have their goods immediately even without any payments. Additionally, while layaway plans are typically used for large, infrequent purchases, BNPL is mostly used for smaller, more frequent purchases such as groceries.

When it comes to payday loans, despite sharing similarities with BNPL (typically used for smaller purchases and do not require hard credit check), they are single-payment loans and require a fixed fee ranging from $15 to $20 for each $100 borrowed. On the contrary, BNPL are often spilt into four or more payments and do not charge any interest if the payments are made on time.

From these three comparisons, we see that the BNPL's nature is greatly different than that of other credit methods. In particular, the most notable differences of BNPL compared to other credit methods are instant credit access, soft credit check, and interest free for a given period. Lake, R. (2023) also summarizes these differences as follows: Firstly, a BNPL plan normally does not charge any interests. And secondly, BNPL loans are much more likely to get approved as they typically do not require any credit checks.

2.1.3 Examples of BNPL plans

For a better understanding of how this credit method works, we can look at the Buy Now Pay Later plans that are currently offered by large merchants and BNPL providers. For example, on March 28, 2023, Apple introduced Apple Pay Later which allows its customers to apply for Apple Pay Later loans of $50 to $1,000 for online and in-app purchases of iPhone and iPad. The loan application process, which is done through Apple Wallet, requires only a soft credit pull and has no impact on customers' credit. The merchant explicitly stated that it is excited to provide its customers with flexible payment options and there will be no fees and no interest for using Apple Pay Later.

Besides merchants like Apple, there are also big BNPL providers such as Klarna and Afterpay. Klarna, a Swedish BNPL provider which currently has over 150 million customers worldwide, offers 2 interest-free plans of BNPL which are *"Pay in 4: split your purchase in 4 interest-free payments, paid automatically every 2 weeks"* and *"Pay in 30 days: Get it now. Pay later. Shop first and pay up to 30 days after placing your order. No upfront payments, no interest"*.

Overall, with the two above examples, we can see that BNPL is widely adopted by multiple sellers and providers, which to some extent enables this credit method to grow substantially by creating positive network externalities (the more merchants approve BNPL as a payment method, the more customers use it and the more BNPL providers offer it). The impact of network externalities on the growth of BNPL will be discussed in more detail in section 3.

2.2 The BNPL industry

2.2.1 The substantial growth of BNPL

According to BIS's cross-country analysis, BNPL's global merchandize volume (GMV) has grown more than sixfold in 4 years (from 50 USD bn in 2019 to roughly 350 USD bn in 2023). Besides the growth in GMV, BNPL also experienced similar growth in its number of daily active users. Particularly, in 2019, there were just 0.25 million of active users per day while the figure reached 2.5 million in 2023, which means an impressive 10-fold increase in just 4 years.

The number of BNPL users in the US doubled to 50.6 million within a year from 2020 to 2021 while the global spending on BNPL is estimated to increase 300% from 2022 to 2027 (Soni 2023). In Australia, two of the main BNPL providers, Afterpay and ZipCo, reported to have 3.6 and 2.8 million of active users in 2021 (Boshoff, E., Grafton, D., Grant, A.R. and Watkins, J. 2022). Besides US and Australia, the growth of BNPL has also been prominent in the UK and China. Particularly, Guttman-Kenney, B., Firth, C. and Gathergood, J. (2022) shows that 19.5% of UK credit cards active in December 2021 have a transaction by a BNPL firm charged to their credit card during 2021.

When it comes to China, according to Bian, W., Cong, L.W. and Ji, Y. (2023), although the US has the largest transaction volume, China is the biggest BNPL market with over 500 million users in 2020. The BNPL market in China was about US $30 billion in 2020 and is expected to reach US $750 billion in 2025. This study also summarized that BNPL currently accounted for a relatively large segment of ecommerce in European countries in 2021. In particular, the figures are 11.7% for Denmark, 12.8% for Finland, 18.1% for Norway, and 19.7% for Germany.

2.2.2 The interaction among different stakeholders

The substantial growth that we mentioned above suggests that BNPL is widely accepted by multiple sides of the industry. To answer why BNPL is so widely used by the public, we must understand what drives stakeholders to participate in the BNPL market, how they interact with each other, and how each of them benefits from using BNPL. This literature will focus on the 3 most relevant stakeholders which are consumers, merchants, and BNPL providers. Particularly, consumers are people who use BNPL to finance their purchases. Merchants are sellers of goods that consumers want to purchase. Sometimes, these merchants also provide their own BNPL plans for their own products (like what we see with Apple). BNPL providers are firms that offer BNPL plans only like Klarna.

