

The impact of financial behaviour of the household sector on GDP: A comparative analysis between Nordic countries from 2004 to 2012

Martin Mandli



Author Martin Mandli	
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<p>This Bachelor's thesis examines the relationship between changes in household financial behaviour and GDP in the Nordic countries from 2004 to 2012. Households' financial position is one of the key determinants in household consumption and final consumption expenditure is said to represent around 70% of GDP in most countries.</p> <p>The thesis objective is to determine the main similarities and differences between Nordic countries. Additionally, the research indicates the applicability of the results in macroeconomic policymaking. The thesis consists of three main components: a theoretical framework, a quantitative empirical research and a discussion part.</p> <p>The theory part examines previous studies, models and theories about the relation between aggregate demand, national accounts and GDP. Most of the theoretical framework leads back to John Maynard Keynes. The life work of some of the key economists, including Nobel prize winners Milton Friedman and Franco Modigliani, is weighed in the context of the thesis topic.</p> <p>The empirical part deals with applying linear and multiple regression analysis to statistical data about Nordic countries' GDP, consumption expenditure and the factors determining household financial position and disposable income. The data is gathered from Eurostat – Directorate-General of the European Commission.</p> <p>The research shows that there is a clear correlation between GDP, consumption and the financial behaviour of households. However, the results are not consistent in all of the Nordic countries. None of the regression analyses with high correlation coefficients produced statistically significant results for Denmark whilst 6 out of 30 analyses rejected the null hypothesis and can be considered statistically significant for Finland. Further and more comprehensive investigation of the topic is in order. However, based on the key findings, the implications and applicability of the results are analysed in a detailed matter. The reliability and validity of the analyses are evaluated by an expert on the household sector from Statistics Finland.</p>	
Keywords household's financial position, final consumption expenditure, GDP, Nordic countries, regression analysis	

Table of contents

1	Introduction	1
1.1	Background	1
1.2	Research objectives and research questions	2
1.3	Key concepts	4
1.4	Demarcation	5
2	Theoretical framework.....	7
2.1	Financial behaviour of households.....	7
2.2	Final consumption expenditure	10
2.3	Gross Domestic Product (GDP)	13
2.4	Regression analysis.....	16
3	Methodology	21
3.1	Research design.....	21
3.2	Research methods.....	23
4	Empirical findings.....	26
4.1	Finland.....	26
4.2	Sweden	29
4.3	Norway	32
4.4	Denmark	35
5	Discussion and analysis.....	37
5.1	Key results.....	37
5.2	Conclusions	41
5.3	Applicability and recommendations.....	42
5.4	Reliability and validity.....	46
5.4	Personal learning and professional development.....	48
	References	51
	Appendices.....	58
	Appendix 1. Interview questions.....	58
	Appendix 2. Nordic countries' data	60
	Appendix 3. Nordic countries' worksheet data.....	62
	Appendix 4. Statistically insignificant regression analyses (Finland).....	64
	Appendix 5. Statistically insignificant regression analyses (Sweden).....	67
	Appendix 6. Statistically insignificant regression analyses (Norway)	70
	Appendix 7. Statistically insignificant regression analyses (Denmark)	73

1 Introduction

The following chapter introduces the thesis topic in detail. Main research question and investigative questions are presented. The chapter is divided into four sections: thesis background, research objectives, key concepts and demarcation.

1.1 Background

This thesis focuses on analysing certain aspects of one of the key pillars in society – economy. According to Karl Marx, the economy is the basis of any community and a social superstructure (Wood 1981, 82). The study of economy is called economics – “Economics is a science which studies relationship between allocation and production of scarce resources for the promotion of economic growth and social welfare” (Suri, Budhiraja & Rajput 2006, 5).

Economics can be divided into microeconomics and macroeconomics. Microeconomics researches the economy at an individual or business level. Macroeconomics studies the key processes in economy as a whole by examining the entire economy. According to Blanchard & Fischer (1989, 1) the main purpose of macroeconomics is to analyze and characterize economic output, unemployment and price levels. The thesis specifically addresses issues related to economic output.

Household consumption expenditure is said to constitute about two thirds of Gross Domestic Product (GDP); therefore making it the main measure of economic health (Tapsin 2014, 1). The level of household consumption depends on numerous of interrelated factors. Financial behavior and wealth of households are the primary aspects influencing consumption. John Maynard Keynes (Miller 1996, 3) was the first acknowledged economist who recognized the impact of disposable income and savings rate on household consumption.

The effect of household debt on consumption is explained in a life cycle hypothesis (LCH). According to the hypothesis (Debelle 2004, 2) households design their savings and consumption over their lifetime, which implies that individuals consume only the sum of discounted income and present financial position (savings minus debt). Therefore, in the long-run, increasing debt-to-income ratio constrains consumption.

