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Cashless societies

The impact on spending habits in Australia and the Nordic Countries

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Abstract:

The shift towards a cashless society has garnered widespread attention due to the increasing popularity of digital payment methods, FinTech services and a decrease in the use of physical money. This desktop study focuses on analysing the relationship between the decrease in the use of physical money and changes in spending behaviour in the Nordics and Australia as two similar but geographically different societies. These countries offer a compelling analysis of geographically diverse developed economies with robust social welfare systems, low levels of income inequality, transparent political systems, and a high GDP per capita. The research question guiding this study is, *"Does the progress towards a cashless society have an impact on people's spending habits?"*. To explore this research question, the desktop study is conducted through secondary data analysis using reputable sources to examine the connection between the amount of cash in circulation in a society and household economic indicators. The data is collected from various sources, including national banks, government agencies, and financial institutions. Quantitative research methods New were primarily used to collect and partially analyse the data, with the assistance of qualitative methods during the analysis stage to interpret visual graphics and their significance. The results of the desktop study suggest there is not a significant relationship between the amount of cash in circulation and consumers' spending habits. Instead, short-term interest rates were found to have a more substantial impact on the overall cause-effect relation. The findings of the study highlight the need for further research to explore the long-term effects of a cashless society as well as additional consumer behavioural studies. Implications of the shift towards a cashless society are significant for businesses, policymakers, and consumers, making this desktop study particularly relevant and valuable for understanding this complex economic development.

Contents

Figures

Appendices

Foreword

As I approached writing the final words of this thesis, it felt surreal, as though I was on the brink of separating from something that had been a major aspect of my life for an extended period. The countless hours spent researching, analysing, and writing have culminated in this very moment. I have become acutely aware of how much this work has become a part of me. It has been a journey marked by dedication, perseverance, and personal growth, with significant changes unfolding in my life since commencing my Master's studies.

I would like to acknowledge my thesis supervisor, Christa Tigerstedt, PhD, who has been instrumental in bringing this thesis together. Her expertise, professional guidance, and encouragement have been invaluable throughout the entire research process. Her constructive feedback and insightful suggestions have helped me refine my ideas and enhance the quality of my work. Moreover, I would like to thank her for being accommodating and flexible with me during my relocation to the other side of the world while pursuing my studies.

Lastly, I would like to express my gratitude to my husband for his unwavering love, support, and motivation not only during my academic and professional pursuits but also in my daily life. When I embarked on my Master's studies, we were uncertain about our future and whether we would be able to see each other again due to the pandemic complicating our plans. However, with hard work, persistence, and unwavering commitment to each other, we are now happily married, and I am grateful for his presence in my life.

Sydney, Australia, May 2023

Helga Carroll-Himberg

1 Introduction

The digital revolution has drastically changed the way people spend and regulations. Especially buy-now-pay-later (BNPL) services have raised concerns about the consequences for consumers in terms of running into debt (Pritchard, 2021). Consumers are spending without seeing physical money leaving their wallets, which might have an indirect but equally significant effect on consumer economic behaviour as the direct impact of having less money in their wallets (Pritchard, 2021).

This thesis examines how consumer spending patterns have changed as societies have become increasingly cashless. It is essential to see if consumers in a cashless society spend more because changes in consumer spending habits affect the economy. The economy does not only depend on businesses but on consumers as well. Individual consumers' consumption of goods and services is a significant input factor in determining the key components of the economy, such as the GDP, employment rates and other factors. Therefore, consumer spending habits can significantly affect these key components of the economy (Amadeo, 2021).

1.1 Background and motivation for research

FinTech has recently transformed the financial services landscape as new payment tools have entered the market, giving consumers more options for purchasing goods and services. Due to FinTech solutions being accessible to a broader range of people, making spending and banking more convenient, they have also exposed consumers to risks (He et al., 2017). As more and more countries continue to transition from physical money, it encourages people to increasingly use various digital payment methods (Fabris, 2019).

FinTech has exposed consumers to a plethora of new financing choices, but concerns about the consequences on consumers have elicited caused concern amongst regulators (He et al., 2017). Countries regulate the space to varying degrees by implementing, for example, stricter conditions for consumers using FinTech services (Restoy, 2020). Yet consumer protection agencies in various countries are increasingly worried about how new technologies enable consumers to accumulate dept, conduct regulatory arbitrage, and harvest data in a consumer credit market. For example, in 2021, the US Consumer Financial Protection Bureau (CFPB)

issued a series of orders to FinTech companies offering BNPL services, allowing consumers to get quick loans without involving relatively little information from the consumer (Consumer Financial Protection Bureau, 2021).

With a fast-evolving space, my research aims to investigate how adopting new payment forms has impacted consumer spending habits as countries increasingly become cashless. Rather than investigating on a global or a single-country level, I've narrowed my scope to the Australian and Nordic markets. This way, the research is not too expansive and allows me to compare two regions. Understanding the regional aspects is key to understanding their respective consumer markets.

As someone who has called both Finland and Australia home, I find myself in a unique position to gain insights into the markets of these countries. Having lived in Finland for 29 years, I am deeply interested in its history, current affairs, and our role across Nordic countries. At the same time, my relocation to Australia in 2021 sparked an equal curiosity about the country.

After living in both Australia and Finland, I have observed both similarities and differences between these countries. I have found that their economies and fiscal cultures are quite similar, which is noticeable when it comes to consumer behaviour. Moreover, Nordic countries and Australia share comparable social customs, particularly regarding family formation and child-rearing practices. Similarly, household spending priorities and attitudes towards debt exhibit resemblances between the two countries.

Australia and the Nordics also provide an excellent comparison of geographically distinct developed economies with high levels of GDP per capita, strong social welfare systems, relatively low levels of income inequality, stable and transparent political systems with a long history of democratic rule and a high degree of economic openness, with a strong emphasis on international trade and investment.

As I considered my personal interests as to why I picked the markets, I discovered a few additional parallels between them, making me even more convinced that the focus areas might be compared effectively. For instance, population-wise, Australia possesses a very comparable population to the Nordic region. According to the Australian Bureau of Statistics (2022), on the 30th of June 2022, the resident population was roughly 25,700,000. The population size of

the Nordics in 2022 was roughly 27,800,000 across 5 countries (Finland, Sweden, Denmark, Norway, and Iceland) and 3 independent territories (the Faroe Islands, Greenland and Åland) (PxWeb, 2023).

If there was a significant difference in population size between Australia and the Nordics, the data obtained from the research might not be as comparable. However, it is essential to note that this research does not include Iceland. Consequently, the population count of the Nordic region is, therefore, roughly 370,000 people fewer, making the Nordic population size for the study around 27,400,000 people (PxWeb, 2023). Finding data for Iceland was limited compared to other Nordic countries. Specifically, the data either failed to encompass the targeted time frame or was expressed in an incompatible format. This exclusion will have little impact on the robustness of the comparison as Iceland has an extremely small population and economy (less than 1.5% of the Nordic region).

The citizens in the selected market areas also have access to many services provided by FinTech companies. I suspect these services enable people to spend more without considering the consequences and possibly increase personal debt (excluding business and residential loans). This research will help understand consumer spending patterns. It will also contribute to a real-world problem by informing policymakers and academics about the implications of alternative payment methods. Also, it will provide an analysis of consumer spending habits before and after the rise in cashless alternatives.

It is also worth noting that the average wages and the GDP per capita among the market areas would be important factors to consider when analysing the collected data. Although the cultures and populations may seem comparable, there are distinctive disparities in the standard of living between Australia and Nordic countries such as Finland. Additionally, it is essential to consider the variations between Nordic countries themselves. However, when aggregated and weighted on a population basis Australia and the Nordic countries are very similar.

Similar comparison research involving only Australia and the Nordic markets is limited; there is earlier research on the subject, especially around cashless societies, from various angles and perspectives. For instance, earlier research by Ferré et al. (2019) made a cross-country comparison of Key Drivers that influence countries to become cashless. The study had a wider scope in terms of the number of countries involved in the research, and it focused on the various

factors that drive countries to go cashless. In 2016, Rogoff looked at why and how cash should be phased out in societies (Rogoff, 2016), while another study by Bátiz-Lazo et al. (2016) focused on a global point of view on cashless societies.

1.2 Aim and research questions

This thesis aims to understand how people's spending habits are impacted in Australia, and the Nordic countries as societies become increasingly cashless. Therefore, my main research question to be answered is: *"Does the progress towards a cashless society have an impact on people's spending habits?"*. In order to answer the main question, I will look at the following sub-questions:

1. *How has the amount of cash (banknotes, excluding coins) in circulation changed during 2010-2019? and;*
2. *If less physical money is in circulation, are people spending more, gaining more debt and saving less?*

To answer these questions, my study will focus on the rate of cashlessness in the Australian and Nordic markets during 2010-2019 to see how people are affected by having less physical money available and if this correlates with gaining more debt as the money is in a digital form rather than tangible. Since physical currency usage changes slowly, looking at a 9-year time span is required to see if there are any significant changes in consumer spending behaviours. Additionally, I will be excluding 2020 and 2021 as I expect the use of physical currency and personal debt to have been affected by the COVID-19 pandemic.

The findings should help academics understand what factors encourage people to spend more money if they don't physically see their money leaving their wallets, which could lead to policies being created that discourage overspending. Economists can use these results when making predictions about future trends in digital payments and financial technologies, which will be helpful for policymakers to develop plans to mitigate any issues that might occur due to consumers changing the way they spend money.

To understand the changes and trends in consumer behaviour, household, and society, I have focused on the following three additional sub-questions:

3. *Has household debt increased/decreased between 2010 to 2019 in Australia and the Nordics? and;*

4. *Has household savings increased/decreased between 2010 to 2019 in Australia and the Nordics? and;*

5. *Has household spending increased/decreased between 2010-2019 in Australia and the Nordics?*

By answering these additional questions, I look to discover if there is a correlation between the amount of cash in circulation and household income, savings, debt, and spending.

1.3 Demarcation

Focusing the research on examining data between 2010 and 2019 will reveal how the trends have changed over a more extended time period. Due to the financial crisis of 2007-2008, I will look at data after 2010 as it is apparent that the crisis has had a considerable impact on consumer finances even a year after the worst of it. Also, I will look at the data only until 2019 since the pandemic in 2020 has made the spending habits of various countries change dramatically (e.g., Japan has seen a massive increase in the use of cashless payments while it before relied heavily on cash (Abdullah et al., 2021)).

I will focus only on Australia and Nordic countries to keep the research concise enough and not include too many countries in the comparison. Iceland is excluded from the pool of Nordic countries due to data availability issues. For example, finding information on the amount of cash (ISK) in circulation proved challenging. Since Iceland has a small economy compared to the other Nordic countries, excluding it from the analysis is not expected to misrepresent the Nordic region.

In addition to leaving Iceland out of the scope, I have not explored data for the various Fintech-related services such as buy-now-pay-later. This is mainly due to not finding data for each researched country but also the vast differences in countries' regulations. For instance, Australia has only started working on a regulatory framework for BNPL arrangements in recent years, and there have not been credit checks for consumers using BNPL services. The lack of regulations has allowed BNPL providers not to hold an Australian Credit License. Therefore,

their products have not exercised responsible lending standards or requirements of the Credit Act (The Treasury, 2022). In the Nordic countries, for example, Klarna, on the other hand, must do a credit check whenever their consumer uses their services. This is done by the consumer providing their social security number linked to their credit history.

1.4 Structure of the thesis

This thesis comprises six main chapters: an introduction, concepts and previous research, methodology, analysis and results, discussion, and conclusions. The *introduction* provides a background and purpose of the study, with an overview of the research problem, the research questions, and the scope. The *concepts and previous research* summarise the existing research on the topic and identifies gaps in the knowledge the study aims to fill.

The *methodology* chapter describes the research approach and the procedures used in the study. The *analysis and results* chapter presents a detailed breakdown of the data collection and its results. In the *discussion* chapter, I have interpreted the results and discussed implications in the context of the existing literature. Finally, the *conclusion* summarises the main findings and their significance, as well as the critical and ethical discussion of the research. It also includes a small section on directions for future research.

2 Concepts and previous research

This chapter provides a comprehensive overview of research related to the main research question. Moreover, it provides an understanding of the concepts most relevant to the thesis, including various payment methods such as debit and credit payments. The chapter also examines the emerging field of FinTech services, which have become increasingly popular in recent years. In addition, it provides a comparative analysis of the Australian and Nordic markets to shed light on the specific contexts within which the research will be conducted.

2.1 Concepts

This section provides an in-depth explanation of key concepts related to payment methods pertinent to this thesis. Specifically, it offers an overview of debit and credit and an exploration of FinTech and the range of services relevant to this thesis.

2.1.1 Debit and credit

Debit and credit are two fundamental concepts in accounting and finance that are commonly used in personal and business transactions. Debit can have two meanings; debit in accounting or a debit payment card to make purchases in place of cash. The former relates to a debit entry that represents a transfer value to another account, usually an asset account, to reduce the total amount of that account (Warren et al., 2017). The latter is a physical card issued by a bank or other financial institution that may be used like cash to pay for goods or services.

A credit entry on the asset side of a company's balance sheet represents the cash that has been received and is available to pay liabilities. This type of credit usually arises from the sale of goods or services on credit terms, whereby the buyer pays the seller at some point in the future (Warren et al., 2017). On the other hand, credit in consumer borrowing is when a lender allows a borrower to delay repaying a loan or debt until a later date. This type of credit is also known as an instalment loan. Credit and borrowing can also refer to other types of transactions, such as the hiring (or leasing) of goods and services (O'Sullivan & Sheffrin, 2013).

To be able to use a debit card, money must be in the cardholder's bank account at the time of the purchase. Some cards may limit the amount of cash that can be withdrawn daily (Caskey & Sellon, 1994), and some debit cards have the possibility to have stored value, meaning that it is a prepaid card (Worthington, 1995). Examples of such debit card issuers would include FinTech companies such as Revolut, Wise and N26.

When consumers use credit to pay for their transactions, they generate debt. Most credit cards have a limit, the maximum amount a lender will allow the borrower to borrow at any time. When borrowers use their credit cards to make a purchase, they are accessing this debt (O'Sullivan & Sheffrin, 2013).

Credit or loans can be repaid early if the consumer chooses to repay the credit before the end of the term, thus allowing the consumer to repay without interest. Paying with a credit card can be a more expensive and risky option for a consumer if they fail to pay back on time or if the bank has specific repayment with interest rules (O'Sullivan & Sheffrin, 2013).

2.1.2 FinTech

The term, "FinTech" is a portmanteau word that is made up of two words: "financial technology." FinTech includes various products, technologies and business models that are changing the financial services industry. It is said that it is revolutionising how consumers use and access their financial services. FinTech refers to everything from cashless payments, crowdfunding platforms, virtual currencies, and even robotic advisors (Nicoletti, 2017).