When it comes to benefits from using BNPL, customers, especially credit constrained ones, immediately have access to extra credits without any credit checks and impacts on their credit points. This helps customers become more flexible in terms of consumption smoothing and dealing with credit/budget constraints. In addition to credit constrained customers, BNPL is also beneficial to customers who have no budget struggling. Particularly for these customers, BNPL acts as a method that helps them get away from interest or fixed fees which normally come with other types of financing methods like credit cards or personal loans (Aidala, Mangrum, and van der Klaauw, 2024).

Besides customers, merchants also greatly benefit from significant sale boosts by adopting BNPL as a payment method. This benefit from sale increases has been stated in a report by the Consumer Financial Protection Bureau (CFPB). Particularly, in some cases, BNPL has led to a 41% increase in the average order value, 30% increase in conversion, and 80% increase in customer retention. Moreover, Affirm (a BNPL provider) also reported that BNPL results in an 85% higher average order value than other payment methods (Reagan, C. 2021). In Berg, T., Burg, V., Keil, J. and Puri, M. (2024), the authors found out that sales increase by 20% when BNPL is available. Furthermore, the cost required for providing BNPL is also remarkably lower than that of other payment methods. Taken all together, the study suggests that the additional gross profit generated by BNPL is three times higher than the costs. All these statistics suggest that BNPL is a worth try for merchants due to its ability to lead to incremental sales and relatively low costs to offer.

The last stakeholder of concern is BNPL providers. These firms often offer BNPL plans to customers on behalf of merchants which means they must bear all the risks if the buyers are unable to complete their payments. While this may sound risky for BNPL providers at first, these firms in fact greatly benefit from the commissions that merchants offer them when they successfully make customers pay for merchants' products through their BNPL plans. For these BNPL providers, such huge revenue from commission rates and sometimes even late payment charges is a worth trade-off.

In short, it is not random that BNPL grows tremendously within such a short period of time. Its growth is mainly due to the huge benefits that it brings to different stakeholders in the industry. In many cases, these benefits outweigh the associated risks which in turn motivates multiple stakeholders to enter the market, making the market grow substantially.

2.2.3 A grey zone of regulation and a need for stricter regulations

Despite its wide adoption and substantial growth, little is known about risks associated with BNPL. This is because BNPL is still considered a grey zone of regulation due to its different nature.

For instance, regarding Australia, according to Obrien, Ramsay, and Ali (2023), BNPL providers are currently operating outside the scope of National Consumer Credit Protection Act 2009 (NCCPA), which means they are exempt from several points in the National Credit Code (NCC). The first exemption is no interest charged for a given period as according to NCCPA, such zero interest arrangements cannot be considered "credits". The second exemption is known as "continuing credit contract" exemption because this applies to *'a credit contract for the purchase of goods or services' where 'no interest is charged, and any fees for providing the credit are limited to $200 in the first year and $125 in each subsequent year'* which many BNPL plans satisfy. Lastly, BNPL can also be exempt from "short term credits" under NCC. To qualify for this exemption, the BNPL plan must not last more than 62 days, charges fees of more than 5% of the amount borrowed and have an interest rate higher than an effective annual rate (which is 24%).

Because many policymakers are aware of this regulatory problem of BNPL, they have expressed the need for stricter regulations regarding BNPL. Evidently, in certain countries, new regulations aiming at better controlling BNPL and limiting its harmful effects have been introduced. For instance, in a media release in June 2024, the Albanese Government (Australia) introduced new consumer protection legislation that would see BNPL as consumer credit. In addition to Australia, the UK government also had done consultation on their legislation draft regarding regulating BNPL products. Moreover, to deal with the problem of misleading marketing regarding BNPL products, the Committees of Advertising Practice (the UK) published its guidance on advertising delayed payment services. In this guidance, CAP stated that advertisers should clearly state that delayed payment is a form of credit and customers should be aware of the terms and conditions as well as consequences on credit scores and future payments when using these services.

2.3 The Concept of Two-sided Platforms

Jean-Charles Rochet & Jean Tirole (2004) formally defined two-sided markets as *"A market is two-sided if the platform can affect the volume of transactions by charging more to one side of the market and reducing the price paid by the other side by an equal amount; in other words, the price structure matters, and platforms must design it so as to bring both sides on board."*. This suggests that for profit maximization of these platforms, one side of users (normally customers/buyers) typically needs to be subsidized so that they have the incentive to participate. The participation of this subsidized side (if large enough) will attract the participation of the other side (normally sellers/merchants), from whom these platforms can charge commissions for revenues and profits.

An example of these two-sided platforms is Uber, a transport sharing application. This platform allows customers to join for free and even gives them promotional discounts as an incentive for using the service. With many customers joining, Uber undoubtedly becomes more attractive to drivers. This leads to more drivers joining, resulting in higher revenue from commissions charged for each driver-rider transaction.