According to The Economist, Sweden, Denmark, Finland and Norway are one of the best governed countries in the world (The Economist 2013). By combining key global political, economic and social index rankings, in 2012, Sweden was leader in governance

practices. Denmark, Finland and Norway took the following positions. It is remarkable how four small countries are able to outperform larger and wealthier countries. Even more noticeable is that the countries are from the same region with a total population of just about 26 million.

The Nordic countries' economies are often described through the "Nordic Model". According to The Research Institute of the Finnish Economy (ETLA 2007, 13), the Nordic Model is characterized with comprehensive welfare state, high public spending and by active labour market policies. Although Nordic countries share similar values towards social and economic policies, the countries have differences in their household assets and liabilities, consumption and income.

Keynes argued (Blinder 2008) that by increasing government spending the national output will increase by more than the original change in spending. The phenomenon is called multiplier effect. Free market mixed with welfare state and high public spending make the Nordic countries especially suitable subject for this thesis. By adopting certain aspects in Keynesian economics, policy makers in Nordic countries can further stimulate aggregate demand through increasing household consumption. As said earlier, consumption levels are largely influenced by household financial behavior. By analyzing specific characteristics in household financial behavior and their relation to consumption expenditure, policy makers gain valuable information. The information can be used for increasing national output. Furthermore, the topic and methods used in the research are unique in a sense that there are no earlier similar studies attempted.

1.2 Research objectives and research questions

This thesis is expected to show what kind of a correlation is there between GDP's growth rate and financial behaviour of households during a 9-year period (2004-2012) in Nordic countries. The thesis reveals the main similarities and differences between the countries and indicates applicability of the results in macroeconomic policymaking. The topic is divided into a broader research question and five detailed investigative questions:

Research question (RQ):

"What is the relationship between household financial behaviour and GDP in Nordic Countries between 2004 and 2012?"

Investigative questions (IQ):

- IQ1: How has financial behaviour of households in Nordic Countries changed between 2004 and 2012?
- IQ2: How have changes in financial behaviour of households affected final consumption expenditure in Nordic Countries from 2004 to 2012?
- IQ3: How has Nordic Countries' GDP changed between 2004 and 2012 compared to final consumption expenditure?
- IQ4: What kind of correlation is there between changes in GDP and changes in financial behaviour of households' in Nordic countries from 2004 to 2012?
- IQ5: How could the results of the thesis be applied in macroeconomic policymaking?

The following overlay matrix (Table 1. Overlay matrix) demonstrates the investigative questions in the context of theoretical frame, methods used and expected end results.

Table 1. Overlay matrix

Investigative Questions (IQs)	Theoretical Framework	Method	Results
IQ1: How has financial behaviour of households in Nordic Countries changed between 2004 and 2012?	"Campbell, J.Y. 2006. Household Finance" "Life-Cycle Model Franco Modigliani"	Desktop research	Descriptive statistics <i>Chapter:4</i>
IQ2: How have changes in financial behaviour of households affected final consumption expenditure in Nordic Countries from 2004 to 2012?	"Keynesian Theory of Consumption" "Friedman Permanent income theory"	Desktop research	Descriptive statistics <i>Chapter:4</i>
IQ3: How has Nordic Countries' GDP changed between 2004 and 2012 compared to final consumption expenditure?	"The Circular Flow Model" "Keynesian Aggregate Expenditure model"	Desktop research	Descriptive statistics <i>Chapter:4</i>
IQ4: What kind of correlation is there between changes in GDP and changes in financial behaviour of households' in Nordic countries from 2004 to 2012?	"Keynesian Theory of Consumption and Expenditure model" "Baker, S. L. 2006. Multiple Regression Theory" "Sykes, A.O. 1992- An Introduction to Regression Analysis"	Regression analysis	Descriptive statistics: correlation <i>Chapter:4</i>
IQ5: How could the results of the thesis be applied in macroeconomic policymaking?	Author's personal knowledge and understanding of the matter	Author's own analysis Qualitative interview	Conclusions and recommendations <i>Chapter:5</i>

1.3 Key concepts

Household – “The households sector (S.14) consists of individuals or groups of individuals as consumers and as entrepreneurs producing market goods and non-financial and financial services (market producers) provided that the production of goods and services is not by separate entities treated as quasicorporations. It also includes individuals or groups of individuals as producers of goods and nonfinancial services for exclusively own final use”. (ESA 2010, 45.)

Gross domestic product at market prices (GDP, expenditure approach) – GDP is the sum of final uses of goods and services by resident institutional units (final consumption and gross capital formation), plus exports and minus imports of goods and services”. (ESA 2010, 273.)