In the past two years, FinTech has experienced an extraordinary surge in growth and is projected to shape the financial sector. As most FinTech credit providers are not under regulatory control, there is a scarcity of data available for most countries. Due to the lack of regulations in many countries, these services are exempt from regular reporting requirements, making it complicated to measure activities (Brandao et al., 2022)
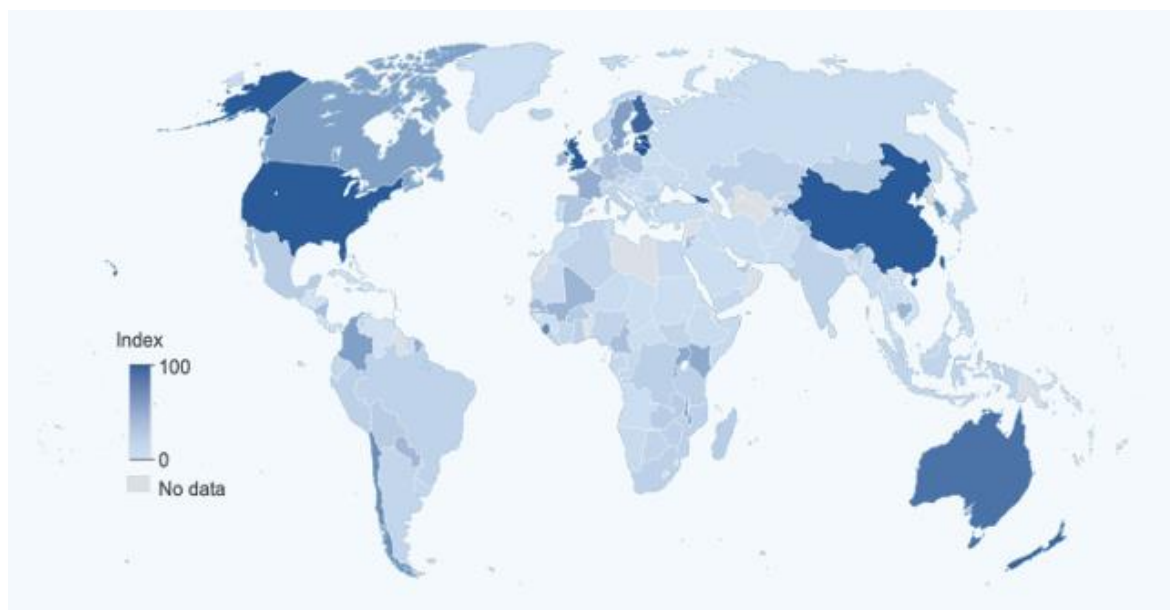
Figure 1. Usage of Fintech Credit. (Brandao et al., 2022)
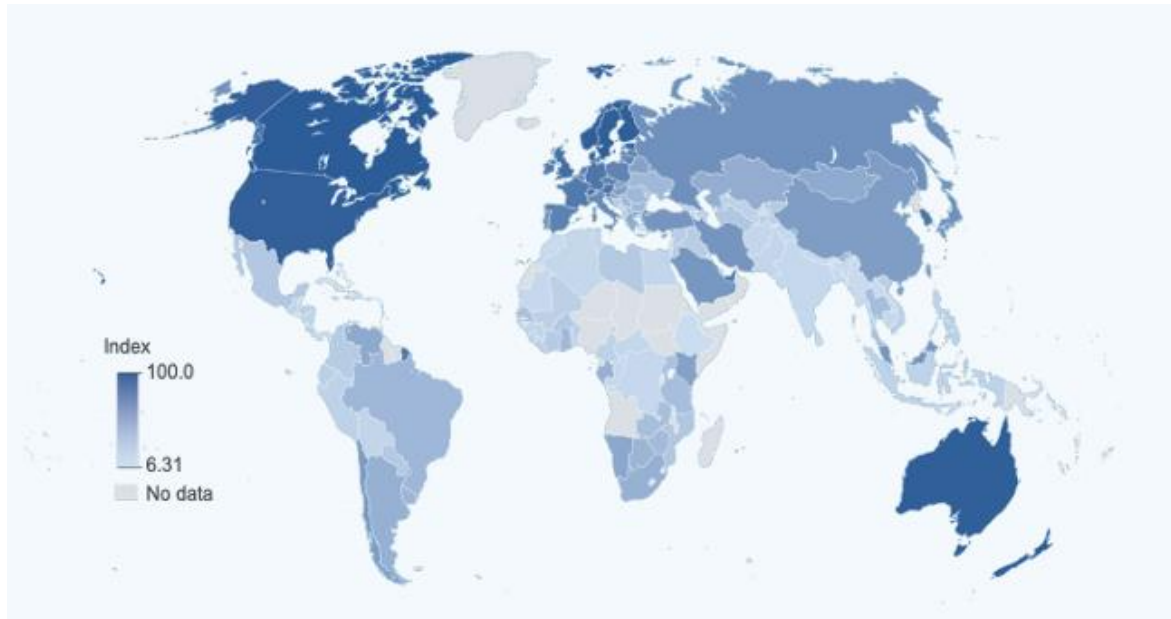
Figure 2. Index of usage of digital financial services across countries retrieved from World Bank's report sourced by the World Bank staff. (Brandao & al. 2022)

Digital financial services are used worldwide, as Figure 2 demonstrates. Figure 3 shows, more specifically, the changes in the number of active BNPL accounts between the financial years 2015-2016 to 2018-2019. The trend has been one of consistent yet significant increase growth.
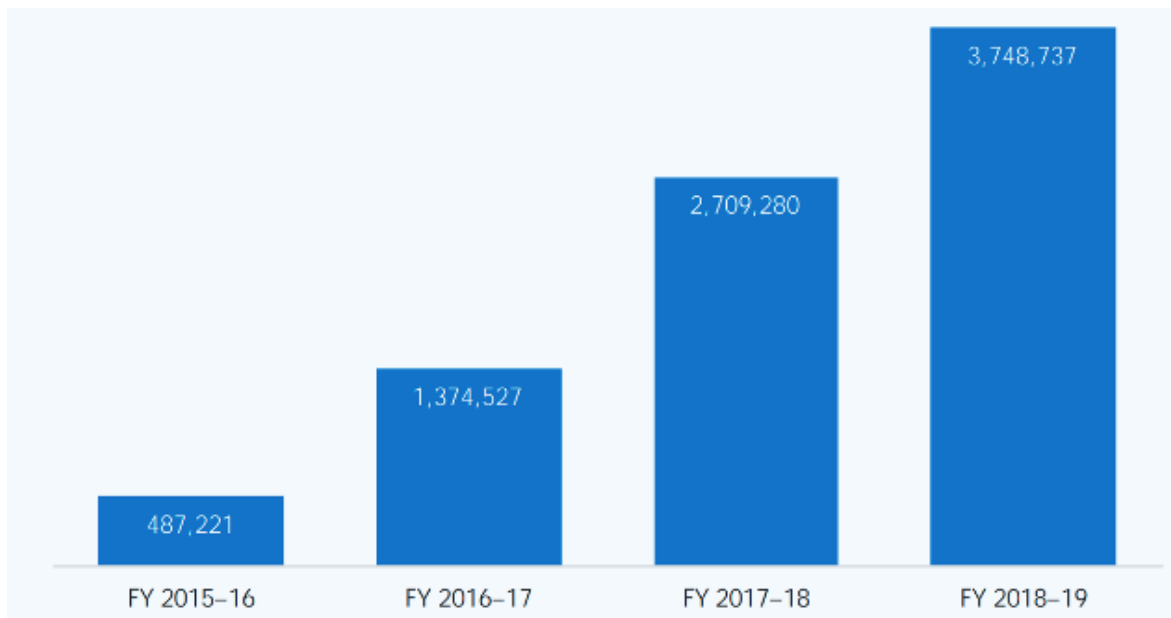
Figure 3. Number of active BNPL accounts between the financial year 2015-2016 to 2018-2019. (Australian Securities and Investments Commission ASIC, 2020)

FinTech has challenged traditional banks and financial industries, changing how consumers pay and borrow money. Consumers who do not have access to conventional banking services can benefit from the global reach of FinTech (Schueffel, 2016). Services by various FinTech

companies have been under the magnifying glass of regulators due to their significant impact on consumers' spending habits and accumulation of consumer debt (Nicoletti, 2017), as well as posing a risk to consumer protection (Gerrans et al., 2022).

Australia has raised concerns about the growth of BNPL as many consumers are struggling to pay, incurring missed payment fees, causing them to meet other financial commitments (Australian Securities and Investments Commission ASIC, 2020.) Fees caused by missing BNPL payments can lead to hefty fees, making them similar to payday loans which are known for their exorbitant costs, although not as high as credit card debts. Consumers with financial difficulties are less likely to gain more credit card debts as the space is more regulated (Papich, 2022), whereas a significant worry for experts is that FinTech services are yet to be regulated in many parts of the world (Brandao et al., 2022).

FinTech comprises several service providers, with multiple financial service types available for consumers. Looking closer at the 'buy-now-pay-later' services, 'payday loans' services, cryptocurrencies, e-wallets, and neo-banks gives a more detailed view of the digital financial products and services available in the market and the risks associated with them.

Buy-now-pay-later (BNPL)

Companies such as Klarna, Afterpay and Zip offer customers 'buy-now-pay-later' or BNPL services. The idea is that a consumer can buy an item immediately and pay the full price without worrying about paying it off until a later point in the future. Compared to other regulatory approaches, BNPL services are sparsely regulated (Johnson et al., 2021). This process can be done with multiple payments over time or one lump sum at the end (Consumer Financial Protection Bureau, 2021). BNPL services can be considered debt traps due to the high costs associated with borrowing this type of money, which can lead people into a cycle of debt (Johnson et al., 2021).

Payday loans

A payday loan is a small, short-term unsecured loan typically given by a non-banking financial institution. The interest rates on these loans are often several hundred per cent or more per annum. They also carry high fees and are designed to cover a person's expenses until their next pay check or benefits check arrives (Bhutta et al., 2015).

Payday lenders use customers' personal information against them with predatory lending practices such as an Automated Clearing House (electronic transfer from one account to another), debiting their bank account and charging excessive overdraft fees when they cannot repay the loan immediately. This risk creates long-term debt, and the interest rates are very high, often coupled with additional fees for borrowing, making it difficult to pay off the debt (Bhutta et al., 2015).

Cryptocurrencies

Cryptocurrency is a digital or virtual currency that uses cryptography for security. Any central authority does not issue it, often traded on decentralized exchanges, and can be used to purchase goods and services. Cryptocurrencies are not considered a currency in the traditional sense because they're not controlled or maintained by a central authority (Hileman & Rauchs, 2017).

Bitcoin, the first and most well-known cryptocurrency, was created in 2008 and began to be used in 2009 (Hileman & Rauchs, 2017) (Pernice & Scott, 2021). Only within 6 years of its release, more than 550 other cryptocurrencies were developed, however, only a small portion were successful (Farell, 2015).

The dynamic and unpredictable nature of cryptocurrencies has raised an abundance of questions and concerns in the financial world. According to Farell (2015), the main factors impacting the development and integration of cryptocurrencies into the broader financial scheme are government regulations and the public's perception. As the currencies are not decentralised, governments have been looking to impose regulations to curb any possible illegal activities and protect consumers. The other concern around cryptocurrencies is their volatility which can result in huge losses if the currency is suddenly devalued (Pernice & Scott, 2021) (Farell, 2015).

E-wallets

An e-wallet or also known as a digital wallet is a digital application that allows users to store, send and receive money. It is a digital system that stores a person's payment information and is purely electronic. Purchases can be paid with a laptop, tablet or smartphone (Kolandaisamy & Subaramaniam, 2020). E-wallets allow for cashless transactions done through the use of a unique QR code that the seller generates. The buyer can scan the QR code to make a payment (Kolandaisamy & Subaramaniam, 2020).

Yang et al. (2021) performed a study examining consumers' intention and adaption of e-wallets and how it impacts their spending habits. They indicate that, in recent years, electric payments have improved considerably because of the increasing number of sellers with extensive delivery networks. Consumers are also keener on using e-wallets as it makes shopping faster and more convenient; however, the study suggests the convenience of use may be prone to reckless spending. According to the study, e-wallets may be a security risk and put users' information at risk because cyber thieves can access and misuse their devices.

Neobanks

A neobank is a FinTech that operates primarily through digital channels, such as an app or website. Neobanks are not banks in the traditional sense. Instead, their financial services rely on relationships with chartered banks. They offer similar services to traditional banks, such as savings and checking accounts, debit cards, and loans; however, they tend to have lower fees and interest rates than conventional banks. Neobanks make most of their income through transaction fees from consumer debit card payments (Bradford, 2020).

2.2 Cashless society

A cashless society is referred to as a society in which cash transactions have been replaced by electronic means of payment (Tee & Ong, 2016). For example, currencies are no longer linked to any real precious metal or other commodities as they were in the past. Many parts of the world increasingly use digital money in commerce, investment, and everyday life transactions (Rivera, 2019).

Historically, bankers faced challenges with the high costs of processing paper-based payments, including fraud, and they looked for ways to cut these costs. Eliminating cash in favour of electronic payments causes political and public concern, but cashless transactions have many advantages beyond reduced business expenses. One of the key benefits of domestic and international trade is the ease of processing large and long-distance transactions (Bátiz-Lazo et al., 2011). The fast evolution of information technology and innovation in mobile devices has rapidly developed cashless payments. However, it is generally accepted that a totally cashless society will be adopted in the near future (Tee et al., 2016).

2.2.1 Potential benefits and challenges of cashless societies

A fair bit of research has been done on cashless societies, especially around the advantages and disadvantages of countries moving more and more towards digital payments. There are several reasons for this. To understand why we haven't already embraced a cashless society or ever will, we must consider the benefits and challenges of a cashless world.

The table (Figure 4) below summarises the pros and cons of a cashless society (Fabris, 2019). It is not an exhaustive list; however, it summarises the main points of what should be considered as our societies move to become more and more cashless.

Table 1: Costs and benfits of cashless society

Benefits of cashless society	Costs of cashless society
Decline in crime and money laundering	Elderly and uneducated people could be on the side of losers
Convenient means of payment	Low level of financial and IT literacy can prevent some part of population from using cashless means of payment
Reduced shadow economy	Cybercrime
Fast development of IT technologies, smart phones and electronic applications support e-payments	Threats to privacy
Personal safety	Tradition
Lower transaction costs	IT risk

Figure 4. Table summarising costs and benefits of a cashless society. (Fabris, 2019)

With large amounts of physical cash circulation in societies, money laundering and other crimes involving a tremendous amount of cash have been an issue for countries to tackle. Eliminating physical currency can help reduce crime rates since it is easier to track electronic transfers (Fabris, 2019).

Digital payments provide a convenient way for consumers to pay for their purchases; however, paying with a card or app requires an internet connection, makes them more vulnerable to cybercrimes and may threaten their privacy. Moreover, digital payments are impossible in a power outage or power shortage (e.g. during natural disasters), whereas cash can be used in such a situation (Fabris, 2019).

While cashless payment options may be a convenient means of payment for many, they can present difficulties for a significant portion of the population. For example, the elderly and technologically challenged may face barriers to accessing cashless payment methods. When it comes to personal safety, carrying an abundance of cash in public places or storing it at home can be a hazard, and consumers are at risk of being robbed (Fabris, 2019). Financially literate consumers are more likely to trust banks, insurance companies and pension funds. Consequently, some customers prefer to use cash instead of storing their money in banks (van der Cruijsen, 2021).

A study by the Reserve Bank of Australia (Delaney et al., 2020) shows that consumers with lower household incomes were more prone to using large sums of cash than high-income earners. Their study also suggests that consumers without internet access are more likely to use cash. This is said to be due to difficulty in utilising digital payments or lack of internet access. The same study mentions that the reason for using cash is due to "*...budgeting or financial management purposes, and a preference for cash for smaller transactions*" (Delaney et al., 2020).

2.2.2 Previous research on spending habits

With the adoption of digital payments, it is safe to say that our spending habits have changed somewhat drastically only in the last 10 to 20 years. In the 1960s and 1970s, electronic fund transfers were said to replace cheques and cash as primary payment methods in the United States (Bátiz-Lazo et al., 2016). Even though electronic payments have largely replaced cheques and cash transactions in some countries, no society is entirely cashless (Tee & Ong, 2016).

People's spending habits have evolved as more options have become available. Throughout the majority of human history, coins and paper currency have been the preferred method for people to make purchases. Only in the second half of the 20th century new methods for retail payments have been systematically introduced (Bátiz-Lazo et al., 2016).

According to Yang et al. (2021), online payments are considered convenient and straightforward to use, which has helped them grow in popularity. For example, the study found that people intend to use an e-wallet as a means of payment if it's perceived as useful, easy to

use, fits their lifestyle, and can trust the provider. It's also worth noting that their study corroborates previous research indicating that consumer age and gender influence e-payment adoption.

Another study by Aji & Adawiyah, 2021, looked at e-wallets possibly encouraging excessive spending behaviour amongst young adult consumers in particular. Generating an illusion of liquidity, customers paying with e-wallets may perceive prices as lower than they are in reality, triggering them to ignore the total amount spent. Paying for goods may seem less 'painful' when the payment is made digitally, as it is a less transparent mode of payment (Aji & Adawiyah, 2021).

Risks of data breaches and loss of privacy are mentioned in a number of studies as the challenges or downsides of a cashless society (Fabris, 2019) (Ferré et al., 2019). Besides risks, customers are also looking into the benefits. A study by Nicoletti (2017) suggests that 44% of consumers want financial institutions or insurers to use their data to provide them with relevant advice to help with their spending habits. Regulators have become increasingly important in monitoring consumer spending as FinTech services have developed and consumer expenditures have increased (Johnson et al., 2021).

2.2.3 Factors that lead to consumer debt

To effectively answer the main research question, "*Does the progress towards a cashless society have an impact on people's spending habits?"* it's vital to look at the factors impacting consumers' spending more. After examining several studies, it seems that a few factors can impact our spending habits: the form of payment used (cash or cards) and the amount of money available.

According to the 2005 Australian Parliamentary inquiry into consenting adults' deficits and household debt, one of the main reasons for growing household debt levels is caused by freeing up the financial markets and making credit more available for consumers. The report includes other factors such as accessibility to a broader range of products from lenders (e.g., FinTech companies offering credits and interest-only loans), growing acceptance of the concept of debt used for investment as 'good debt', and a sustained period of economic growth (Economics References Committee, 2005).

FinTech services and products have altered how consumers spend and the future of how societies do business. The simplicity and accessibility have been heavily criticised since it allows customers to acquire items before they have the required capital. This does not differ greatly from consumers using credit cards; however, conventional banks that issue credit cards follow strict government regulations in developed nations. FinTech start-ups, on the other hand, are not beholden to the same rules (Hodson et al., 2014). Consumers, therefore, have access to more accessible debt to fuel purchases. In the short term, it may help economic growth, but in the long term, this could have a detrimental effect on consumers unable to meet these debt obligations (Lombardi et al., 2017).