Another example is Facebook, a social media for people to share their daily life stories. By enabling users to join the platform for free, Facebook has gained billions of users, making it attractive to advertisers to display their ads on the platform. In other words, Facebook greatly benefits from selling ads by subsidizing its individual users.

2.4 Similarities between the BNPL industry and two-sided platforms

As this literature review aims at analyzing the growth of BNPL with the model of two-sided platforms, this part will provide a detailed explanation of how BNPL is comparable to two-sided platforms and why we can use the two-sided platforms' operation model to explain the growth of BNPL. Based on what have been discussed above, I summarize the similarities between BNPL and two-sided platforms in the following table:

	BNPL	Two-sided platforms
Growth somewhat accelerated by digital advancement	A lot of BNPL transactions are done through E-commerce websites meaning the growth of BNPL is possibly accelerated by digitalization.	These two-sided platforms are considered digital markets, and their growth was fueled by the digital age.
A service provider (often a digital platform) that enables match making between two sides of users	BNPL providers such as Klarna and Afterpay enable transactions between customers who want to use BNPL and merchants who want to offer BNPL.	Platforms such as Uber connect riders and drivers, making the search process shorter and more efficient.
A subsidized user side which can use the service for free	Customers can use BNPL for free as there are no fixed fees and no interest during a given period.	Customers can join these platforms for free. In some cases, they even receive discounts and promotion codes

		which in turn make the joining fee negative.
A side of user that acts as one of the main sources of income	A main source of revenue for BNPL providers is commission from merchants each time customers use BNPL as the payment method for what they purchase from merchants.	Two-sided platforms also have a user side acting as the main revenue source. For instance, this side can be drivers for Uber and advertisers for Facebook.
A problem of regulation	As explained above, BNPL is currently in a grey zone of regulation, which means its substantial growth can somewhat be accelerated by its exemption from laws.	There also have been many issues about how to regulate the operation of two-sided platforms as the operation and algorithms of these platforms sometimes is still a black box to policymakers and the public.

With similarities that have been explained, it is reasonable to analyze the growth of BNPL using the framework of two-sided platforms as they have similar settings and ways of operation. Furthermore, there have been cases in which credit systems are considered two-sided platforms. Specifically, David S. Evans and Richard Schmalensee (2008) stated that card associations such as Visa and MasterCard are examples of cooperative two-sided platforms. Taken all together, it is sensible to analyze BNPL using the framework of two-sided platforms.

3 BNPL's Growth Analysis

This section first provides frameworks and economic principles that help explain the operation and growth of two-sided platforms. Afterwards, we will apply these frameworks and principles to analyze the BNPL industry and determine what leads to its growth.

3.1 Theoretical Frameworks & Economic Principles

3.1.1 Indirect Network Effects & Economies of Scale

David S. Evans and Richard Schmalensee (2008) stated that indirect network effects between two sides promote larger two-sided platforms as more users on one side make the platform more valuable for the other side. An example of this can be seen in the case of Facebook. Particularly, if there are abundant of user active of Facebook, the platform undoubtedly becomes a more ideal place for advertisers to place their ads as their ads potentially can reach a wider pool of audience. Therefore, due to indirect network effects, two-sided platforms will normally want to attract as many users on either side as possible because this in turn makes the platforms more valuable to the other side and more profitable to the owners.

The motivation behind two-sided platforms' owners trying to attract as many users as possible can also be explained using the concept of economies of scale. Particularly, according to David S. Evans and Richard Schmalensee (2008), there could be significant fixed costs of providing two-sided platforms. These costs are often the costs of developing, establishing, and maintaining the platform and its network of users. Despite being significant, these costs are often independent of transaction volume or the number of users, making it more profitable for two-sided platforms by gaining more volume as this helps them lower their average costs. Therefore, two-sided platforms' owners are motivated to provide their services to a large pool of users from both sides to make the operation more profitable.

3.1.2 The Pricing of Two-sided Platforms

Regarding the pricing of two-sided platforms, David S. Evans and Richard Schmalensee (2008) demonstrated the following framework:

Consider a platform with two groups of users A and B. For both groups, there is a price for using the service. Both groups are price sensitive to some extent and there are positive network externalities between these two groups. This means that if the platform raises the price for group A, fewer members from group A will join, leading to a fewer number of joiners from group B because of the network externalities. The magnitude of the drop in the number of A joiners will depend on group A's level of price elasticity while the drop in B members will depend the value B place on A. In short, a price change for one group will not only directly affect the demand from that group through price elasticity but also indirectly affect the demand from the other group through indirect network effects.