Real adjusted gross disposable income of households per capita – “The adjusted gross disposable income of households and Non-Profit Institutions Serving Households (NPISH) divided by the purchasing power parities (PPP) of the actual individual consumption of households and by the total resident population”. (Eurostat 2014.)

Final consumption expenditure – “Final consumption expenditure consists of expenditure incurred by resident institutional units on goods or services that are used for the direct satisfaction of individual needs or wants or the collective needs of members of the community”. (ESA 2010, 70.)

Household saving rate – “The gross saving divided by gross disposable income, with the latter being adjusted for the change in the net equity of households in pension funds reserves. Gross saving is the part of the gross disposable income which is not spent as final consumption expenditure”. (Eurostat 2014.)

Gross debt-to-income ratio – “Loans, liabilities divided by gross disposable income with the latter being adjusted for the change in the net equity of households in pension funds reserves”. (Eurostat 2014.)

Household investment rate – “The gross fixed capital formation divided by gross disposable income with the latter being adjusted for the change in the net equity of households in pension funds reserves. Household investment mainly consists of the purchase and renovation of dwellings”. (Eurostat 2014.)

Nordic countries – Finland, Sweden, Norway and Denmark

Regression analysis – “The use of mathematical and statistical techniques to estimate one variable from another especially by the application of regression coefficients, regression curves, regression equations, or regression lines to empirical data”. (Merriam-Webster 2014.)

Multiple regression – “A statistical technique that uses several explanatory variables to predict the outcome of a response variable. The goal of multi linear regression (MLR) is to model the relationship between the explanatory and response variables”. (Investopedia 2014.)

1.4 Demarcation

The thesis is demarked based on the following criteria: sector, theoretical approach, research type and research method, geography and time period.

Sector

Consumption expenditure of households is the largest component of most of countries' national accounts and GDP's. Financial position of households is the key factor influencing level of consumption. Thereby the thesis concentrates only on the characteristics of financial behaviour of the household sector.

Theoretical approach

Mostly the thoughts of Keynesian school of economics are being exploited in the theoretical framework. Although the thesis concentrates on the relationship between household financial behaviour and consumption, it does not examine the factors influencing final consumption expenditure. For example, inflation, consumer confidence index, age structure of the population, changes in credit growth and unemployment rate. Furthermore, the thesis does not take into consideration the possible impact of currency fluctuations. All figures are retrieved from a single source in euros. Finally, the research' theoretical framework includes certain advanced mathematical functions and formulas. However, the thesis does not attempt to verify the mathematical side of the theorems validity in the Nordic countries between 2004 and 2012.

Research type and method

The research' type is rather desktop than field, although, the thesis utilizes both types of methods – qualitative and quantitative. The study is being performed by using regression analysis (both, linear and multiple) and additional comments are gathered through face-to-face interview with an expert on macroeconomics.

The research concentrates only on the changes of certain key variables, introduced in chapter 1.2 “Research objectives and research questions”, and not on their absolute values. The real values are discarded because they are irrelevant in the context of the research.

Geography and time period

The thesis examines four Nordic countries — Finland, Sweden, Norway and Denmark. The smallest Nordic country, Iceland, is not included in the study because of unavailability of statistical information in Eurostat. Data analysis focuses on a 9-year period between 2004 and 2012. Years 2013, 2014, 2015 are excluded because of data unavailability. The same implies for the year 2004 and backward.

2 Theoretical framework

Modern macroeconomics is greatly influenced by John Maynard Keynes. Thereby his work and the work of other theorists from the school of Keynesian economics are presented in this chapter in the context of the thesis topic. The chapter is divided into four subchapters. First three subtopics introduce theories relevant to the investigative questions. Subchapter 2.4 Regression analysis introduces theories behind the thesis' main research method and defines relevant terminology related to regression analysis.

As seen in Figure 1 (Conceptual image of the theoretical framework) this thesis investigates the relationship between financial behaviour of households, consumption expenditure and GDP. Financial behaviour of the households in the sense that the research will examine how do changes in household's disposable income, debt-to-income-ratio, investment rate and saving rate correlate with movements in annual consumption expenditure and GDP.