Some experts believe that when consumers use cash to make purchases, they are more mindful of spending because they see and feel the money leaving their hands. This can quickly lead us to lose sight of our spending when we're using credit or debit cards. (Yang et al., 2021). Another study suggests that people using cashless payments tended to spend more money on impulse purchases than those who used cash (Aji et al., 2021).

2.3 Description of the Australian and Nordic markets

As the chosen market areas play an essential role in the thesis's overall data collection and findings, detailed elaboration of the market areas is necessary.

Despite being geographically distant, Australia and the Nordic countries are culturally affiliated with one another, owing to their shared heritage as Western societies (Kurth, 2003). Australia, officially the Commonwealth of Australia, is divided into 6 states and 10 territories, of which two are located on the mainland (Australian Bureau of Statistics, 2022). Australia is a highly developed country with a high-income economy, and in 2019, it had the 8th highest Human Development Index (HDI) in the world (United Nations Development Programme, 2020).

The Nordics consist of five sovereign states plus the three autonomous territories connected to these states. All the Nordic countries are highly developed, and in 2019, they were all ranked within the top 11 of the highest Human Development Index (HDI) countries in the world;

Norway 1st, Iceland 4th, Sweden 7th, Denmark 10th and Finland 11th (United Nations Development Programme, 2020).

The Gross Domestic Product (GDP) growth in developed countries is driven mainly by household consumption (Kharroubi et al., 2017). This increase in consumption can be fuelled by productivity growth or increased debt levels (Drehmann & Juselius, 2012). The average household consumption is largely similar in both the Australian and Nordic markets; in 2019, Australian household spending was 52.9% of GDP, Denmark 46.9%, Finland 52.6%, Iceland 49.9%, Norway 44.3%, Sweden 44.9% (OECD, 2022a).

2.3.1 European Debt Crisis

The European debt crisis was a financial crisis that began in the late 2000s and affected several countries in the European Union (EU). The crisis was caused by a combination of factors, including high levels of government debt, weak economic growth, and a lack of competitiveness in some EU countries (Beker, 2014).

The crisis began in Greece, where the government was unable to repay its debts, and then spread to other countries such as Portugal, Spain, Italy, and Ireland. The crisis led to significant social and economic consequences, including high levels of unemployment, austerity measures, and political instability. The European Central Bank and the International Monetary Fund provided financial assistance to affected countries, but the crisis had a long-lasting impact on the EU's economy and political landscape (Beker, 2014).

2.3.2 China resources boom

The China resources boom refers to the period of rapid economic growth and development in China that began in the late 1990s and continued into the 2010s. During this time, China experienced significant increases in industrial production, infrastructure development, and foreign investment, which contributed to its emergence as a major global economic power (Garnaut, 2012).

Australia was heavily involved in the China resources boom as a major supplier of natural resources to China. China's rapid industrialisation and urbanisation led to a significant increase in demand for raw materials such as iron ore, coal, and natural gas, which are abundant in

Australia. As a result, Australia became one of China's largest trading partners, with China importing large quantities of Australian resources to fuel its economic growth. This led to a significant increase in Australia's exports to China, which had a positive impact on the Australian economy. The China resources boom also stimulated investment in the Australian mining and resource sectors, which further boosted economic growth in Australia. However, the reliance on resource exports also made the Australian economy vulnerable to fluctuations in global commodity prices, as seen in the aftermath of the China resources boom (Garnaut, 2012).

2.3.3 Increased expenditure

As previously discussed, debt can boost economic output in the short term but presents a risk in the long term. Specifically, it has been found that debt overhang impairs household consumption when negative shocks hit. Debt overhang occurs when existing debt is so great that new debt cannot be accessed, even when that new borrowing is actually a good investment that would more than pay for itself. Examples of this type of debt in personal finance are being unable to access a car loan to facilitate work or cover unexpected expenses (Alter et al., 2018).

Increases in national household debt heighten the probability of future banking crises, which significantly disrupt financial markets. This is especially true of unsecured debt and smaller institutions that issue it. Crash risk may be systematically neglected due to investors' overoptimistic expectations associated with household debt booms (Alter et al., 2018).

However, several institutional factors such as flexible exchange rates, higher financial development and financial inclusion are found to mitigate debt. Financial inclusion is when individuals and businesses have access to useful and affordable financial products and services that meet their needs. Examples of these are transactions, payments, savings, credit, and insurance. But these products must be delivered in a responsible and sustainable way. There is no current data on if BNPL and other cashless services contribute to this financial inclusion. Due to little regulation, they are not offered in a responsible and sustainable way (Alter et al., 2018).

3 Methodology

The methodology chapter outlines the research methods and techniques used to conduct this study. This chapter is the backbone of the thesis, as it provides a comprehensive explanation of how the research was conducted, including the research design, data collection, analysis, and interpretation. This section discusses the steps taken to address the research questions as well as the rationale behind the chosen methods. Additionally, it explains the limitations of the methodology and potential sources of bias, ensuring that the study's findings are credible and reliable. Overall, this section provides a clear understanding of the research process, making it easier to evaluate the study's validity and generalisability.

3.1 Research approach

The term 'cashless' describes economies that do not rely on physical currency (notes and coins) for transactions. Instead, digital forms of payment such as debit and credit cards are favoured, but also services provided by FinTech companies, for instance, payday loans and BNPL services, have become increasingly popular (Pritchard, 2021).

The purpose of this research is to answer the question: "*Does the progress towards a cashless society have an impact on people's spending habits?*". This implies that I must establish whether the amount of cash circulating in a society affects people's borrowing, spending, and saving habits. To arrive at a conclusion, I needed to understand the effects of this transition by examining the borrowing, spending, and saving habits in the societies I chose to research (Australia and Nordics, excluding Iceland).

Qualitative and quantitative data have some fundamental differences when data is analysed. Qualitative data is descriptive and non-numerical in nature. It is typically used to describe characteristics or qualities of a phenomenon, such as someone's opinion or emotion. It is often collected through methods such as interviews, observations, or focus groups. Quantitative data is numerical and can be used to measure a variable. It is often collected through surveys, experiments, or observations, where data is recorded in numerical form. Quantitative data can be used to calculate averages, percentages, and other statistical measures (Bryman & Bell, 2011).

These methods uncover different things, but it is important not to create too big of a gap between these two methods. They can be used together to provide a more comprehensive understanding of the research question. The qualitative method focuses on words to interpret meaning, while the quantitative method looks at numbers and stats to find relationships (Bryman & Bell, 2011).

The data was collected and partially analysed using the quantitative research method, and in the analysis stage, I used qualitative methods to understand the visual graphics and their meaning. Using the mixed method was especially important as the regions differ in economic development, spending, and consumption habits. Secondary data sources were used to analyse the effects of a cashless society on consumer behaviour.

Since I had to rely on having as much data as possible to make an informed judgement of the situation, I've relied on secondary quantitative data collected from first-hand sources. To understand what the numbers mean, I analysed them by using the qualitative method.

The quantitative aspects of this research included debt levels, household spending and saving, and short-term interest rates. As the Australian population is slightly larger, I calculated the population-weighted average, an average (mean) in which each value in the data set has been weighted according to the size of the population it represents. This average is used to represent a population better when looking at aggregate data, as it considers the size of each population.

The research uses a mixed-method approach since it incorporates both approaches. Since there are weaknesses associated with the method types, this strategy allows combining the strengths of each method to give a more holistic understanding and more reliable research results (Bryman & Bell, 2011). Bryman & Bell also mention that a mixed-method approach should be used in mixing the methods rather than using them in tandem, and they also should be mutually illuminating.

Figure 5 summarise the process of quantitative data analysis in my research involved the following steps:

1) Research question

Determining what data was needed to be collected in order to answer the research question. In addition, setting the subquestions to helped to reach the answer to the main research question.

2) Collecting data from official statistic departments

Collected data was downloaded in a CSV or Excel file which was then added to a general data collection Excel file. This helped to keep track of the sources used including the date the data was downloaded as a well as the URL.

3) Calculating averages of the gathered data

Data from each Nordic country was initially collected individually, but later combined by calculating a population-weighted average. The significant population size differences between some Nordic countries, such as Finland and Sweden, were considered during this process.

4) Data visualisation

Graphs provide a visual representation of trends and fluctuations, allowing to easier interpret changes. In addition to the relative numbers, I calculated the percentage changes compared to previous years to gain a wider understanding of the data.

5) Qualitative data analysis

By looking at the numbers, qualitative method was used to determine the reasons behind the fluctuations along the years. Employing this method provided a way to examine why the Nordics and Australia have diverged or evolved in a particular way.

Figure 5. The quantitative data anlaysis process in this thesis

3.2 Data collection

Social scientists, market intelligence firms, professional associations and others collect data; however, accessing it may be expensive. Since analysing quantitative data alone is time-consuming, I looked for secondary data that was free, accessible, of high quality and trustworthy. The quantitative data used in this research has been collected from official statistics.

I carefully considered the sources since countries collect data differently. To illustrate, some countries/organisations display the data for cash in circulation as percentages, while others show it as a currency amount. I made sure to take such variables into account to be able to see how the data compared side by side. When data varies significantly between countries, it is challenging to make precise comparisons and draw conclusions.

Finding data on topics such as household spending, saving, and debt levels in Australia was significantly easier compared to the Nordics. The databases are simpler and require less clicking across various websites. Some examples of these databanks belong to the Australian Bureau of Statistics and the Reserve Bank of Australia (RBA). Despite the tremendous potential of these databanks, I was unable to utilise these sources as I did not manage to find comparable data for the Nordics. Therefore, locating comparable data in the Nordics was indeed one of the biggest hurdles in the process of collecting data. A couple of times, the data I found in the Nordics consisted of pre-made graphs instead of raw data. Another roadblock I encountered was that some datasets did not encompass the time period of my research. This is why I ended up collecting most of the data from the same sources.

The OECD has gathered a lot of the quantitative data I collected. OECD is a reliable source because all their data has been compiled by each of the OECD countries that need to follow the 2008 System of National Accounts (SNA 2008) guidelines. SNA is the internationally agreed standard set of recommendations on how data is compiled, making data consistent regardless of the country but also fitting the needs of countries in various stages of their economic development (United Nations Statistics Division, 2022).

Figure 6 is an example of a dataset I gathered from the OECD website (OECD, 2022c). This specific dataset contains numbers that helped me understand the development of household disposable income in the Nordics and Australia from 2010 to 2019, shown in US dollars per capita.
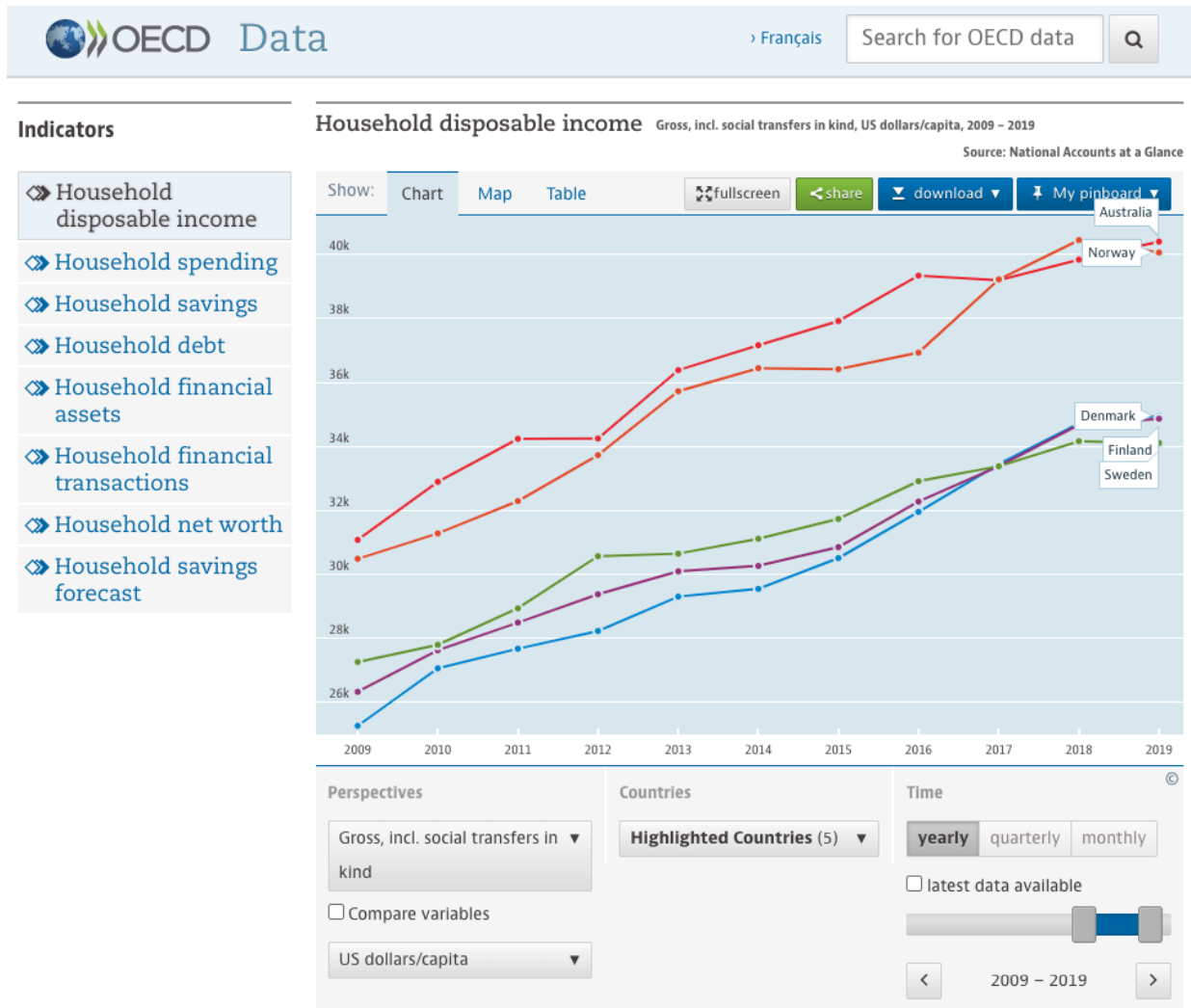
Qua

Figure 6. OECD data shows the household disposable income in Australia and the Nordic countries in a chart format. (OECD, 2022c)

The dataset presented in Figure 7 is shown in a tabular form, which is available for download as a CSV file, facilitating easy data collection.

Indicators

- Household disposable income
- Household spending
- Household savings
- Household debt
- Household financial assets
- Household financial transactions
- Household net worth
- Household savings forecast

Household disposable income Gross, incl. social transfers in kind, US dollars/capita, 2009 – 2019

Source: National Accounts at a Glance

Show: Chart | Map | Table   fullscreen | share | download ▼ | My pinboard ▼

Location	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Australia	31 077	32 892	34 235	34 244	36 382	37 164	37 918	39 338	39 191	39 839	40 403
Denmark	25 261	27 059	27 672	28 227	29 303	29 544	30 507	31 951	33 441	34 714	34 951
Finland	26 326	27 623	28 489	29 374	30 093	30 263	30 849	32 273	33 377	34 675	34 864
Norway	30 483	31 277	32 289	33 726	35 724	36 444	36 414	36 929	39 221	40 450	40 063
Sweden	27 258	27 796	28 934	30 566	30 645	31 112	31 730	32 911	33 378	34 162	34 106

All OECD countries compile their data according to the 2008 System of National Accounts (SNA). Information on data for Israel: http://oe.cd/israel-disclaimer

.. Not available; | Break in series; e Estimated value; f Forecast value; x Not applicable; p Provisional data; s Strike; - Nil;

Perspectives | Countries | Time

Gross, incl. social transfers in kind ▼ | Highlighted Countries (5) ▼ | yearly | quarterly | monthly

☐ Compare variables | ☐ latest data available

US dollars/capita ▼ | < 2009 – 2019 >

Figure 7. OECD data shows the household disposable income in Australia and the Nordic countries in a table format. (OECD, 2022c)

Most of the data I gathered for this research is from the OECD's database due to the accessibility and accuracy of the data. As the data is standardised between the countries, numbers are more straightforward to analyse, and conclusions are expected to be more accurate.

The countries can be selected one by one on the OECD website, depending on which countries a researcher wants to gather data on. The database contains extensive data that is available going back several years. This data can be obtained specifically on a yearly, quarterly, or monthly basis. Once the criteria have been selected, the data can be downloaded into a CSV file. Appendix 1 is an example of the same dataset as in Figures 6 and 7, downloaded as a CSV file.

To access the data on how much cash countries have in circulation, I used several sources. Figure 8 is an example of how the central bank of Sweden (Sveriges Riksbank, 2022a) has shown the data on their website.

Banknotes in circulation

SEK million

The chart shows banknotes in circulation, including invalid notes, as of 31 October 2022 (value per denomination). The figures have been rounded off. Some quality constraints between September and November 2001. For longer time series, see the link below. Click on the different explanations below the chart to hide them or show a series and use the slider to show the time interval. Download the data from the chart by clicking on the arrow to the right, above the chart. Source: The Riksbank.