David S. Evans and Richard Schmalensee summarized this situation by two demand functions: $Q^A = D^A(P^A, Q^B)$ and $Q^B = D^B(P^B, Q^A)$. From these two equations, we can see that the participation of group A depends on the price charged for group A and the participation of group B. The situation applies for participation of group B.

From the above demand functions, the authors formulate the equation for price elasticity for each group by holding participation of the other group constant. This elasticity function does not include the externalities between two groups: $e^I = -(\partial D^I/\partial P^I)(P^I/Q^I)$ for $I = A, B$.

Additionally, they also formulate an elasticity function where externalities between two groups are considered: $\theta_J^I = (\partial D^I/\partial Q^J)(Q^J/Q^I)$ for $I, J = A, B$ and $I \neq J$. This elasticity function measures the strength of the externalities connecting the two groups, which are typically positive in two-sided platforms.

Finally, the authors present the price elasticity function but at this point, they assume other prices remain constant, but participations can vary $E^I = -(dQ^I/dP^I)(P^I/Q^I)$ for $I = A, B$. By differentiating both demands function with respect to either price, the authors yield: $E^I = e^I/\left(1 - \theta_J^I \theta_I^J\right)$ for $I, J = A, B$ and $I \neq J$.

With this final function, we can see that even when A are not particularly price-sensitive, A's participation can still be highly sensitive to prices charged to A as a small response to price changes from A can trigger B which eventually triggers A. Because of this, it appears to be robust that the profit-maximizing price for either side may be below the marginal cost of supply for that side or even negative.

3.2 An application to analyze BNPL's growth

Based on the pricing theoretical framework and economic concepts explained above, I will analyze how BNPL attracts a large pool of customers and merchants, leading to its tremendous growth in recent years.

3.2.1 General setting which applies to any credit method

Consider having two groups which are borrowers and lenders/sellers. Between the two groups, there are indirect network effects (also known as positive network externalities in this case). On the one hand, the more borrowers, the more sellers/lenders have the motivation to offer loans. On the other hand, the more sellers/lenders accept a certain type of credit, the more borrowers use it due to the possibility to buy a wider range of products. This means it is reasonable to assume that participations of both sides are positively correlated with each other. Additionally, both sides are price elastic to a certain level.

The price charged on borrowers for using a credit method can be in various forms but for simplicity, I group them into three forms. The first one is the joining fee which can be the fee charged when a person starts using a certain credit method or the time and effort they have to spend on initial credit check and approval. An example of this is the fee charged when customers open a new credit card. The second one is the using fee which is the interest rate, or fixed fees charged when customers borrow money from lenders. Lastly, it is the maintaining fee. An example of this is the monthly or annual fee charged on credit card users for maintaining their cards. Any form of prices among these three can to some extent discourage borrowers from borrowing, which in turn hurts borrowers' participation.

On the sellers/lenders' side, the price can be the risk that the borrower will be unable to pay back the money. It can also be the commissions that sellers must pay for transaction systems. For instance, this price can be the commissions that sellers pay to credit card systems (like Visa and MasterCard) whenever their buyers use these cards to pay for the purchase.

When considering the setting for a credit method, besides price elasticity and volume, which are the same as with two-sided platforms, utility from consumption smoothing also and instant borrowing must also be considered. Particularly, borrowers will have more utility when using a certain type of credits if they can borrow and smooth their consumption immediately without any delay.

3.2.2 Specific setting for BNPL & an explanation for its growth

Like the general setting, consider having two groups which are customers (group A) and merchants (group B). There are positive network externalities between the two groups, meaning that more A joiners will attract more B joiners and vice versa.

Regarding price elasticity, I assume that group A is greatly price elastic while group B is less sensitive to prices. I had it assumption because BNPL customers are typically either credit constrained or wary of interest rates so even a small change in the fee for using BNPL (either in the form of joining or using fees) can discourage them from using it. Besides being price elastic, BNPL customers also have great utility from consumption smoothing as BNPL are often used for smaller and more frequent purchases such as groceries and other necessities. The longer the lag between when customers want to purchase a certain item and when they successfully purchase it, the lower the utility level. Additionally, it is also reasonable to assume that the utility level of using BNPL is higher for customers who do not have other substitutes for credits such as credit cards and personal loans.

On the other hand, group B is less price-elastic. Particularly, this group, if not offering BNPL themselves, will use BNPL as long as the commissions charged are reasonable. However, this group will place significant value on the participation of group A. The reason for this is merchants, if they directly offer BNPL to their customers, will directly bear the risks that the customers will not be able to pay back what they borrowed. Therefore, the sale boost from offering BNPL, which depends on the participation of A, must be sufficiently large to make bearing the risks a worth trade-off for merchants.