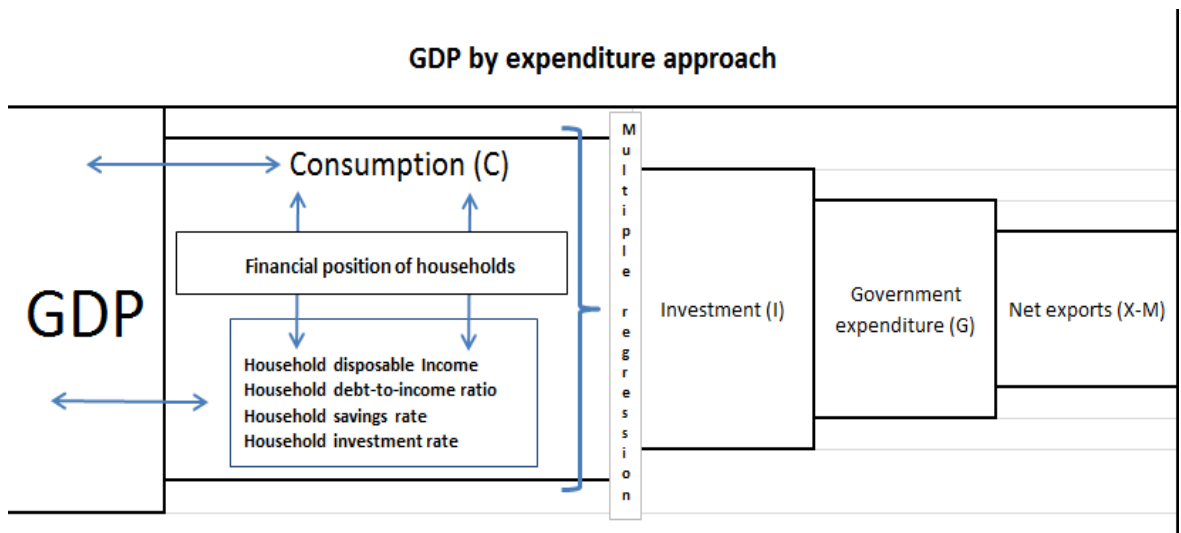


Figure 1. Conceptual image of the theoretical framework

2.1 Financial behaviour of households

The study of financial behaviour of households is challenging because the behaviour is difficult to measure precisely and the number of factors influencing the households is extensive; among others, including constraints on borrowing, inflation and uninsurable income risk. John Campbell characterises household financial behaviour as follows: "Households must plan over long but finite horizons; they have important nontraded assets, notably their human capital; they hold illiquid assets, notably housing; they face

constraints on their ability to borrow; and they are subject to complex taxation". (Campbell 2006, 4.)

However, as stated in chapter 1.4 Demarcation, the true complexity of households' financial behaviour and consumption is not under investigation and the thesis concentrates only on examining numeral relationships. Therefore, Campbell's thoughts on household financial behaviour are largely discarded, except for the idea that households need to plan their financial behaviour long-term.

According to Guy Debelle (Debelle 2004, 6.) the Life-Cycle Model (Franco Modigliani 1950's) implicates that households dis-save during their early working life and finance their consumption by borrowing. Latter part of their lives hoseholds' income rises and debttness decreases to the point when loans are repaid and assets accumulate. During retirement households dis-save again by financing their consumption with their accumulated assets. Debelle also states that: "The debt position of an individual household can therefore be determined by the path of future income and the interest rate (relative to the discount rate)".

Based on the Life-Cycle Model, households seek to gain a specific income to net worth ratio (the difference between households' total assets and total liabilities), during their lifetime, in order to maintain consumption in a certain level through retirement. For example, the theory may imply that in case of unfavourable occurrences, increased risk of losing a job for example, households increase their saving and/or pay back debts for the sake of securing the desirable income to net worth ratio. (Glick & Lansing 2011, 1.) Therefore, it can be assumed that any change in disposable income and/or net worth (or even only a perspective of a change) has a direct impact on households' consumption patterns, saving and investment rates and debt-to-income ratio.

Life-cycle model can be formulized as follows:

$$C = \frac{W + RY}{T}$$

Where,

C= Annual consumption

W= Wealth

R= Years to retirement

T= Remaining lifetime in years

Y= Annual income

Assuming that all factors except the one under investigation (either wealth or annual income) remain constant, the following assumptions can be drawn from the Life-Cycle Model in the context of the thesis:

- An increase/decrease in Y (Annual income/disposable income) has a positive/negative impact on C (Consumption).
- There is a relationship between household saving rate (S), debt-to-income ratio (D), investment rate (I) and disposable income. Increases or decreases in S, D and I correlate with the changes (increase or decrease) in disposable income. Level and type of the correlation (positive or negative) is determined by applying regression analysis to datasets.

2.2 Final consumption expenditure

Final consumption expenditure can be also defined as follows: “Expenditure incurred by residential institutional units on goods or services that are used for the direct satisfaction of the individual needs or wants or the collective needs of members of the community”. (Eurostat 2014.)