For longer time series, see Statistics on banknotes in circulation from 1945.

Figure 8. Statistics on banknotes and coins in Sweden by Sveriges Riksbank (2022a)

Sveriges Riksbank (2022a) includes a link to download the raw data on banknotes in circulation. The downloaded CSV file contains a large dataset, spanning 1945 until recent months. It contains data for every month since 1945 and shows the value per domination in million SEK for each of those months. Appendix 2 shows a fraction of the raw data used in the study. This research was based on data collected between 2010 and 2019.

Similar data for Australia looked quite different compared to Sweden and the other Nordic countries. Figure 9 shows how the Reserve Bank of Australia (2022) has uploaded statistical tables on several financial datasets, and Appendix 3 shows the data for the banknotes on issue by denomination in a downloaded Excel file.

Figure 9. Statistics for banknotes on issue by denomination on Reserve Bank of Australia's website (2022)

3.2.1 Australia

To ensure the collected data was uniform across all researched countries, I sourced most of the data from the OECD's website containing all their data. By utilising their database, I was able to access reliable data without the need to adjust or interpret the numbers. Using a single source with data from multiple countries speeded up the process significantly. Locating sources equipped with the data I needed turned out to be one of the most time-consuming parts of the research process.

For statistics on cash in circulation, I had to rely more on organisations in each of the countries. In Australia's case, the data I collected was gathered by the Reserve Bank of Australia (RBA). For the purpose of gathering data on all available cash in circulation, I solely focused my research on banknotes and excluded coins.

3.2.2 Nordics

Since much of the data for this research had to be obtained from the OECD's database, I was required to locate each country's exact sources of cash in circulation separately through their respective databases. For Denmark and Finland, the data was collected from the European Central Banks' (2022b) database. Sweden's numbers were available on Sveriges Riksbank's (2022a) website, and Norway's were from Norway's central bank (Norges bank (2022)).

I found similar data from the statistical institution on Finland's (Tilastokeskus) website. However, to reduce the enormous discrepancies that various sources would have on data, I decided to use the same source for Finland and Denmark. Since the European Central Bank did not have data on cash in circulation in Sweden or Norway, it was inevitable to find other sources for these two countries.

In terms of cash in circulation, it is worth mentioning that the data for Norway goes back to only 2012, making it a slight problem as the research focuses on 2010 to 2019. Another important thing to note is that Nordic countries (and Australia) all use different currencies. This was solved by converting all currencies into Euros based on the exchange rate on the 7th of November 2022 (European Central Bank 2022a).

3.3 Data analysis

I have done the secondary data analysis as a person who has not been involved in collecting any of the primary data used in this research. Instead of focusing on individuals, I have looked at the data from a societal point of view to see the main drivers and how spending habits have changed on average. To answer my main research question, "*Does the progress towards a cashless society have an impact on people's spending habits?*" I used the quantitative research method for data collection and for analysing data by combining the numbers I gathered and visualised.

The quantified data collected from first-hand sources gave me a way to calculate averages for various metrics. I calculated the averages of changes for each country's GDP, the amount of money that has been in circulation (inflation was also considered), how much personal debt people have had over the years, and how people's spending habits have evolved. Rather than

looking at the exact numbers, I was looking for the trend, i.e., how the situation has changed in terms of periods with increases and decreases.

Using Excel, I drew graphs for each country to show how the averages have changed over time. After calculating the averages for all five Nordic countries, I combined them so that I could use those results to compare with Australia, which consists of only one country. Based on the visual graphs, I examined the similarities and differences between the Nordics and Australia. I also noted significant drops or increases during the time period.

Once I had all the numbers gathered, calculated, and visualised, I used qualitative methods to gain a holistic understanding of why numbers have evolved as they have. I looked for possible explanations for why there have been significant drops or increases. I ended up with a list of factors that could have influenced the changes in spending habits, which I explain in more detail in Chapter 4.

3.4 Reliability and validity

As the research is based on quantitative data, there may be an issue with reliability as there are concerns about whether the measure is stable or not (Bryman & Bell, 2011). After collecting the data, I analysed it qualitatively.

The gathered quantitative data was used to determine the mean, trends, and patterns in the researched societies and timeframe, resulting in a complete view of borrowing, debt, spending, and saving habits. Using secondary data over a certain time period gives this research the possibility for replication. According to Bryman & Bell (2011), replication is a criterion of research and the procedures of one need to be explained in detail. Replication involves someone else repeating the study to see if the same results will be found, even if replication of business research is uncommon.

One of the concerns of quantitative research is that there can be issues of reliability and validity. The challenge is so much about explaining why things are the way they are but rather only focusing on describing how things are (Bryman & Bell (2011). The purpose of this research is not only designed to graph out numbers but also to examine if similar societies exhibit commensurate spending habits.

An additional challenge encountered in the research was the diverse array of currencies used across the countries. Australia uses Australian dollars (AUD/$), Finland Euros (EUR/€), Sweden uses Swedish Krones (SEK), Norway uses Norwegian Krones (NOK), and Denmark uses Danish Krones (DKK). To make things easier to understand, I converted all the amounts into Euros to maintain uniformity among the five different currencies. To make the data more manageable, I chose the currency rate from November 7th, 2022 (European Central Bank, 2022a).

The analysis was done by using the qualitative method to assess the results I got from qualitative data gathering. Since I used data collected by other researchers, it freed up my time from doing primary research; however, as Bryman & Bell (2011) point out, it was necessary to dedicate time to fully understand each dataset, especially as some of them were large samples. Figuring out which data to search for was a minor difficulty, and since countries have unique sets of conditions, there is always the possibility of making an error in locating analogous datasets for each country.

The following simplified steps in Figure 10 outline the process of data analysis:

1) Data sorted based on themes in the researched countries (e.g. debt levels or spending).

2) To observe the differences, compare the data from Australia and the Nordics.

3) To comprehend the patterns and significant differneces, interpret the data.
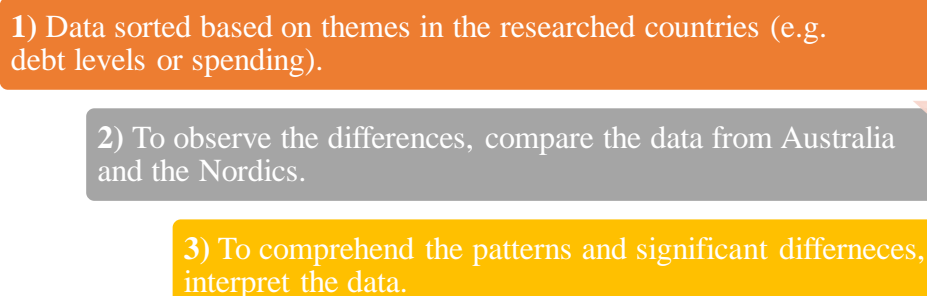
Figure 10. The process of data analysis of this thesis

Sorting the data into themes made it easy to return to my research and find specific information. Moreover, it enabled more efficient data organisation and analysis, allowing for better comprehension of the data to reach accurate conclusions. Taking the extra step of sorting data by theme helped uncover patterns or trends that would otherwise have stayed hidden.

By exploring the connections between the numbers, I was able to draw qualitative insights from my quantitative data. To illustrate, I analysed the interconnections between two significant quantitative datasets (Australia and the Nordics. The objective was to examine the relationship

between the two variables, explore their respective distributions, and compare the contrast in both datasets. This allowed me to identify relationships between variables and determine whether the datasets were statistically significant (Bryman & Bell, 2011).

4   Analysis and results

The purpose of this research was to find an answer to the main research question: "*Does the progress towards a cashless society have an impact on people's spending habits?*" The research focuses on Australia and the Nordics to contrast how the two regions have evolved in transitioning from cash-centric economies to digital ones. To help reach a conclusion, I formulated five additional sub-questions:

1. *How has the amount of cash (banknotes) in circulation changed during 2010-2019?*
2. *If there is less physical money in circulation, are people spending more, gaining more debt and saving less?*
3. *Has the amount of household debt increased/decreased between 2010 to 2019 in Australia and in the Nordics?*
4. *Has the amount of household savings increased/decreased between 2010 to 2019 in Australia and in the Nordics?, and;*
5. *Has the amount of household spending increased/decreased between 2010-2019 in Australia and in the Nordics?*

To guarantee the utmost accuracy of the data within this research and provide the Nordic numbers as weighted population averages, it was imperative to calculate the population share for each of the Nordic countries (see Appendix 4, including Australia's population size). The share of Finland, Sweden, Denmark, and Norway's population in the Nordics was calculated with the help of accurate population numbers of each country (OECD, 2022f).

Utilising population-weighted averages to calculate the numbers for the Nordics yields a more accurate representation as it accounts for the size of subgroups within a population and gives more weight to the values of larger subgroups. An unweighted average may not reflect the true average of the population as a whole.

Figure 11 demonstrates the average population percentage share of each country in the Nordics between 2010 and 2019. Sweden is the largest country in the Nordics, followed by Denmark, Finland and Norway, respectively - all remarkably similar in population size.
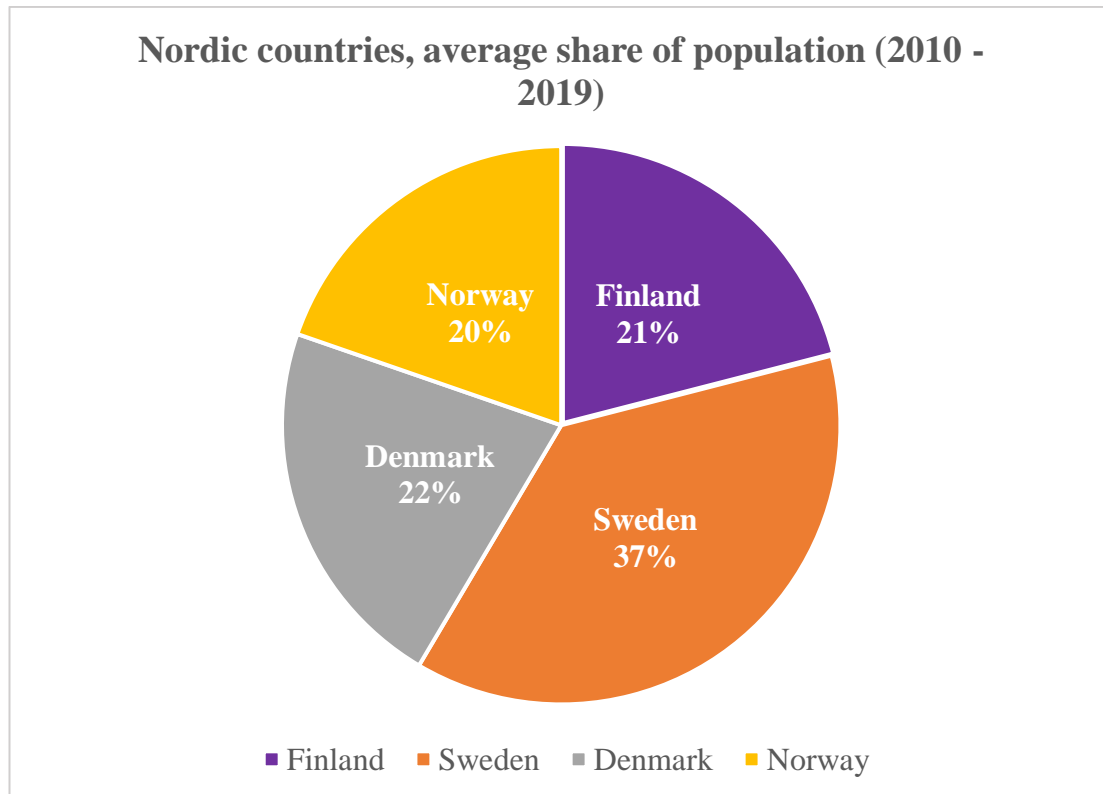
Figure 11. Share of population in the Nordics per each Nordic country (excluding Iceland)

4.1 Cash in circulation (2012 – 2019)

The analysis began by finding data on the amount of cash in circulation in Australia and the Nordics. Appendix 5 shows the data collected and refined for the Nordic countries - Finland, Sweden, Norway, and Denmark – which are presented separately. Australia's data can be seen in Appendix 6. The data collected for all five countries only included notes, no coins. Australia and Sweden's data sets could have included coins too. However, to guarantee the accuracy of the data allowing for uniform analysis, the coins were excluded (if a few datasets include coins and others do not, it would be difficult to draw reliable inferences about the overall cash supply across all countries).

The data collected for cash in circulation provides an answer to the first sub-question:

1. *How has the amount of cash (banknotes) in circulation changed during 2010-2019?*

It also gives a base for answering the second sub-question:

2. *If there is less physical money in circulation, are people spending more, gaining more debt and saving less?*

Once the amount of cash for all of the countries was collected, all the currencies (SEK, NOK, DKK, AUD) were converted into Euros based on the currency rates on the 7th of November, 2022. provided by the European Central Bank (2022a). The per capita currency in the Nordics was calculated with the help of population averages, as demonstrated in Appendix 7. By doing this, numbers from both the Nordic and Australia could be benchmarked against one another.

Figure 12 shows the changes per capita per year in each of the countries. All the researched Nordic countries have also been included individually, but the main focus is on Australia and the Nordics'. It was not possible to obtain data for the Nordics any sooner than 2012 because earlier data from Norway was not readily available. Nevertheless, the graph gives a relatively clear picture of how the amount of cash in circulation in the Nordics fluctuated between 2012 and 2019. The amount has been relatively stable over the years, whereas Australia has steadily increased the amount of cash in circulation.
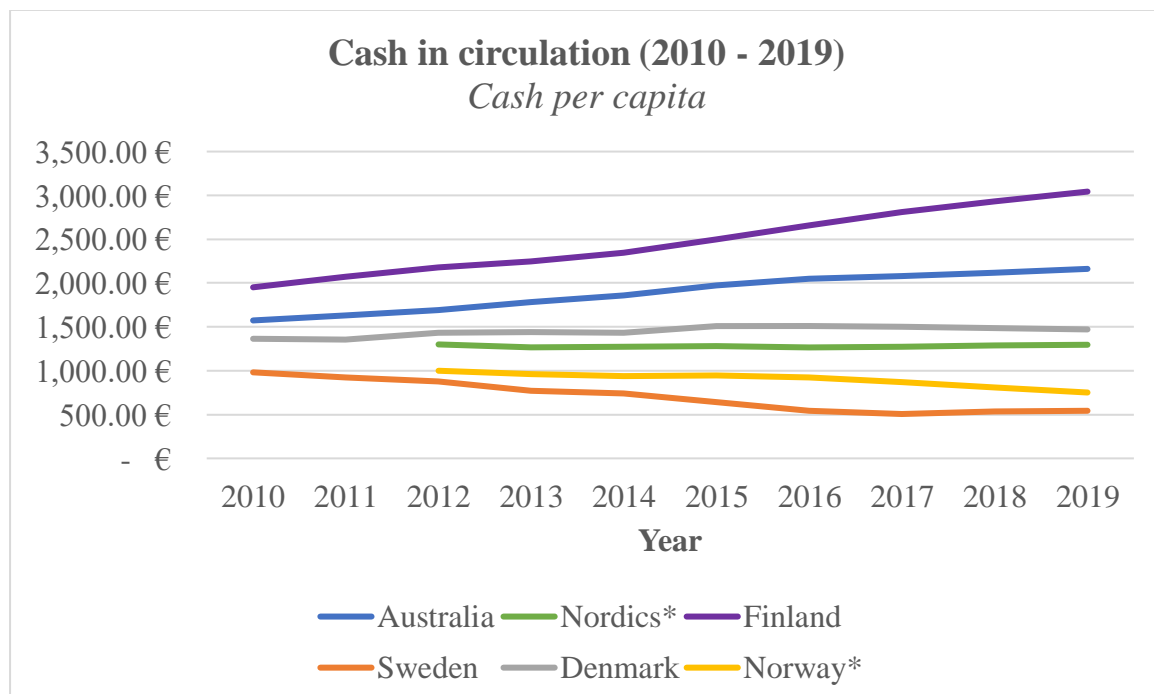
Figure 12. Cash in circulation (Euro) per capita in Australia, Finland, Sweden, Denmark, Norway, and the Nordics as a whole

*Data available for Norway only from 2012 onwards

Figure 13 shows the trend in Australia compared to the Nordics. The baseline has been set since 2012.
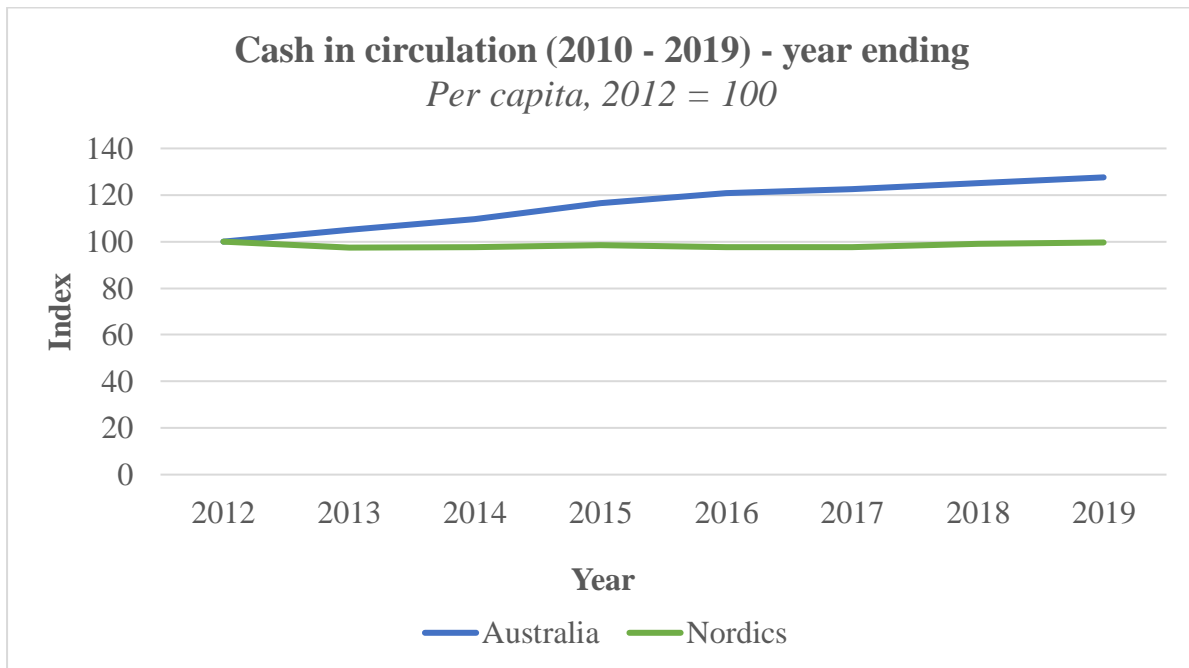
Figure 13. Cash in circulation in Australia and the Nordics with the baseline set from 2012

The graph shows that Australia has had more cash in circulation compared to the Nordics. It is worth noting that Finland is an outlier among the Nordic countries, as seen in Figure 12. In Finland, the per capita cash in circulation increased dramatically (increased ~80% in 7 years) as compared to the other Nordic countries where cash per capita is steady or decreasing.