From the above assumptions, two demand functions for BNPL are derived:

- $Q^A = D(P^A, U^A, Q^B)$ **(1)**
  In which:
  - P^A is the price of using BNPL charged on group A (customers). Thus, P^A will be a function of joining, using, and maintaining fees of BNPL. Due to BNPL's nature (typically no fixed fees, no interest, soft/even no credit checks), we can assume $P^A = 0$.
  - U^A is the customer utility for using BNPL.
  - Q^B is the number of merchants that accept BNPL.
- $Q^B = D(P^B, Q^A)$ **(2)**
  In which:
  - P^B is the commissions charged by BNPL providers if merchants do not offer BNPL themselves or the risks of customers being unable to pay back debts if merchants offer their own plans of BNPL.
  - Q^A is the volume of transactions performed by group A using BNPL.

From group A's demand function (equation 1), we can deduce that by acting as an instant, interest-free credit method, BNPL boosts its use tremendously by attracting an enormous pool of customers. Particularly, an increase in U^A due to instant borrowing and a zero P^A due to zero interest rate will raise Q^A substantially. With indirect network effects, this substantial increase in Q^A will in turn raise Q^B as well (equation 2). This increase in Q^B will trigger group A, leading to a further increase in Q^A (equation 1) and the process continues, leading to a tremendous growth of BNPL eventually. In short, due to its nature as an instant and free credit method and the help from indirect network effects, BNPL has been able to grow substantially in the last few years.

With this framework, we can also explain the accelerating growth of BNPL in recent years. Particularly, because people are likely to have more utility from instant borrowing and consumption smoothing during times of hardships (COVID-19 or current economic recessions), BNPL has scaled up even more significantly since 2019.

4 The Risks of Using BNPL

While BNPL seems to be free for customers, this credit method in fact poses many unaware risks for customers. Particularly, according to Soni (2023), while instalment loans are typically not new, there are novel risks associated with BNPL because it is normally marketed to customers as an interest free alternative to traditional credit methods like credit cards. This situation is similar to that of two-sided platforms because users of these platforms are also prone to serious issues which they are not even aware of such as privacy invasion and identity theft. This section will first explain why BNPL users are prone to many risks through summarizing typical user characteristics and using patterns. Then, it follows by reviewing the inherent risks studied by various researchers and institutions in multiple countries.

4.1 An analysis of user characteristics & using patterns

4.1.1 Between users and non-users

Aidala, Mangrum, and van der Klaauw (2023) found that BNPL users are more likely to be females, renters, individuals without college degree, and experiencing a monotonical decrease in income. Interestingly, although lower income individuals are less likely to be offered BNPL, they are more likely to use it. In general, BNPL is used by 19% of individuals, but its use is noticeably higher for those with credit scores under 620 (43%). Regarding the relationship between credit application and the use of BNPL, compared to people who did not apply for other types of credit, people who did apply over the last year are also more likely to use BNPL in that year. Among people who failed when applying for credit, 41% reported using BNPL over the past year.

This study also found that BNPL are more financially fragile through measuring the average likelihood that a person can come up with $2000 next month in case of an emergency. This probability is 66% among all respondents and those who have not been offered BNPL but only 52% among BNPL users. Moreover, the results also suggest that BNPL users are less likely to rely on savings in case of financial shocks. Particularly, while 68% of respondents would rely on their savings, only 42% of BNPL users would do the same. In fact, they reported that they would be more likely to rely on borrowing from their acquaintances or other types of credits.

4.1.2 Between financially stable and financially fragile users

In Aidala, Mangrum, and van der Klaauw (2024), BNPL users are separated into 2 groups, which are financially fragile (determined by those having credit score lower than 620, having been declined for a credit application in the last year, or having fallen thirty or more days delinquent on a loan in the past year) and financially stable. After comparing two groups, the results demonstrate that financially fragile users are almost three times as likely to use BNPL as financially stable ones.

Regarding purchase size, 62% of financially fragile users have a mean purchase under $250 while this figure is only 44% for financially stable users. Financially stable users are also notably more likely to have a mean purchase between $1,750 and $2,000.

This study also reported the reason why each group chooses to use BNPL. Particularly, although both groups demonstrate the interest in spreading out payments, there are remarkable differences between the two groups. While financially stable users are more interested in the zero-interest rate offered by BNPL loans, financially fragile users are drawn upon the easy access to extra credit. Regarding credit, financially fragile users more frequently mention poor credit while financially stable ones use BNPL loans merely to avoid using their credit cards or building credits.