Consumption constitutes the largest part of GDP in most countries, either directly or through government expenditure. One of the most studied papers in economics is John Maynard Keynes’ “General Theory of Employment, Interest and Money” (1936). Keynes’ work covered multiple economic theories, including consumption. According to Keynes the most relevant factor, influencing consumption is individual’s income (Miller 1996, 2). Although the theory characterises consumption of individuals, it can be generalized to households. Keynes’ theory can be formulized as follows:

$$c=a+by,$$

Where,

c= Consumption

a= Autonomous figure (specific level of basic consumption; housing, energy, food etc.)

b= Marginal propensity to consume (ratio of consumption changes to income changes)

y= Real disposable income

Keynes stated that the marginal propensity to consume (MPC) would always have values between one and zero. This is due because households cannot consume more than they earn, which is the case if MPC would be greater than one. Furthermore, Keynes also implied that the autonomous figure would always be positive — elementary needs have to be satisfied. Based on Keynes' work it can be said that households consume a smaller percentage of their disposable income as it rises (marginal propensity to consume does not exceed one). In case household consumption exceeds their disposable income, households have to dis-save and finance spending with debt or with their accumulated assets. Moreover, if disposable income is higher than consumption, the difference is either saved or invested. (Miller 1996, 3.) Figure 2 Keynesian Cross, can be used to illustrate Keynesian theory in practice.

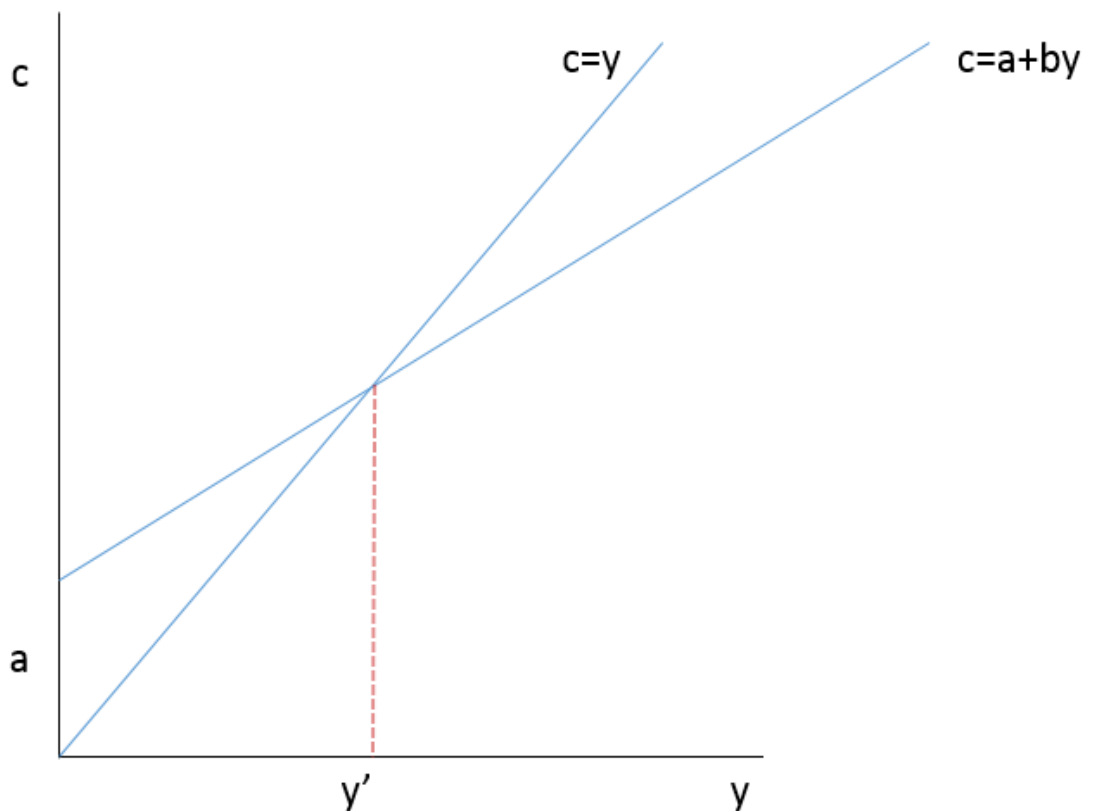


Figure 2. Keynesian Cross

At any point left to y' , household disposable income is lower than consumption and consumers must use their savings or increase debt to finance their basic consumption (autonomous figure a). The y' point can be considered of being a brake-even income and with that level of consumption households neither save nor dis-save. In case the income is higher than the cost of necessities (any level right to y'), households can increase their

consumption or save the surplus. The figure also demonstrates why the marginal propensity to consume is always lower than one, otherwise the $c=y$ and $c=a+by$ lines would never cross and households would constantly dis-save.

However, after numerous of attempts by other economists to verify Keynes' theory on consumption, it was stated that the results largely depended on the length of the time period. According to Tim Miller (Miller 1996, 4), the autonomous constant tended to zero, and the MPC tended to one as the data became more long term.