4.2 Household disposable income (2010 – 2019)

Gross disposable income is what households have available before subtracting taxes and transfers. This includes wages and salaries, income from pensions or other social benefits, and income from financial investments (OECD, 2022c).

The OECD (2022c) states the percentage change in disposable income per capita in Australia and the Nordic countries compared to the previous period. To be able to graph the comparison, the data is expressed as a population-weighted average for the Nordics. The OECD data (2022c) was used to set a baseline of 100 for the year 2010 to show how household disposable income has changed between 2010 and 2019.

2, 3 and 4 are relevant sub-questions when looking at household disposable income:

2. *If there is less physical money in circulation, are people spending more, gaining more debt and saving less?*

3. *Has the amount of household debt increased/decreased between 2010 to 2019 in Australia and in the Nordics?, and;*

4. *Has the amount of household savings increased/decreased between 2010 to 2019 in Australia and in the Nordics?*

To be able to answer the above questions, it is important to understand how household disposable income levels have changed.

Figure 14 shows that disposable household income has increased in both regions, although slightly more in the Nordics by 2019. The absolute number in Australia for 2010 was 1.9%, and 2.22% in the Nordics. Even though the Nordics are seemingly above Australia, these numbers do not indicate that income per capita would be higher in the Nordics compared to Australia. Instead, these numbers show that the percentage change per capita compared to the previous year has increased more in the Nordics than in Australia.
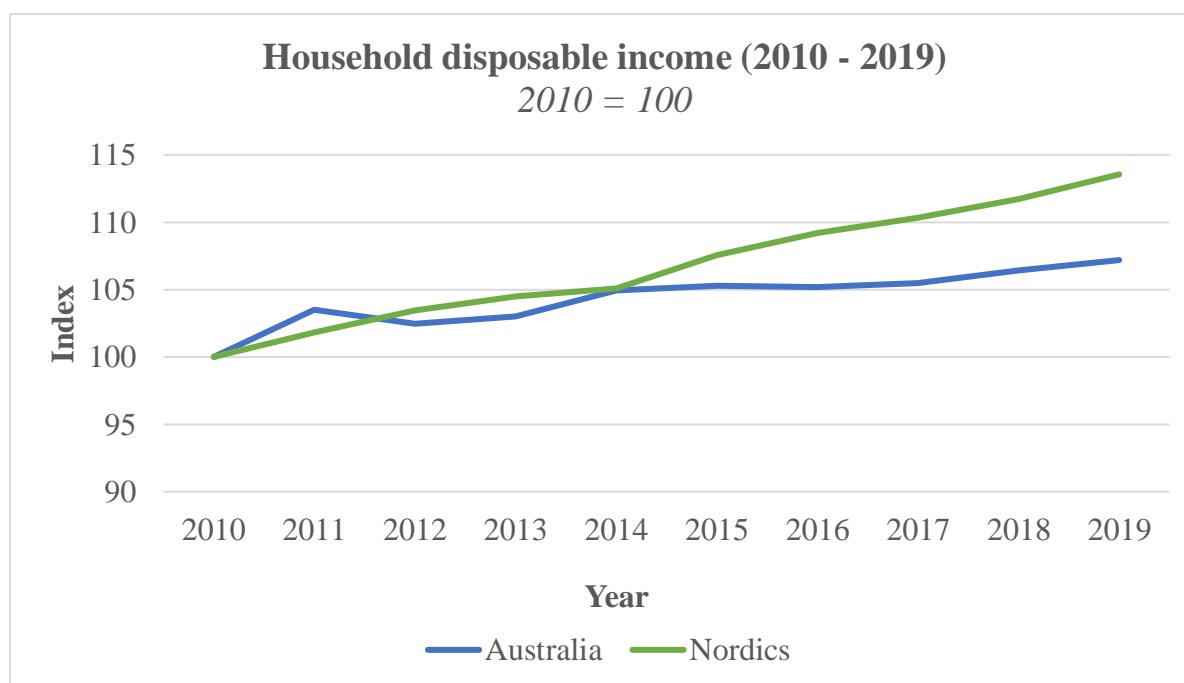
Figure 14. Changes in household disposable income in Australia and the Nordics between 2010 and 2019

Figure 15. Changes in household disposable income in Australia, Finland, Sweden, Denmark, Norway, and the Nordics between 2010 and 2019

Initially, the data indicated a growth pattern for Australia; however, it underwent a shift between 2012 and 2013. In the Nordics, the trend was steadily inclined, with a slight plateau in 2014. Figure 15 shows the data for each of the Nordic countries next to Australia and the Nordics as a whole. The data shows that the trends have been higher in Nordic countries than in Australia. Finland is an exception to this, as well as Denmark, roughly until mid-2015.

4.3 Household debt (2010 – 2019)

The data collected by the OECD on household debt (2022b) includes

> […] all liabilities of households that require payments of interest or principal by households to the creditors at a fixed dates in the future. Debt is calculated as the sum of the following liability categories: loans (primarily mortgage loans and consumer credit) and other accounts payable. The indicator is measured as a percentage of net household disposable income. (OECD, 2022b)

Looking into the household debt changes during 2010 – 2019 gives insights on answering sub-questions: 2 and 3:

> 2. *If there is less physical money in circulation, are people spending more, gaining more debt and saving less?, and;*

3. *Has the amount of household debt increased/decreased between 2010 to 2019 in Australia and in the Nordics?*
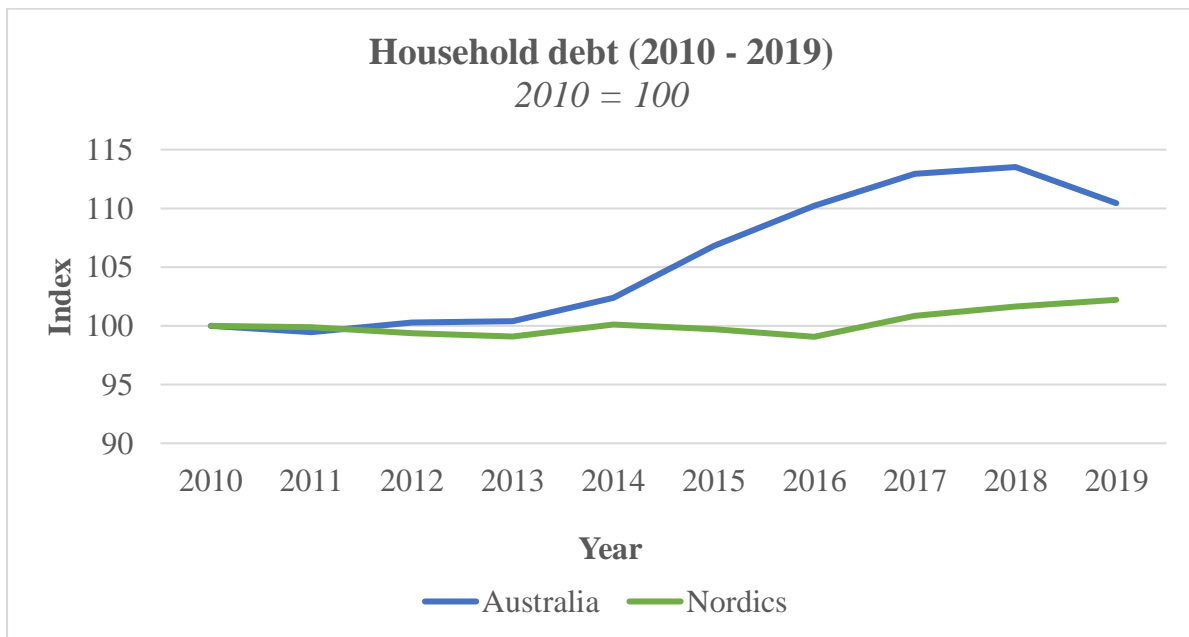
Figure 16. Changes in household debt in Australia and the Nordics between 2010 and 2019

Figure 16 shows the percentage change per household debt with 2010 as the baseline=100. The absolute number for household debt, the total % of net disposable income, in 2010 was 189,5% for Australia and respectively 200.9% for the Nordics. The Nordics have not had as notable a change during the years compared to Australia. In 2014, household debt in Australia seemed to have risen in a slightly steeper upwards curve until 2018, when it started going down. The Nordic countries, on the other hand, have had a minor upwards trend from 2016 onwards.

Household debt (2010 - 2019)
All countries, 2010 = 100

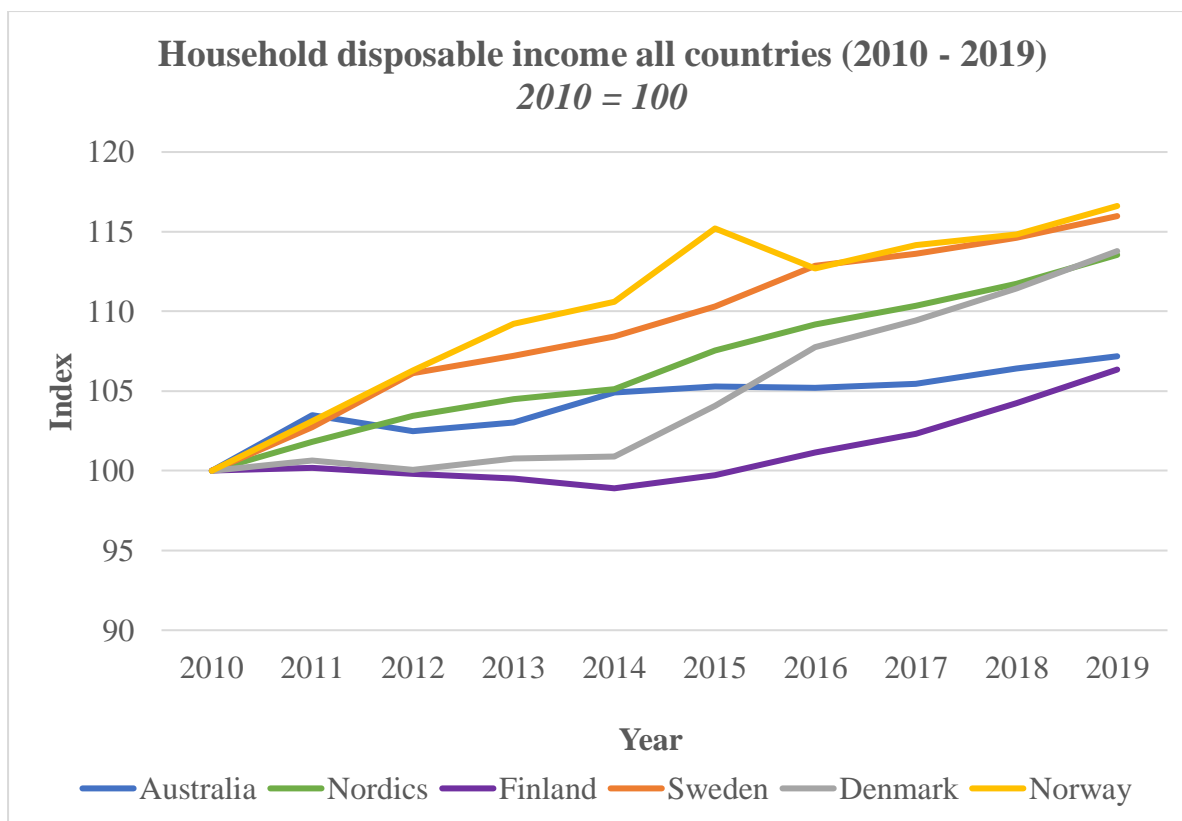*Figure 17. Changes in household debt in Australia, Finland, Sweden, Denmark, Norway, and the Nordics between 2010 and 2019*

Figure 17 presents the same data by country breakdown, where we can see that Denmark has significantly lower debt levels than the rest, keeping the Nordic average much lower than Australia between the years 2014 – 2019. Of all the countries, Finland has the highest debt levels, whereas Australia, Norway and Sweden all have relatively similar rates.

4.4 Household savings (2010 – 2019)

Similar to household debt data, household savings rates give insights that help answer sub-questions 2 and 4:

> 2. *If there is less physical money in circulation, are people spending more, gaining more debt and saving less?*
>
> 4. *Has the amount of household savings increased/decreased between 2010 to 2019 in Australia and in the Nordics?*

The data collected by OECD (2022d) on net household savings rate is the

> […] household net disposable income plus the adjustment for the change in pension entitlements less household final consumption expenditure (households also include non-

profit institutions serving households). The adjustment item concerns (mandatory) saving of households, by building up funds in employment-related pension schemes. Household saving is the main domestic source of funds to finance capital investments, a major impetus for long-term economic growth. The net household saving rate represents the total amount of net saving as a percentage of net household disposable income. It thus shows how much households are saving out of current income and also how much income they have added to their net wealth. (OECD, 2022d)
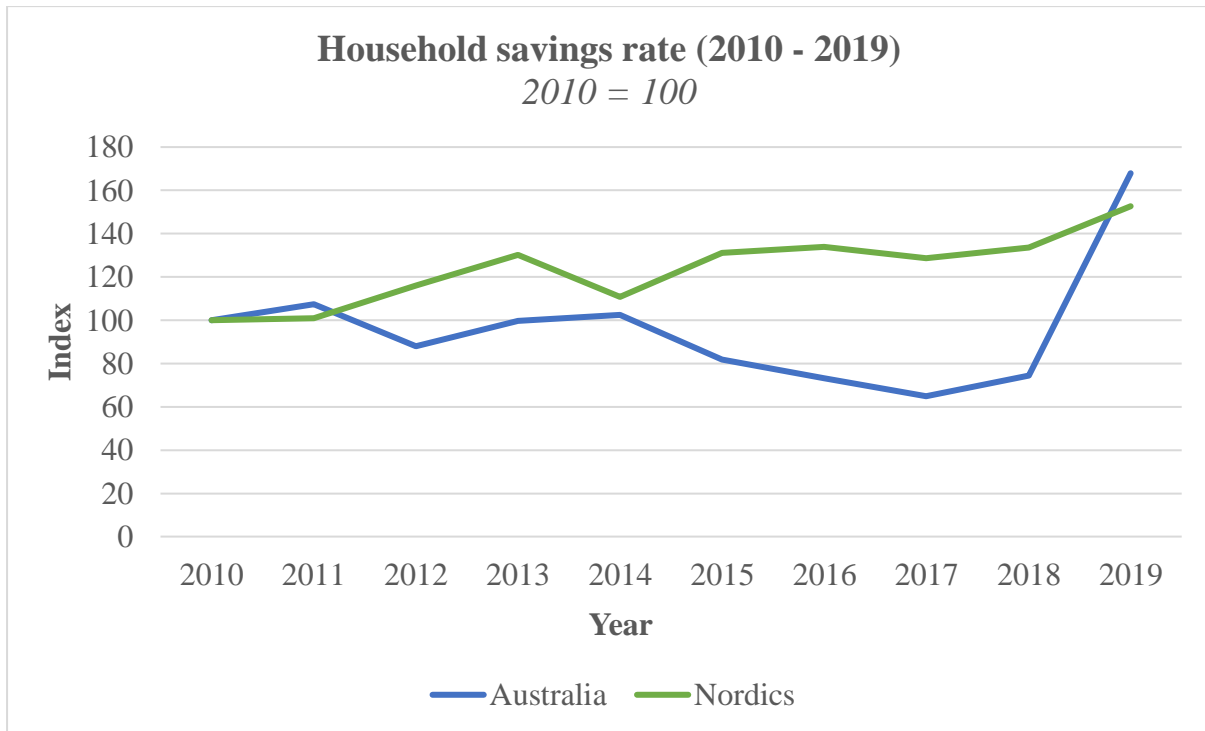
Figure 18. Changes in the household savings rate in Australia and the Nordics between 2010 and 2019