4.1.3 Between users with one BNPL account and users with multiple

Boshoff, E., Grafton, D., Grant, A.R. and Watkins, J. (2022) found that in Australia, approximately 40% of BNPL users have more than one BNPL account. Compared to users with a single BNPL account, users with multiple accounts are more likely to come from a lower socioeconomic area, more likely to be receiving government benefits. This group also has a higher credit card utilization rate and uses more personal loans.

4.1.4 User characteristic summarization and the reason why BNPL users are prone to many risks

Overall, BNPL use is associated with financial constraints. Particularly, people are more likely to use BNPL as well as use it more frequently if they are having a struggle with budgets and fail for other credit applications. This suggests BNPL users are probably vulnerable to the risks associated with this payment method because in many cases, they simply do not have another borrowing option.

Moreover, studies discussed above also suggest that BNPL users are more likely to be younger, come from lower socioeconomic areas, and do not have a college degree. This in turn makes BNPL users even more prone to risks as these individuals may yet have sufficient knowledge and experience to be aware of these risks. Additionally, with lower education levels, users can also be easily drawn away from the risks because of the misleading advertising that often comes with BNPL.

In short, because BNPL users are more likely to come from more vulnerable groups (like lower income and education levels), they are prone to many risks that they are not even aware of.

4.2 The risks associated with BNPL

4.2.1 Overspending

Maggio, Katz, and Williams (2023) performed an analysis of BNPL consumer transaction data to study BNPL use and spending. To understand how spending evolves around the first BNPL use, the authors studied changes in consumer spending after the first use of BNPL compared to a previous week at the same point in the user's pay circle. The regression result suggests that BNPL use leads to an increase in spending, not only at the time of BNPL use but also in the weeks following. Surprisingly, they found out not only does BNPL spending increase, but the same situation happens to non-BNPL spending as well and these spending remains elevated over 20 weeks from the first BNPL use. Overall, this demonstrates a net increase in total spending within weeks following first BNPL use, which implies an increase in consumption. Additionally, the authors also found out the BNPL use is associated with reduced bank account balances, suggesting the use of BNPL can lead to a diminished precautionary savings motive. Generally, the results from this study suggest that BNPL will lead to an increase in spending.

The risk of overspending was also stated in CFBP's reports (2022). Particularly, the reports suggest that many BNPL consumers are not simply switching their payment methods but also borrowing and spending more than they otherwise would.

Bian, W., Cong, L.W. and Ji, Y. (2023) also had similar conclusions. Specifically, by using a randomized experiment, the authors found out that e-wallet credit through BNPL tremendously boosts consumer spending.

4.2.2 Loan Stacking & Overborrowing

According to CFPB's report (2022), as BNPL typically only requires 0-25% down payments with no interest rate, there are risks that BNPL users will not be able to pay back the money. These risks are even more inherent because BNPL often requires soft or even no credit check, making it nearly impossible for lenders to access their borrowers' borrowing status and ability to repay their loans. As a result, a BNPL user may end up having multiple BNPL loans at the same time and become unable to pay for them.

The situation of loan stacking and overborrowing can even be worse when BNPL customers use their credit cards to repay loans. According to Guttman-Kenney, B., Firth, C. and Gathergood, J. (2022), using credit cards to repay BNPL debt can incur costs (overdraft fees, accumulating credit card interest) in case the account balances are not sufficient at the time when periodically payment of BNPL debt is charged. This in turn can lead to further loan stacking and the miss on other payments. deHaan, E., Kim, J., Lourie,

B. and Zhu, C. (2022) also found out that new BNPL users saw a significant increase in overdraft charges and credit card interest and fees, suggesting BNPL actually facilitates overborrowing.

4.2.3 Limitations of borrowing in the future:

Although borrowing using BNPL may not affect a person's credit score and ability to borrow in the future, the inability to repay BNPL loans can make users' access to new loans more challenging in the future. Particularly, according to Guttman-Kenney, B., Firth, C. and Gathergood, J. (2022), when noticing a person's late payment, BNPL lenders may block that person from future borrowing, pass unpaid debt to debt collectors, and report missing payments in credit files. This in turn leads to a drop in the credit score of that person, making it more difficult for them to borrow later in life.

4.2.4 Economic Abuse

According to O'Brien, L., Ramsay, I. and Ali, P. (2023), because BNPL typically requires only a soft credit check which merely asks for basic demographic information, some people may find it easy to incur BNPL loans under others' name, which poses danger to multiple groups especially vulnerable ones. An example of this is domestic abuse through forcing the partner to incur BNPL loans under their name.