Milton Friedman adjusted Keynes theory by introducing distribution of income as the influencing factor of the anomaly in Keynes' theory. According to Friedman (Meghir 2002, 4), the level of consumption depends not only by individuals' current income but also their expected income in the future (permanent income). The theory implies that changes in consumption levels are more determined by changes in permanent income and not in current income – consumers tend to transmit variations in income over time. Friedman concluded that there are two types of income – transitory and permanent. Permanent income is the income an individual/household is expected to earn over a longer period of time (ten years for example) and does not fluctuate significantly compared to actual income. The size of permanent income depends on individuals' physical assets (financial assets and investments) and human assets (education). Permanent income affects households' willingness to save and invest (long-term average income has to be smaller than their current income).

Transitory income may vary a lot compared to actual income, depending on how individuals/households take care of their finances. However, in the long-run, transitory income zeros because positive and negative fluctuations are averaged out. Friedman's ideas can be formulized as follows (Meghir 2002, 5):

Measured consumption equals the sum of permanent consumption and transitory consumption.

$$C=C_p+C_t$$

Where,

C = Measured consumption

C_p = Permanent consumption

C_t = Transitory consumption

Measured income equals the sum of permanent income and transitory income.

$$y = y_p + y_t$$

Where,

Y = Measured income

Y_p = Permanent income

Y_t = Transitory income

“Permanent consumption is determined by the average (or marginal) propensity to consume out of permanent income which depends on the rate of interest and on taste shifter variables z ” (Meghir 2002, 5).

$$C_p = k(r, z) y_p$$

Where,

C_p = Permanent consumption

$k(r, z)$ = Average (or marginal) propensity to consume

Y_p = Permanent income

Based on the Keynes' theory on consumption and Friedman's permanent income hypothesis the following assumptions can be drawn:

- An increase/decrease in Y (real disposable income) has a positive/negative impact on C (Consumption).

An increase/decrease in Y_p (permanent income) has a positive/negative impact on C_p (permanent consumption) because marginal propensity to consume tends to equal one over time. The size of Y_p influences households' willingness to save, invest and willingness to increase debt-to-income ratio. Thereby:

- Increases or decreases in saving rate, disposable income, investment rate and debt-to-income ratio correlate with the changes (increase or decrease) in

consumption. Level and type of the correlation (positive or negative) is determined by applying regression analysis to the datasets.

2.3 Gross Domestic Product (GDP)

GDP (at market prices) can be also defined as follows: “The final result of the production activity of resident producer units” (Eurostat 2014).

Based on the expenditure side, GDP can be measured (Eurostat 2014):

GDP = private final consumption expenditure
+ government final consumption expenditure
+ gross fixed capital formation
+ changes in inventories
+ acquisition less disposal of valuables
+ exports
- imports

One of the basic economic theories describing GDP is the Circular Flow Model. The theory explains how goods, services and money flow throughout the economy. The model is simplified and includes only two types of decision makers — households and companies. Businesses produce goods and services by utilizing inputs (factors of production), such as capital (machines and buildings), land and labour. Households consume the goods and services, produced by companies, and own the factors of production. The relationship between companies and households is interactive in two markets. Firstly, by consuming the products and services, households act as buyers and companies as sellers. In the factors of production market, companies act as buyers and households as sellers. In the latter markets, households provide the inputs needed by the companies to produce goods and services. (Mankiw 2012, 22.)

The Circular Flow Model can be visualized with the figure below.