In stark contrast to the Nordics, Figure 18 illustrates a distinct difference in Australia's trend. The Nordics have had a volatile but steady increase, whereas Australia had a significant decrease between 2014 and 2018 until their curve shifted the direction and Australians started saving more. After 2018, both regions had an upward-inclining curve indicating that people saved more than before.
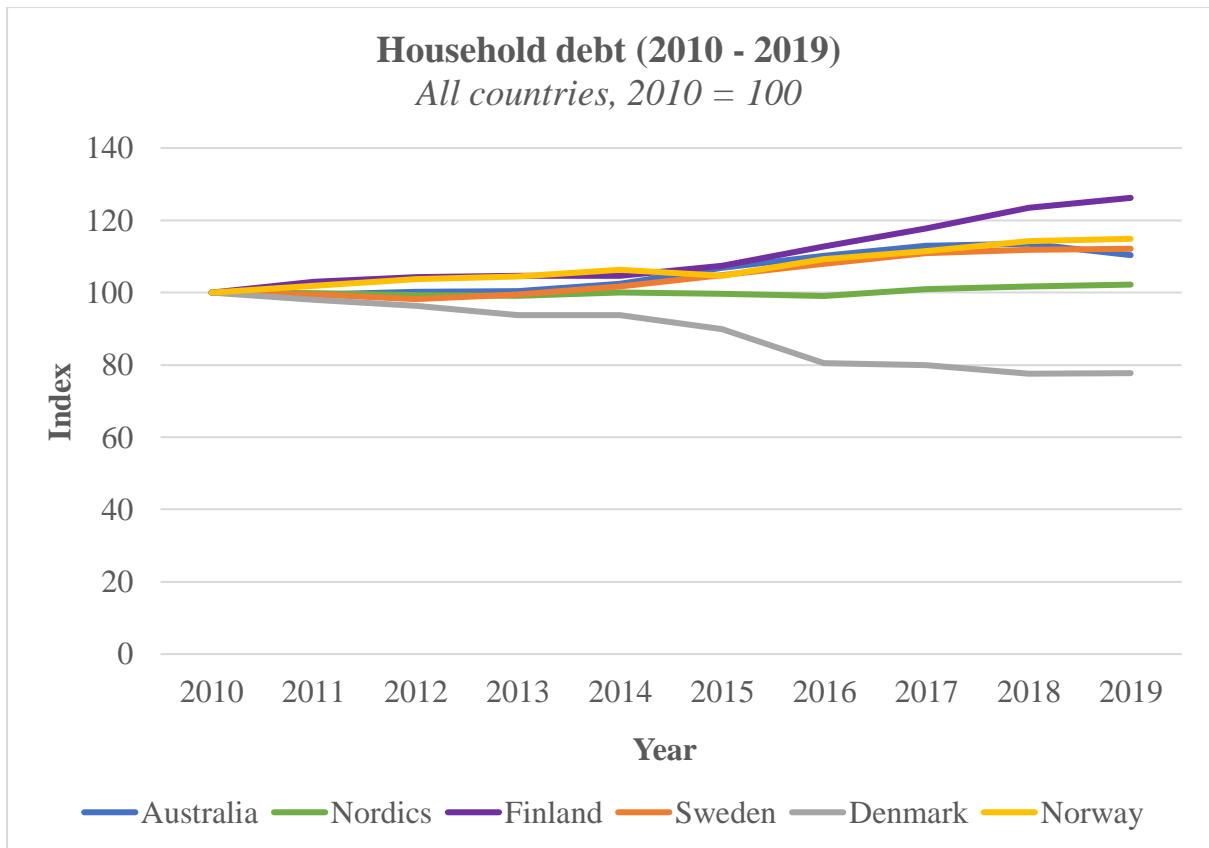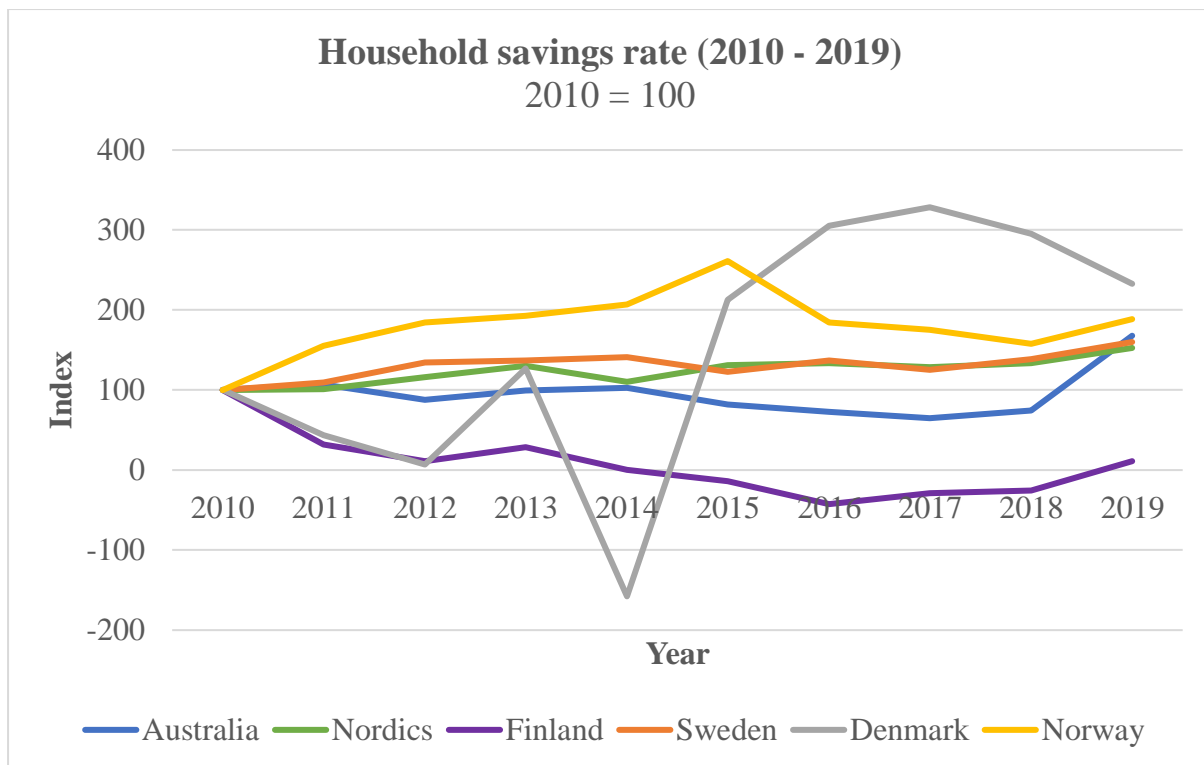
Figure 19. Changes in the household savings rate in Australia, Finland, Sweden, Denmark, Norway, and the Nordics between 2010 and 2019

Figure 19 further shows how the trend between Australia and the Nordics significantly differ between 2014 and 2018. Denmark's dramatic drop and a rather quick turnaround, as well as Norway and Sweden's high savings rates, keep the overall savings rates in the Nordics high. After a consistent decline in the savings rate, Finland experienced a reversal of fortune in 2018.

4.5 Household spending (2010 – 2019)

Looking into household spending, sub-questions 2 and 5 are relevant:

> 2. *If there is less physical money in circulation, are people spending more, gaining more debt and saving less?,* and;
>
> 5. *Has the amount of household spending increased/decreased between 2010-2019 in Australia and in the Nordics*?

Answering the above questions requires to look how household spending has changed during 2010 – 2019.

Household spending refers to

> […] the amount of final consumption expenditure made by resident households to meet their everyday needs, such as food, clothing, housing (rent), energy, transport, durable goods (notably cars), health costs, leisure, and miscellaneous services. It is typically around 60% of gross domestic product (GDP) and is therefore an essential variable for economic analysis

of demand. Household spending including government transfers (referred to as "actual individual consumption" in national accounts) is equal to households' consumption expenditure plus those expenditures of general government and non-profit institutions serving households (NPISHs) that directly benefit households, such as health care and education. "Housing, water, electricity, gas, and other fuels", one out of the twelve categories distinguished, consist of both actual rentals (for tenants) and imputed rentals (for owner-occupied housing), housing maintenance, as well as costs for water, electricity, gas. Total household spending is measured in million USD (in current prices and Private consumption PPPs), as a percentage of GDP, and in annual growth rates. Household spending including government transfers is measured as a percentage of GDP. Spending in housing is presented as a percentage of household disposable income. (OECD, 2022e)
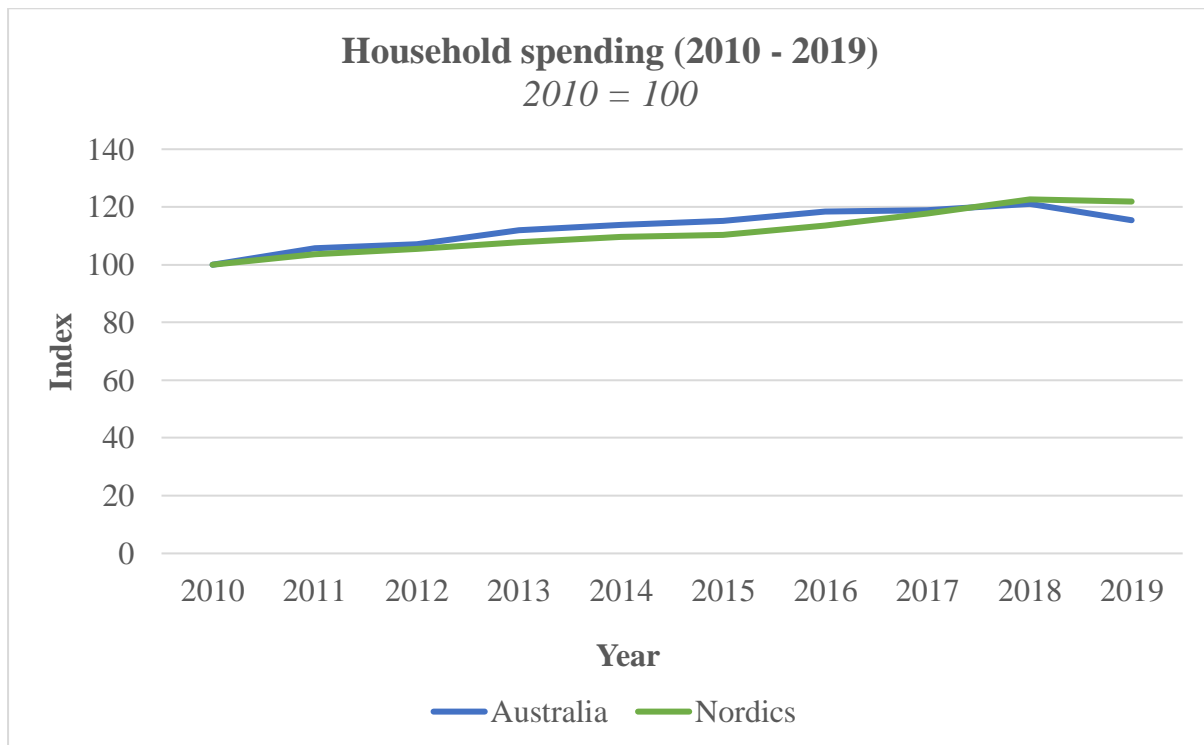
Figure 20. Changes in household spending in Australia and the Nordics between 2010 and 2019

With the baseline set to 100 in 2010, Figure 20 shows that Australia and the Nordics do not differ much, having a notably similar trend, apart from Australia's slight decline after 2018. Australia's financial year ends on the 30th of June each year, which may explain the declining curve in 2019, as some of it is possibly affected by the 2020 Covid pandemic.

4.6 Short-term interest rates (2010 – 2019)

To understand how borrowings have been affected, short-term interest rates are an important metric to look at. The short-term interest rate refers to

> [...] the rates at which short-term borrowings are effected between financial institutions or the rate at which short-term government paper is issued or traded in the market. Short-term

interest rates are generally averages of daily rates, measured as a percentage. (OECD, 2022g)

Short-term interest rates (2010 - 2019)
2010 = 100
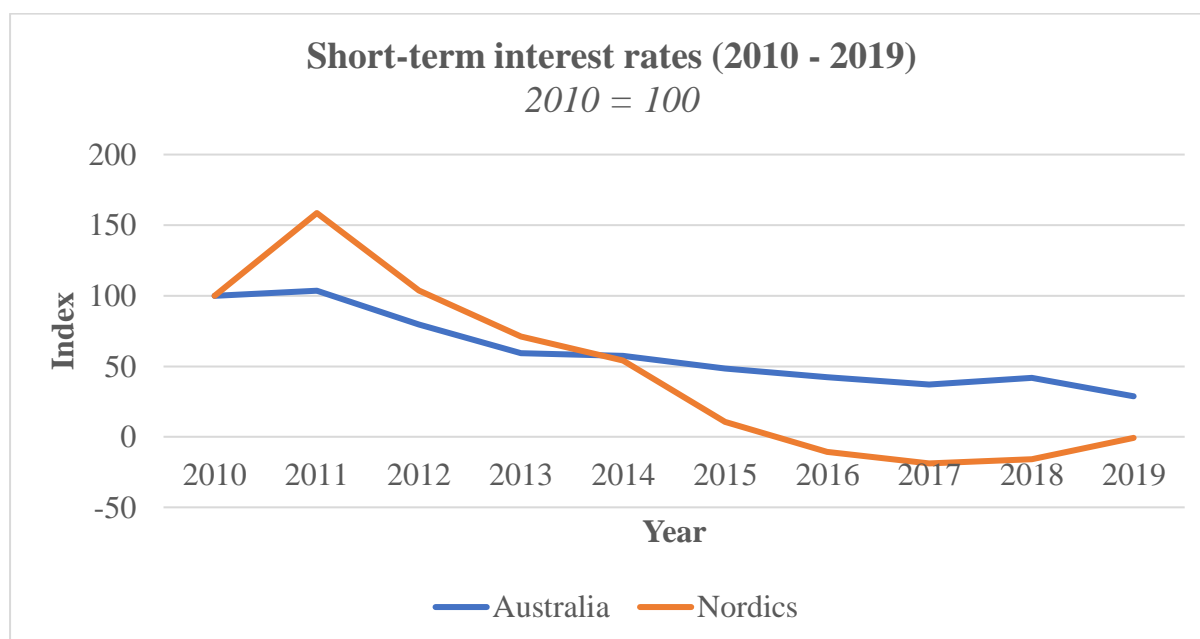
Figure 21. Short-term interest rates in Australia and the Nordics during 2010 - 2019

The short-term interest rates have decreased in Australia and the Nordics between 2010 and 2019. Figure 21 shows that the interest rates in the Nordics went below 0% before the pandemic partially due to the European Central Bank's attempt to increase inflation to maintain price stability (Schmidt, 2018). When taking debt is cheap, people are more likely to take on more debt as interest levels are low (Kearns et al., 2020). Aside from Denmark, Australia and the other Nordic countries saw growing debt levels (as illustrated in Figure 17) when short-term interest rates were dropping.

4.7 Summarising the analysis

To answer the main research question, "*Does the progress towards a cashless society have an impact on people's spending habits?*" the findings suggest that while there is no significant correlation between cash in circulation and household economic indicators, short-term interest rates have a more substantial impact on overall cause-effect relation.

Australia has a higher per capita cash circulation compared to the Nordics, as shown in Figure 13. The cash circulation in Australia has a consistent increase, while there is minimal variation in the Nordics. Finland, however, stands out as an exception, with a notable increase in per

capita cash circulation compared to other Nordic countries. Both regions have had a constant increase in disposable income, with the Nordics showing more pronounced growth.