5 Discussion

With analysis and explanations from section 2 to 4, we have been able to answer the research question about why BNPL has been growing at such a rapid pace in the last few years. In short, the main reason would be its accessible nature enabled by its pricing structure for both customers and merchants. Particularly, from customers' perspective, BNPL acts as an instant, interest-free credit method with soft credit check, making it much easier for customers to use BNPL as a source for extra credits. From merchants' perspective, BNPL is a payment method that has high return on investment through enabling merchants to acquire BNPL at a low cost but can get high returns from tremendous sale increases.

In addition to its accessible nature, the growth of BNPL is also fueled by external socioeconomic factors. Firstly, BNPL is currently exempted from regulations for credit methods due to its different nature. These exemptions enable BNPL to grow at a faster pace as it is regulated by the private market to achieve profit maximization rather than social efficiency. Secondly, COVID-19 and the following global economic recession in recent years also further accelerated the growth of BNPL. This is because in times of hardships, many people struggle financially, making them have higher demand for extra credits in the short run to support even bare necessities such as groceries. This in turn boosts BNPL use as this credit method allows its users to borrow and purchase immediately with small or even no upfront payments. Lastly, as discussed above, BNPL users are typically from lower socioeconomic groups and have lower education levels, making them more vulnerable to credit risks associated with BNPL. Particularly, with BNPL providers' misleading marketing, these users are more likely to view BNPL as a substitute payment method rather than a type of loans. This viewpoint makes BNPL more attractive and even safer compared to other credit methods which partly helps boosting its use.

While these findings and analysis are supported by published frameworks and industry reports, there are still several limitations and challenges. Firstly, most of the studies on the topic are still working papers, meaning their final results may still be different from current ones. Secondly, due to the lack of regulations that probably leads to dishonesty in BNPL providers' reports, data used in empirical studies on BNPL may be incomplete and inappropriate, suggesting that findings from these studies may contain biases or even not align with reality. Finally, because the impact of BNPL has great implications in commercial scenarios, BNPL studies may be prone to the risks of being manipulated to achieve results that are beneficial to private institutions like BNPL providers. All these limitations suggest that when analyzing results from BNPL studies, readers and policymakers should consider other factors such as the current economic situation, the authors of the studies, and how authors collect data and build models used in these studies.

When it comes to the implications of these findings, all findings suggest that there should be more regulations regarding BNPL operations. Particularly, stricter regulations would better protect customers from the associated risks from BNPL and limit BNPL providers' unethical actions such as misreport transaction data and misleading marketing plans. In real life, several countries such as Australia and the UK have already published new regulations to better regulate BNPL. With stricter regulations, BNPL's equilibrium can be brought closer to the socially efficient level.

As BNPL is a topic that only started to receive attention recently, there is much more to study regarding this topic. For instance, future studies can focus on developing a framework that is optimal for analyzing BNPL and its growth, meaning this framework should contain not only the characteristics of a credit method/personal loan that BNPL shares with others but also its signature characteristics that differentiate it from others. Furthermore, with stricter regulations that are now started to be implemented in certain countries, data on BNPL use and transaction will probably become more reliable in the future. This suggests future research can also develop on current ones to reassess the actual impact of BNPL on all stakeholders including both merchants and customers. Finally, further studies can be done on welfare implications of BNPL so that policymakers can have an overview about how strict the regulations should be to balance the trade-off between providing BNPL to more users and better protect its users. Through that, policymakers can make better decisions regarding regulations and welfare maximization.

6 Conclusion

BNPL's tremendous growth in recent years suggests that this payment method is currently widely accepted by society. This public acceptance is not random but due to substantial benefits that BNPL brings to stakeholders. From the customers' side, BNPL enables instant borrowing while from merchants' side, BNPL boosts sales remarkably. These benefits act as incentives to drive them to participate in the market, boosting the use of BNPL.

Despite bringing multiple benefits to all stakeholders, BNPL still contains inherent risks that require further consideration and regulation. Particularly, on the customer side, access to BNPL can lead to overspending and overborrowing which possibly damages their ability to borrow later in life and financial health. On the merchant side, the inability to check their customers' credit status can result in unpaid debt which in turn hurts merchants' revenues. Also, having a great deal of BNPL users represents a higher credit risk for multiple financial institutions and the economy. All these risks suggest that BNPL should be regulated more carefully so that the damage can be under control.

Although there should be more regulations regarding BNPL, these regulations should also consider the trade-off between reducing risks and reducing accessibility of BNPL to maximize social welfare.

References

Aidala, Mangrum, and van der Klaauw (2023). Who Uses 'Buy Now, Pay Later?' Liberty Street Economics. Available at: https://libertystreeteconomics.newyorkfed.org/2023/09/who-uses-buy-now-pay-later/.