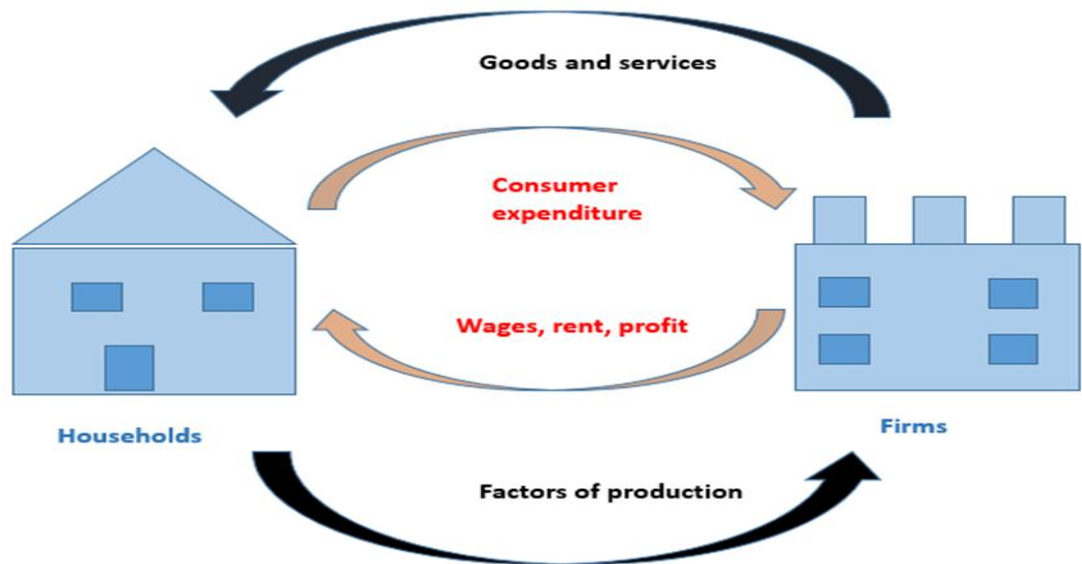


Figure 3. Circular Flow Model

Keynesian Income-Expenditure Model describing the equilibrium of real GDP concentrates on the relationship between aggregate expenditure and income. According to Keynes, the economy's natural level of real GDP can differ from the equilibrium level of output. Macpherson explains equilibrium level of real GDP: "Equilibrium is present in the Keynesian Aggregate Expenditure model when planned aggregate expenditures equal the value of actual output" (Macpherson 2012, 3). If equilibrium is achieved, firms can sell all of the produced services and goods. Therefore, companies have no incentive to either produce more or less during the next period. The equilibrium can be formulized as follows:

$$\underbrace{\text{Total output}}_{\text{Real GDP}} = \underbrace{\text{Planned } C + I + G + NX}_{\text{Planned aggregate expenditures}}$$

Where,

C=Consumption

I=Investment

G=Government spending

NX=Net exports

Consumption is the largest element of the aggregate expenditure. The level of consumption depends primarily of households' disposable income. If disposable income rises, households increase their planned expenditures. In case households' aggregate income

falls, households dis-save and borrow money or use their savings to finance their consumption.

Based on the Circular Flow Model and Keynesian Income-Expenditure Model the following assumptions can be drawn:

- An increase/decrease in C (Consumption) has a positive/negative impact on Real GDP.
- An increase/decrease in disposable income has a positive/negative impact on C (Consumption).
- Based on the theory covered in chapter 2.2 (Final consumption expenditure), it can be assumed that there is a relationship between household financial behaviour and consumption. As consumption is in a relationship with GDP, it can be also estimated that there is there is a relationship between GDP and household financial behaviour (household saving rate (S), debt-to-income ratio (D), investment rate (I) and disposable income).

Level and type of the correlation (positive or negative) is determined by applying regression analysis to the datasets

2.4 Regression analysis

Regression analysis is a technique used in statistics that examines the relationship between variables. According to Alan O. Sykes (Sykes 1992, 1): "To explore such issues, the investigator assembles data on the underlying variables of interest and employs regression to estimate the quantitative effect of the causal variables upon the variable that they influence". It is also common to analyse the relevance of the supposed relationship and evaluate its plausibility.

Regression analysis involves subject specific concepts and terminology, therefore relevant keywords are defined as follows in alphabetical order:

Key concepts

ANOVA – P value – "The P value tests the null hypothesis that data from all groups are drawn from populations with identical means. Therefore, the P value answers this question:

If all the populations really have the same mean (the treatments are ineffective), what is the chance that random sampling would result in means as far apart (or more so) as observed in this experiment?" (Zar, 2010).

A low p-value (< 0.05) indicates that the null hypothesis can be rejected. Higher p-value (>0.05) p-value suggests that changes in the predictor are not associated with changes in the response. (Frost 2013, 1.)

ANOVA table (analysis of variance) – “ANOVA is used to compare differences of means among more than 2 groups. It does this by looking at variation in the data and where that variation is found. Specifically, ANOVA compares the amount of variation between groups with the amount of variation within groups. It can be used for both observational and experimental studies”. (Edanz 2015.)

ANOVA Significance of F – “Ratio of the variability between groups compared to the variability within the groups” (Pennsylvania State University 2008).

Results of the analysis are considered reliable if the value of Significance F is less than 0.05.

Adjusted R square – “A modification of R-square that adjusts for the number of terms in a model. R-square always increases when a new term is added to a model, but adjusted R-square increases only if the new term improves the model more than would be expected by chance”. (The Hedge Fund Consistency Index 2015.)

Coefficient estimates– “In simple or multiple linear regression, the size of the coefficient for each independent variable gives you the size of the effect that variable is having on your dependent variable, and the sign on the coefficient (positive or negative) gives you the direction of the effect. In regression with a single independent variable, the coefficient tells you how much the dependent variable is expected to increase (if the coefficient is positive) or decrease (if the coefficient is negative) when that independent variable increases by one. In regression with multiple independent variables, the coefficient tells you how much the dependent variable is expected to increase when that independent variable increases by one, holding all the other independent variables constant”. (Abrams 2007.)