Australia saw a constant increase in cash in circulation between 2010 - 2019, yet despite more cash being available each year, there was a significant rise in consumer debt between 2014 and 2018. Meanwhile, short-term interest rates in both Australia and the Nordics continued to decline steadily. The household savings rate decreased between 2010 to 2018 in Australia, however, with a noticeable increase in 2018, coinciding with the reduction in debt levels. Although spending rates in both regions showed a consistent upward trend, this reversed in the 2018 – 2019 data.

The Nordics experienced almost no change in cash in circulation between 2010 and 2019. Examining the debt levels and savings, Australia and the Nordics have shown opposite trends, like a mirror image of each other. However, both regions demonstrated nearly identical spending rates and short-term interest rates followed a similar pattern.

5 Discussion

In this section, the concepts and previous research and the desktop study discuss the main research question: "*Does the progress towards a cashless society have an impact on people's spending habits?*".

To explore the main research question, the analysis began by examining the rate of cash circulation in the societies between 2010 and 2019. Merely examining the cash in circulation is insufficient to provide a complete answer. It is essential also to investigate the changes in payment methods during this time.

Various sources show that cash payments have steadily decreased in Finland, Sweden, Norway, Denmark, and Australia. According to an analysis by the Bank of Finland (Snellman & Harju, 2021), Finland is leading the way in reducing cash usage compared to other countries utilising Euros as their currency. Electronic payment methods such as card payments and mobile payment apps have become significantly more popular in comparison to cash. However, cash remains an important payment method and should be secured on a societal level (Snellman & Harju, 2021).

Similarly, a comparable pattern can be observed in Sweden when examining the number of ATM withdrawals, with card payments being the most prevalent payment method. The bank of Sweden, i.e., Sveriges Riksbank (2022b), has indicated that a decrease in cash withdrawals indicates a reduction in the usage of physical currency in society. Recent statistics from 2022 reveal that FinTech magazine ranked the top six countries with the highest usage of digital payments, signalling a move towards a cashless society. Among these countries, Finland was ranked 5th, Norway 3rd, and Sweden 1st (England, 2022). Neither Denmark nor Australia made it on the list. However, a desktop analysis made by Danmarks Nationalbank indicates that Denmark is following a similar trend as its fellow Nordic countries (Heisel, 2022).

The trend in Australia is slightly different, as also this study demonstrates. While Australia began at roughly 500 euros higher per person than the Nordics, it has since increased to almost double the initial amount. In contrast, the study demonstrated that the amount of cash in circulation in the Nordics has remained relatively stable. The Reserve Bank of Australia affirms that Australians still have a strong demand for cash despite electronic payment methods increasing gain popularity (Davies et al., 2016). There are several possible hypotheses as to why there is still a strong demand for cash. For example, according to the Reserve Bank of Australia (2021), Australians use cash as a means of storing wealth, with an estimated half to three-quarters of banknotes in circulation being hoarded. In addition, Australia's substantive underground economy is responsible for the high demand for cash (Bajada, 2017), as well as money laundering occurring through electronic gaming devices (Buchanan, 2018).

The interplay between cashlessness, debt, savings, and spending is intricate, as mentioned in the analysis of this desktop study. While electronic payment methods continue to gain popularity, the desktop study affirms that physical cash remains in circulation in society and is still being utilized, albeit more prevalently in Australia than in the Nordics. Both Australia and the Nordics have a high index of usage of digital services, as Figure 2 (Brandao et al., 2022) shows in Chapter 2.3.1. The level of adoption may vary within the regions due to factors such as infrastructure, regulations, and cultural attitudes towards technology (Brandao et al., 2022).

With several factors impacting people's spending habits, such as the adoption of digital payments and more options becoming available (Bátiz-Lazo et al., 2011), no country is completely cashless (Tee & Ong, 2016). Runnemark et al. (2015) found that consumers paying

with cards are more likely ready to pay higher prices than if they had used cash instead. Their research suggests that different payment methods impact consumer behaviour. Another desktop study by Yang et al. (2021) suggests that the convenience of electronic payment methods such as e-wallets may be prone to reckless spending. In fact, Aji & Adawiyah (2021) say e-wallets may encourage excessive spending behaviour among young adult consumers by creating an illusion of liquidity. Customers paying with e-wallets may perceive prices as lower than their actual value, leading them to ignore the total amount spent.

The emergence of FinTech, especially BNPL services, represents a challenge to existing regulations and poses a risk to consumer protection (Gerrans et al., 2022). Figure 3, as shown in Chapter 2.3.1, indicates a rapid growth in the number of active BNPL accounts, motivating regulators to act in the near future and focusing on consumer outcomes and harms (Australian Securities and Investments Commission ASIC, 2020).

5.1 Similarities between markets

The period leading up to 2010 was eventful for both the Nordics and Australia, and it marks the start of the research period for this desktop study. The European debt crisis in 2008, caused turmoil in the domestic economies of European countries, some more than others. Due to the financial crisis, many countries had taken on debt and were unable to manage the impact on their budgets (Frieden et al., 2017); a response to stimulate economic activity and encourage consumers to borrow and spend, the central banks lowered the interest rates (Lane, 2012).

The global financial crisis (GFC), which impacted Europe heavily, did not cause a large economic downturn in Australia. There was a period of uncertainty; however, compared to many other countries, Australian banks had little exposure to the US subprime mortgage market and were, therefore, less affected by the crisis (Reserve Bank of Australia, 2018a). Instead, 'The China resources boom' buoyed Australia's economy of historical dimensions. Primarily this was driven by strong Chinese demand for iron ore, coal, and other natural resources such as gold and bauxite (Garnaut, 2012).

The findings of the desktop study indicate that the impacts of both the European debt crisis and the China resources boom can be observed, particularly in the immediate years after 2010. One

example of this is the steady increase in household disposable income in the regions since 2010. Additionally, short-term interest rates have continuously decreased since 2010.

Moreover, the research shows that the regions have resemblances not only in short-term interest rates and household disposable income, but similarities are also reflected in household spending. The trend is almost identical between the Nordics and Australia. During lower interest rates, consumers tend to spend more as it often leads to increased customer confidence, and people feel more secure in their financial situation. Higher interest rates attract consumers to save money rather than spend (Reserve Bank of Australia, 2018b).

5.2 Australians saving less and taking on more debt

Inflation and government spending are important factors shaping a nation's economy and overall well-being. The effectiveness of central banks in controlling inflation can have a significant impact on the economy, as was seen during the European financial crisis but also in Australia during the resource boom.

As the desktop study results indicate, as short-term interest rates were falling from 2010 to 2019, household spending went steadily up in both the Nordics and Australia. Meanwhile, household debt and savings rates were quite the opposite between the regions, with Australian consumers increasingly using debt to finance their consumption. Household debt is largely driven by short-term interest rates and is recognised as a key risk to financial and macroeconomic stability (Kearns et al., 2020). While the Nordics were more conscious of taking on debt and were rather saving, they were also spending in a more controlled and safe way compared to Australia.

6 Conclusions

The research question guiding this study is, "*Does the progress towards a cashless society have an impact on people's spending habits?*". Although the desktop study yielded some interesting findings, it suggests that there is no significant relationship between cash in circulation and household economic indicators. As it turns out, in this study, short-term interest rates appear to have a more substantial impact on people's spending habits. It is also possible that the availability of various payment methods, such as credit and the cost of borrowing, influences

spending decisions more than if a consumer uses cash rather than a form of digital payment method.

There is still a significant amount of cash in circulation even though the Nordics and Australia are becoming more cashless. Previous research indicates that when it comes to electronic payments, consumers are more likely to spend more on individual purchases, but it does not necessarily translate to spending more money overall. Even though there are quite some differences in the cash in circulation, debt levels, and saving rates between the Nordics and Australia, the spending habits were very similar.

As a developed economy using common electronic payments, Australia seems to be an outlier in the amount of cash in circulation. Among Nordic countries, Finland continues to have a great amount of physical cash in circulation, whereas Sweden has seen a sharp decline. Had this research had focused on a longer time span, there might have been further insights to uncover.

6.1 Future research

While conducting the desktop study, it turned out to be a significant challenge to find data on FinTech services and, in particular, the most popular ones. For future research, it would be beneficial to understand the number of consumers who have experienced issues with repayments linked to FinTech services. With the space being largely unregulated, most FinTech companies are not obligated to report statistics. Therefore, determining the true impact of FinTech on consumer behaviour is challenging due to a scarcity of comprehensive sources.

Intriguingly, the desktop study spotlighted a disparity in cash circulation amongst Nordic countries. Investigating why Finland has a greater amount of cash in circulation per capita than Sweden turned out to be an arduous task to uncover. The difficulty in obtaining data on the most popular payment methods used in each country could be a contributing factor to this issue. Although there might be data available, it would likely require using the local language to find it. As an example, the Bank of Finland had data about this topic, yet for those lacking Finnish language abilities, obtaining it would be a near impossibility.

Future research could focus on the same topic but for the period after the pandemic when the world returned to its business-as-usual state. It could discover some interesting consumer

behaviour patterns as it is highly likely the interest rates are acting the opposite way as they did during this focus time period of this thesis.

6.2 Critical discussion

While the results of this desktop study may not be ground-breaking, they provide some new insights for future exploration into the complex relationship between payment methods, interest rates, and spending behaviour. This is particularly important given the shift towards digital payments in recent years and the potential impact this could have on consumer spending.

In hindsight, the data needed to conduct the research should have been given more consideration when selecting the topic for the thesis. This desktop study utilised data from reliable sources, however, it does not furnish conclusive proof that consumers tend to spend less money when exclusively using cash. To investigate why consumers spend money in certain ways, a focus group or experiment comparing two groups, one with cash-only and the other with digital payment options, could reveal interesting insights. However, it is important to acknowledge that such a study could have limitations in terms of the accuracy, reliability, and completeness of the data collected.

Anticipating the limitations and obstacles encountered throughout the process of writing a thesis is challenging to know beforehand. Although there are gaps in the data used in this desktop study, the resources at hand have been used and addressed to the best of their ability.

6.3 Ethical discussion

The use of digital payment methods involves organisations collecting and processing large amounts of personal and financial data, which can be vulnerable to privacy violations and security breaches. Privacy and confidentiality of the individuals in the data sets are protected, and the findings do not lead to stigmatisation or discrimination against certain groups of people.

The desktop research did not require any ethics committee approvals or consent from participants because the data used is publicly available and gathered by authorised organisations. The data used has no negative ongoing impacts on individuals as it has already been collected and collated, and it was not experimental in nature.

The findings in this thesis are presented in an appropriate and responsible manner, and the thesis outlines the rationale for the investigation. It is possible that certain groups are underrepresented or excluded from the data sets. For example, there are concerns about the potential for certain segments of society, such as the elderly or those without access to technology, to be excluded from the benefits of a cashless society. This could lead to a biased analysis or conclusions that do not accurately reflect the reality of the populations studied.

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Appendices

Appendix 1: OECD data of household disposable income in Australia and the Nordic countries (OECD, 2022c)

LOCATION	INDICATOR	SUBJECT	MEASURE	FREQUENCY	TIME	Value	Flag Codes
AUS	HHDI	GROSSADJ	USD_CAP	A	2010	32892.3259327105	
AUS	HHDI	GROSSADJ	USD_CAP	A	2011	34235.1651937415	
AUS	HHDI	GROSSADJ	USD_CAP	A	2012	34244.0253494228	
AUS	HHDI	GROSSADJ	USD_CAP	A	2013	36382.2377812422	
AUS	HHDI	GROSSADJ	USD_CAP	A	2014	37163.9707051489	
AUS	HHDI	GROSSADJ	USD_CAP	A	2015	37917.6312157671	
AUS	HHDI	GROSSADJ	USD_CAP	A	2016	39338.1204629588	
AUS	HHDI	GROSSADJ	USD_CAP	A	2017	39190.7071368347	
AUS	HHDI	GROSSADJ	USD_CAP	A	2018	39839.1725709759	
AUS	HHDI	GROSSADJ	USD_CAP	A	2019	40403.0258276133	
SWE	HHDI	GROSSADJ	USD_CAP	A	2010	27795.5932486814	
SWE	HHDI	GROSSADJ	USD_CAP	A	2011	28934.1725000991	
SWE	HHDI	GROSSADJ	USD_CAP	A	2012	30565.8161485949	
SWE	HHDI	GROSSADJ	USD_CAP	A	2013	30645.2417356805	
SWE	HHDI	GROSSADJ	USD_CAP	A	2014	31112.0448611177	
SWE	HHDI	GROSSADJ	USD_CAP	A	2015	31730.0575729485	
SWE	HHDI	GROSSADJ	USD_CAP	A	2016	32911.1075449133	
SWE	HHDI	GROSSADJ	USD_CAP	A	2017	33377.7342435385	
SWE	HHDI	GROSSADJ	USD_CAP	A	2018	34162.2127509561	
SWE	HHDI	GROSSADJ	USD_CAP	A	2019	34105.9372827131	
NOR	HHDI	GROSSADJ	USD_CAP	A	2010	31277.1266361885	
NOR	HHDI	GROSSADJ	USD_CAP	A	2011	32289.3983727829	
NOR	HHDI	GROSSADJ	USD_CAP	A	2012	33725.7539408297	
NOR	HHDI	GROSSADJ	USD_CAP	A	2013	35724.0413015554	
NOR	HHDI	GROSSADJ	USD_CAP	A	2014	36443.7520099028	
NOR	HHDI	GROSSADJ	USD_CAP	A	2015	36413.9307472056	
NOR	HHDI	GROSSADJ	USD_CAP	A	2016	36928.7868422497	
NOR	HHDI	GROSSADJ	USD_CAP	A	2017	39220.6264890483	
NOR	HHDI	GROSSADJ	USD_CAP	A	2018	40450.1254202558	
NOR	HHDI	GROSSADJ	USD_CAP	A	2019	40062.6296004462	
FIN	HHDI	GROSSADJ	USD_CAP	A	2010	27623.0864305437	
FIN	HHDI	GROSSADJ	USD_CAP	A	2011	28489.4495067786	
FIN	HHDI	GROSSADJ	USD_CAP	A	2012	29373.983871873	
FIN	HHDI	GROSSADJ	USD_CAP	A	2013	30093.2105440337	
FIN	HHDI	GROSSADJ	USD_CAP	A	2014	30263.2133645628	
FIN	HHDI	GROSSADJ	USD_CAP	A	2015	30849.1223441098	
FIN	HHDI	GROSSADJ	USD_CAP	A	2016	32273.2230052653	
FIN	HHDI	GROSSADJ	USD_CAP	A	2017	33377.1258240619	
FIN	HHDI	GROSSADJ	USD_CAP	A	2018	34675.1907182505	
FIN	HHDI	GROSSADJ	USD_CAP	A	2019	34864.0845547132	
DNK	HHDI	GROSSADJ	USD_CAP	A	2010	27059.417407132	
DNK	HHDI	GROSSADJ	USD_CAP	A	2011	27671.8631486807	
DNK	HHDI	GROSSADJ	USD_CAP	A	2012	28226.796578206	
DNK	HHDI	GROSSADJ	USD_CAP	A	2013	29302.6636572859	
DNK	HHDI	GROSSADJ	USD_CAP	A	2014	29543.8327968615	
DNK	HHDI	GROSSADJ	USD_CAP	A	2015	30507.1829275656	
DNK	HHDI	GROSSADJ	USD_CAP	A	2016	31950.5301364607	
DNK	HHDI	GROSSADJ	USD_CAP	A	2017	33441.2777459902	
DNK	HHDI	GROSSADJ	USD_CAP	A	2018	34714.1638787589	
DNK	HHDI	GROSSADJ	USD_CAP	A	2019	34951.0844684595	

Appendix 2: Statistics on banknotes and coins in Sweden by Sveriges Riksbank (2022a)

statistics-on-banknotes-in-circulation-from-1945 (1)