Aidala, Mangrum, and van der Klaauw (2024). How and Why Do Consumers Use 'Buy Now, Pay Later'? *Liberty Street Economics*. Available at: https://libertystreeteconomics.newyorkfed.org/2024/02/how-and-why-do-consumers-use-buy-now-pay-later/.

Apple (2023). Apple introduces Apple Pay Later. *Apple Newsroom*. Available at: https://www.apple.com/newsroom/2023/03/apple-introduces-apple-pay-later/.

Berg, T., Burg, V., Keil, J. and Puri, M. (2024). The Economics of 'Buy Now, Pay Later': A Merchant's Perspective. doi:https://doi.org/10.2139/ssrn.4448715.

Bian, W., Cong, L.W. and Ji, Y. (2023). The Rise of E-Wallets and Buy-Now-Pay-Later: Payment Competition, Credit Expansion, and Consumer Behavior. Available at: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4407023.

Boshoff, E., Grafton, D., Grant, A.R. and Watkins, J. (2022). Buy Now Pay Later: Multiple Accounts and the Credit System in Australia. doi:https://doi.org/10.2139/ssrn.4216008.

Consumer Financial Protection Bureau (2022). Buy Now, Pay Later: Market trends and consumer impacts. *Consumer Financial Protection Bureau*. Available at: https://www.consumerfinance.gov/data-research/research-reports/buy-now-pay-later-market-trends-and-consumer-impacts/.

Cornelli, G., Gambacorta, L. and Pancotto, L. (2023). Buy now, pay later: a cross-country analysis. *Bank of International Settlement*. Available at: https://www.bis.org/publ/qtrpdf/r_qt2312e.htm.

deHaan, E., Kim, J., Lourie, B. and Zhu, C. (2022). Buy Now Pay (Pain?) Later. doi:https://doi.org/10.2139/ssrn.4230633.

Di Maggio, M., Williams, E. and Katz, J. (2022). Buy Now, Pay Later Credit: User Characteristics and Effects on Spending Patterns. doi:https://doi.org/10.2139/ssrn.4236470.

Evans, D.S. and Schmalensee, R. (2008). Markets with Two-Sided Platforms. *ISSUES IN COMPETITION LAW AND POLICY (ABA Section of Antitrust Law)*, Vol. 1, Chapter 28, 2008. Available at: https://papers.ssrn.com/sol3/papers.cfmabstract_id=1094820.

Guttman-Kenney, B., Firth, C. and Gathergood, J. (2022). Buy Now, Pay Later (BNPL)...On Your Credit Card. *Journal of Behavioral & Experi mental Finance*. doi:https://doi.org/10.2139/ssrn.4001909.

HM Treasury (2023). Regulation of Buy-Now Pay-Later: consultation on draft legislation. *GOV.UK*. Available at: https://www.gov.uk/govern ment/consultations/regulation-of-buy-now-pay-later-consultation-on-draft-legislation.

Klarna (2022). Buy now pay later – *How it works | Klarna US*. Available at: https://www.klarna.com/us/what-is-klarna/.

Lake, R. (2023). What Is Buy Now, Pay Later? *Investopedia*. Available at: https://www.investopedia.com/buy-now-pay-later-5182291.

Treasury Ministers (2024). Government introduces consumer protections for Buy Now Pay Later | *Treasury Ministers*. ministers.treasury.gov.au. Available at: https://ministers.treasury.gov.au/ministers/stephen-jones-2022/media-releases/government-introduces-consumer-protec tions-buy-now-pay.

O'Brien, L., Ramsay, I. and Ali, P. (2023). Innovation, Disruption and Con sumer Harm in the Buy Now Pay Later Industry: An Empirical Study. *University of New South Wales Law Journal*, Vol. 47, No. 2, 2024 (forthcoming). Available at: https://papers.ssrn.com/sol3/pa pers.cfm?abstract_id=4635958.

Reagan, C. (2021). Retailers bid farewell to layaway, as shoppers embrace buy now, pay later options. *CNBC*. Available at: https://www.cnbc.com/2021/09/25/why-retailers-are-embracing-buy-now-pay-later-financing-services.html.

Rochet, J.-C. and Tirole, J. (2004). Two-Sided Markets: An Overview. doi:https://web.mit.edu/14.271/www/rochet_tirole.pdf.

Soni, S. (2023). Regulating Buy Now, Pay Later: Consumer Financial Protection in the Era of FinTech. *S&P Global Market Intelligence*. doi:https://doi.org/10.2139/ssrn.4359956.

The Committees of Advertising Practice (2020). Guidance on advertising delayed payment services Advertising Guidance (broadcast and non-broadcast). Available at: https://www.asa.org.uk/static/dcb7c4f7-82f8-458b-98a4ef02d298f470/Guidance-on-advertising-delayed-payment-services.pdf.