	20	50	100	200	500	1 000	Total
2010-01-31	1 804,90	1 214,40	9 455,60		55 627,10	30 742,00	98 844,10
2010-02-28	1 771,80	1 189,10	9 315,60		55 490,90	30 345,90	98 113,20
2010-03-31	1 772,30	1 193,60	9 475,10		56 300,80	30 082,00	98 823,80
2010-04-30	1 767,70	1 201,80	9 280,70		55 523,60	29 813,90	97 587,60
2010-05-31	1 782,70	1 239,10	9 298,90		55 306,50	29 631,30	97 258,60
2010-06-30	1 797,10	1 270,20	9 691,00		56 811,10	29 490,20	99 059,60
2010-07-31	1 805,40	1 285,30	9 770,20		57 019,10	29 224,30	99 104,30
2010-08-31	1 803,10	1 276,50	9 570,70		56 498,90	28 892,80	98 042,00
2010-09-30	1 785,50	1 252,00	9 441,10		55 893,40	28 684,30	97 056,40
2010-10-31	1 778,90	1 228,20	9 323,40		55 781,10	28 487,80	96 599,30
2010-11-30	1 778,50	1 219,20	9 289,30		55 505,80	28 307,40	96 100,20
2010-12-31	1 824,90	1 243,90	9 849,10		58 419,40	28 564,80	99 902,10
2011-01-31	1 790,70	1 208,10	9 000,90		54 700,40	27 901,10	94 601,30
2011-02-28	1 767,10	1 183,60	8 896,40		54 324,60	27 581,70	93 753,40
2011-03-31	1 755,00	1 184,90	8 880,50		54 029,80	27 238,10	93 088,40
2011-04-30	1 774,30	1 210,90	9 201,40		54 885,90	27 018,90	94 091,30
2011-05-31	1 773,30	1 225,80	9 190,80		54 236,40	26 687,40	93 113,70
2011-06-30	1 800,30	1 274,70	9 591,90		55 805,80	26 419,20	94 891,90
2011-07-31	1 809,10	1 285,10	9 566,80		55 457,80	26 152,50	94 271,40
2011-08-31	1 801,50	1 283,50	9 499,00		55 348,60	25 824,20	93 756,80
2011-09-30	1 788,20	1 258,70	9 330,00		54 661,30	25 462,60	92 500,80
2011-10-31	1 780,00	1 238,80	9 266,10		54 707,60	25 246,50	92 239,10
2011-11-30	1 788,10	1 226,00	9 260,60		54 681,50	25 098,00	92 054,10
2011-12-31	1 816,90	1 233,20	9 612,10		57 018,30	25 090,10	94 770,60
2012-01-31	1 783,80	1 195,70	8 828,20		53 430,80	24 439,90	89 678,30
2012-02-29	1 763,80	1 179,80	8 789,70		53 033,70	24 071,00	88 838,00
2012-03-31	1 759,90	1 184,80	8 932,40		53 659,90	23 769,40	89 306,30
2012-04-30	1 763,70	1 190,50	8 933,70		53 232,40	23 373,00	88 493,30
2012-05-31	1 781,70	1 220,20	9 073,10		53 286,90	23 066,80	88 428,70
2012-06-30	1 800,60	1 260,40	9 387,60		54 666,90	22 864,70	89 980,20
2012-07-31	1 809,70	1 281,40	9 436,70		54 316,40	22 586,40	89 430,60
2012-08-31	1 808,50	1 279,50	9 359,80		54 026,70	22 286,50	88 761,00
2012-09-30	1 802,90	1 260,40	9 235,80		53 670,70	21 896,10	87 866,00
2012-10-31	1 798,80	1 244,90	9 091,00		53 272,20	21 660,50	87 067,40
2012-11-30	1 798,10	1 229,80	9 033,40		53 216,50	21 418,30	86 696,10
2012-12-31	1 828,60	1 243,80	9 784,80		56 819,00	21 380,00	91 056,20
2013-01-31	1 809,40	1 218,50	9 050,50		53 031,50	20 823,80	85 933,80
2013-02-28	1 790,00	1 198,70	8 992,50		52 663,70	20 511,20	85 156,10
2013-03-31	1 778,00	1 186,10	9 285,70		53 433,50	20 217,70	85 901,00
2013-04-30	1 771,90	1 191,90	9 142,10		52 746,40	19 710,50	84 562,90
2013-05-31	1 795,20	1 246,10	9 395,80		53 267,70	19 119,90	84 824,70
2013-06-30	1 815,20	1 264,30	9 623,40		53 698,10	18 420,40	84 841,40

Appendix 3: Statistics for banknotes on issue by denomination on Reserve Bank of Australia's website (2022)

	A	B	C	D	E	F	G	H	I
1	A6 RESERVE BANK								
2	Title	$1 notes	$2 notes	$5 notes	$10 notes	$20 notes	$50 notes	$100 notes	All banknotes
3	Description	$1 banknotes on issue, by value	$2 banknotes on issue, by value	$5 banknotes on issue, by value	$10 banknotes on issue, by value	$20 banknotes on issue, by value	$50 banknotes on issue, by value	$100 banknotes on issue, by value	Total banknotes on issue, by value
4	Frequency	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly
5	Type	Month-end	Month-end	Month-end	Month-end	Month-end	Month-end	Month-end	Month-end
6	Units	$ million	$ million	$ million	$ million	$ million	$ million	$ million	$ million
7									
8									
9	Source	RBA	RBA	RBA	RBA	RBA	RBA	RBA	RBA
10	Publication date	01-Sep-2022	01-Sep-2022	01-Sep-2022	01-Sep-2022	01-Sep-2022	01-Sep-2022	01-Sep-2022	01-Sep-2022
11	Series ID	ARBAB1M	ARBAB2M	ARBAB5M	ARBAB10M	ARBAB20M	ARBAB50M	ARBAB100M	ARBABTM
12	25-Jan-1984	88	162	178	517	2227	3661		6833
308	30-Sep-2008			629	938	2738	21224	18219	43749
309	31-Oct-2008			653	972	2934	23262	18859	46680
310	30-Nov-2008			654	976	3202	25759	19098	49688
311	31-Dec-2008			675	1008	3389	27100	19538	51709
312	31-Jan-2009			666	996	3077	24868	19528	49135
313	28-Feb-2009			657	982	2968	24687	19628	48922
314	31-Mar-2009			658	976	2928	24645	19897	49104
315	30-Apr-2009			658	977	2844	24284	19937	48700
316	31-May-2009			648	963	2672	23633	19937	47853
317	30-Jun-2009			644	954	2651	23721	20117	48087
318	31-Jul-2009			651	952	2627	23629	20326	48185
319	31-Aug-2009			656	968	2686	23797	20336	48442
320	30-Sep-2009			657	1000	2694	23916	20376	48641
321	31-Oct-2009			666	1024	2710	24155	20415	48968
322	30-Nov-2009			668	999	2761	24362	20494	49285
323	31-Dec-2009			693	1015	2965	26090	20824	51586
324	31-Jan-2010			683	1013	2792	23969	20583	49040
325	28-Feb-2010			673	976	2668	23587	20622	48527

Data from 1984   Data prior to 1984   Notes   +

Appendix 4: Share of population in the Nordics per each Nordic country (excluding Iceland), own calculations

Population of each country						
Year	Finland	Sweden	Denmark	Norway	Australia	Nordics
2010	5,363,341	9,378,131	5,543,819	4,889,253	22,031,750	25,174,544
2011	5,388,272	9,449,216	5,566,856	4,953,089	22,340,024	25,357,433
2012	5,413,967	9,519,379	5,587,085	5,018,574	22,733,465	25,539,005
2013	5,438,975	9,600,374	5,608,784	5,080,171	23,128,129	25,728,304
2014	5,461,507	9,696,105	5,639,719	5,137,427	23,475,686	25,934,758
2015	5,479,528	9,799,183	5,678,348	5,189,898	23,815,995	26,146,957
2016	5,495,297	9,923,086	5,724,456	5,236,152	24,190,907	26,378,991
2017	5,508,209	10,057,695	5,760,694	5,276,965	24,601,860	26,603,563
2018	5,515,525	10,175,215	5,789,957	5,311,916	24,982,688	26,792,613
2019	5,521,605	10,278,888	5,814,461	5,347,893	25,365,745	26,962,847

share of the population in the Nordics (%)				Nordic countries averages (2009-2019)	
Finland	Sweden	Denmark	Norway*		
21.3%	37.3%	22.0%	19.4%		
21.2%	37.3%	22.0%	19.5%	Finland	21.0%
21.2%	37.3%	21.9%	19.7%	Sweden	37.5%
21.1%	37.3%	21.8%	19.7%	Denmark	21.8%
21.1%	37.4%	21.7%	19.8%	Norway	19.7%
21.0%	37.5%	21.7%	19.8%		
20.8%	37.6%	21.7%	19.8%		
20.7%	37.8%	21.7%	19.8%		
20.6%	38.0%	21.6%	19.8%		
20.5%	38.1%	21.6%	19.8%		

Appendix 5: Data collected and refined on the amount of cash in circulation in the Nordic countries - Finland, Sweden, Norway, and Denmark

FINLAND			**DENMARK**		
Month & Year	**Normal value**	**Thousands of Euros (notes)**	**Month & Year**	**Normal value**	**Thousands of DKK (notes)**
31-Dec-09	9420413	9,420,413,000.00 €	31-Dec-09	54456000	DKK 54,456,000,000.00
31-Dec-10	10466300	10,466,300,000.00 €	31-Dec-10	56135000	DKK 56,135,000,000.00
31-Dec-11	11164326	11,164,326,000.00 €	31-Dec-11	56139000	DKK 56,139,000,000.00
31-Dec-12	11795986	11,795,986,000.00 €	31-Dec-12	59492747	DKK 59,492,747,000.00
31-Dec-13	12231288	12,231,288,000.00 €	31-Dec-13	60123830	DKK 60,123,830,000.00
31-Dec-14	12830950	12,830,950,000.00 €	31-Dec-14	60123830	DKK 60,123,830,000.00
31-Dec-15	13686809	13,686,809,000.00 €	31-Dec-15	63615702	DKK 63,615,702,000.00
31-Dec-16	14613891	14,613,891,000.00 €	31-Dec-16	64321253	DKK 64,321,253,000.00
31-Dec-17	15472289	15,472,289,000.00 €	31-Dec-17	64324368	DKK 64,324,368,000.00
31-Dec-18	16180669	16,180,669,000.00 €	31-Dec-18	64059196	DKK 64,059,196,000.00
31-Dec-19	16803565	16,803,565,000.00 €	31-Dec-19	63789990	DKK 63,789,990,000.00

SWEDEN	Rounded up to the closest number						
Month & Year	**20 SEK notes**	**50 SEK notes**	**100 SEK notes**	**200 SEK notes**	**500 SEK notes**	**1,000 SEK notes**	**Total**
31-Dec-09	SEK 1,847,000,000.00	SEK 1,253,000,000.00	SEK 10,313,000,000.00	SEK 0.00	SEK 59,810,000,000.00	SEK 31,367,000,000.00	SEK 104,590,000,000.00
31-Dec-10	SEK 1,825,000,000.00	SEK 1,244,000,000.00	SEK 9,849,000,000.00	SEK 0.00	SEK 58,419,000,000.00	SEK 28,565,000,000.00	SEK 99,902,000,000.00
31-Dec-11	SEK 1,817,000,000.00	SEK 1,233,000,000.00	SEK 9,612,000,000.00	SEK 0.00	SEK 57,018,000,000.00	SEK 25,090,000,000.00	SEK 94,770,000,000.00
31-Dec-12	SEK 1,829,000,000.00	SEK 1,244,000,000.00	SEK 9,785,000,000.00	SEK 0.00	SEK 56,819,000,000.00	SEK 21,380,000,000.00	SEK 91,057,000,000.00
31-Dec-13	SEK 1,827,000,000.00	SEK 1,236,000,000.00	SEK 9,918,000,000.00	SEK 0.00	SEK 57,603,000,000.00	SEK 9,708,000,000.00	SEK 80,292,000,000.00
31-Dec-14	SEK 1,823,000,000.00	SEK 1,260,000,000.00	SEK 9,630,000,000.00	SEK 0.00	SEK 57,408,000,000.00	SEK 7,767,000,000.00	SEK 77,888,000,000.00
31-Dec-15	SEK 1,935,000,000.00	SEK 1,278,000,000.00	SEK 8,448,000,000.00	SEK 932,000,000.00	SEK 49,985,000,000.00	SEK 5,615,000,000.00	SEK 68,193,000,000.00
31-Dec-16	SEK 1,816,000,000.00	SEK 1,392,000,000.00	SEK 5,569,000,000.00	SEK 6,513,000,000.00	SEK 38,126,000,000.00	SEK 4,788,000,000.00	SEK 58,204,000,000.00
31-Dec-17	SEK 1,703,000,000.00	SEK 1,375,000,000.00	SEK 4,268,000,000.00	SEK 6,243,000,000.00	SEK 36,832,000,000.00	SEK 4,795,000,000.00	SEK 55,216,000,000.00
31-Dec-18	SEK 1,714,000,000.00	SEK 1,352,000,000.00	SEK 4,217,000,000.00	SEK 5,452,000,000.00	SEK 41,872,000,000.00	SEK 4,541,000,000.00	SEK 59,148,000,000.00
31-Dec-19	SEK 1,705,000,000.00	SEK 1,325,000,000.00	SEK 4,118,000,000.00	SEK 4,982,000,000.00	SEK 44,048,000,000.00	SEK 4,204,000,000.00	SEK 60,382,000,000.00

NORWAY	Year average (2012 - 2019) in whole million NOK						
Year	**50 NOK notes**	**100 NOK notes**	**200 NOK notes**	**500 NOK notes**	**1000 NOK notes**	**Total**	
2012	1080.0	2149.3	6335.4	15633.4	21180.4	NOK 46,378,347,639.58	
2013	1035.9	2117.7	6250.5	16306.4	19798.0	NOK 45,508,455,935.42	
2014	1054.1	2095.8	6032.6	17101.0	18711.5	NOK 44,994,978,633.33	
2015	1092.8	2153.5	6056.3	18354.9	17947.2	NOK 45,604,655,089.58	
2016	1116.0	2172.4	5963.3	18444.8	17029.4	NOK 44,725,847,960.42	
2017	1119.2	2160.9	5830.3	17689.0	15627.4	NOK 42,426,923,406.25	
2018	1094.8	2066.9	5611.9	16567.3	14013.4	NOK 39,354,343,806.25	
2019	1055.9	2145.0	6009.7	15128.6	12238.0	NOK 36,577,235,770.83	

Appendix 6: Data collected and refined on the amount of cash in circulation in Australia

AUSTRALIA							
Month & Year	$5 notes	$10 notes	$20 notes	$50 notes	$100 notes	Total	
31-Dec-09	$693,000,000.00	$1,015,000,000.00	$2,965,000,000.00	$26,090,000,000.00	$20,824,000,000.00	$	51,587,000,000.00
31-Dec-10	$734,000,000.00	$1,058,000,000.00	$3,087,000,000.00	$26,766,000,000.00	$21,437,000,000.00	$	53,082,000,000.00
31-Dec-11	$758,000,000.00	$1,100,000,000.00	$3,271,000,000.00	$27,786,000,000.00	$22,902,000,000.00	$	55,817,000,000.00
31-Dec-12	$801,000,000.00	$1,133,000,000.00	$3,464,000,000.00	$29,000,000,000.00	$24,583,000,000.00	$	58,981,000,000.00
31-Dec-13	$828,000,000.00	$1,164,000,000.00	$3,515,000,000.00	$30,675,000,000.00	$26,836,000,000.00	$	63,018,000,000.00
31-Dec-14	$854,000,000.00	$1,203,000,000.00	$3,431,000,000.00	$32,163,000,000.00	$29,204,000,000.00	$	66,855,000,000.00
31-Dec-15	$879,000,000.00	$1,236,000,000.00	$3,439,000,000.00	$33,922,000,000.00	$32,447,000,000.00	$	71,923,000,000.00
31-Dec-16	$1,058,000,000.00	$1,289,000,000.00	$3,506,000,000.00	$35,341,000,000.00	$34,646,000,000.00	$	75,840,000,000.00
31-Dec-17	$1,080,000,000.00	$1,429,000,000.00	$3,581,000,000.00	$37,432,000,000.00	$34,672,000,000.00	$	78,194,000,000.00
31-Dec-18	$1,037,000,000.00	$1,393,000,000.00	$3,628,000,000.00	$38,930,000,000.00	$36,151,000,000.00	$	81,139,000,000.00
31-Dec-19	$1,063,000,000.00	$1,446,000,000.00	$3,769,000,000.00	$39,473,000,000.00	$38,206,000,000.00	$	83,957,000,000.00

Appendix 7: Currency per capita in the Nordics calculated with the help of population averages

Banknotes (2010 - 2019) - year ending						
Currency per capita						
Year	Finland	Sweden	Denmark	Norway*	Australia	Nordics
2010	1,951.45 €	981.47 €	1,360.63 €		1,573.60 €	
2011	2,071.97 €	924.05 €	1,355.10 €		1,631.85 €	
2012	2,178.81 €	881.30 €	1,430.85 €	999.60 €	1,694.51 €	1,299.83 €
2013	2,248.82 €	770.55 €	1,440.44 €	960.16 €	1,779.59 €	1,266.53 €
2014	2,349.34 €	740.10 €	1,432.54 €	941.63 €	1,860.00 €	1,269.48 €
2015	2,497.81 €	641.16 €	1,505.42 €	945.62 €	1,972.40 €	1,278.38 €
2016	2,659.35 €	540.41 €	1,509.86 €	921.80 €	2,047.59 €	1,267.91 €
2017	2,808.95 €	505.81 €	1,500.43 €	872.35 €	2,075.88 €	1,270.75 €
2018	2,933.66 €	535.57 €	1,486.70 €	808.76 €	2,121.23 €	1,288.94 €
2019	3,043.24 €	541.23 €	1,474.21 €	751.24 €	2,161.75 €	1,296.45 €