Collinearity – “Two independent variables’ values have a close linear relationship” (Baker 2006, 11).

Correlation coefficient – “A measure of the interdependence of two random variables that ranges in value from -1 to +1, indicating perfect negative correlation at -1, absence of correlation at zero, and perfect positive correlation at +1. Also called coefficient of correlation”. (TheFreeDictionary 2015.)

Dependent variable (y) – “Dependent variable is a function of the independent variables. The variable represents the process that is under investigation”. (ArcGIS Resources 2015.)

Independent variable (x) – Variables used to model or to predict the dependent variable values” (ArcGIS Resources 2015).

Intercept – “The expected mean value of Y when all X=0” (The Analysis Factor 2014).

Multicollinearity – “One independent variable’s value is close to being a linear function of some of the other independent variables’ values” (Baker 2006, 11).

Multiple R (Coefficient of multiple correlation) – “Multiple correlation between the dependent variable and a linear combination of the predictors” (Cross Validated 2014).

R Square (coefficient of determination) - “Proportion of variability in a data set that is accounted for by a statistical model. In this definition, the term "variability" is defined as the sum of squares” (The Hedge Fund Consistency Index 2015).

Standard error – “The standard deviation of the sampling distribution of a statistic. Standard error is a statistical term that measures the accuracy with which a sample represents a population. In statistics, a sample mean deviates from the actual mean of a population; this deviation is the standard error”. (Investopedia 2015.)

Regression analysis model faces restrictions and special conditions in certain cases. The following list briefly defines the most significant ones.

Considerations, assumptions and limitations of regression analysis (Abrams 2007)

- **Linearity** – The main assumption of regression analysis is that there is a straight line relationship between dependent variable and independent variable. Regression analysis only tests the linear relationship between independent variables and dependent variable, therefore ignores any nonlinear relationships.

- **Number of cases** – The ratio between independent variables and cases should be at least 1:5. This means that for every independent variable there should be at least five cases for the regression analysis to be valid.
- **Normality** – Before performing regression analysis it is reasonable to verify that the data is normally distributed. This can be achieved by visually examining histograms of the data and its normality line. Other ways how to visually validate data normality is to construct a normal probability plot or a scatterplot. Statistical examination of the data normality can be done using special statistical programs which calculate the skewness and kurtosis for each variable. Skewness measures how symmetrical the data is and kurtosis shows how peaked the distribution is.
- **Homoscedasticity** – The assumption is central to linear regression models. According to homoscedasticity dependent variable shows similar volumes of variance across the range of values for an independent variable. In another word it states that the variability in scores for independent variables is the same at all values of the dependent variables.
- **Multicollinearity and Singularity** – Multicollinearity refers to a situation where independent variables exhibit extremely high correlation (90% or higher). This as a result may increase the value of Significance F (>0.05) and the results will be considered statistically insignificant. In singularity, the independent variables correlate perfectly and one of the independent variables is a mixture of other independent variables. Both of the conditions are unfavorable in regression analysis, because in those cases an independent variable doesn't add any predictive value over the other independent variable.
- **Data accuracy, outliers and lacking of data** – Other things to be considered while performing regression analysis is data accuracy, missing data and outliers. Data accuracy may come an issue if data is entered manually instead of using ready dataset.
An outlier in another hand is an abnormally high or low valued case (at least 3 standard deviations above or below the mean). If it is plausible that the outlier might not be a part of the same "population" as the other cases, it might be reasonable leave the case out.

In case missing data or specific variables have a lot of missing values, it may be also justifiable to leave those variables out.

Simple linear regression analysis

Regression analysis is used to forecast values of the dependent variable based on the historical relationship between dependent and independent variable. In simple linear regression model, the relationships are straight-line and between two variables.

According to Alan O. Sykes (Sykes 1992, 5) simple linear regression can be expressed as follows:

$$I = \alpha + \beta E + \varepsilon$$

Where,

I = Dependent or endogenous variable.

E = Independent, explanatory, or exogenous variable.

α = Constant term

β = Coefficient of the variable E

ε = The "noise" term which is comprised of factors that are unobservable, or at least unobserved

Multiple regression analysis

Multiple regression is similar to simple linear regression, except that instead of only one independent and dependent variable, the number of independent variables is not limited. According to Samuel Baker (Baker 2006, 8), multiple regression allows to use more than one factor to make predictions, whereas simple linear regression only examines one causal factor. Furthermore, multiple regression also separates causal factors by analyzing their influence on a certain subject independently.

Baker expresses multiple regression formula with two independent variables as follows:

$$Y = \alpha + \beta X + \gamma Z + \varepsilon$$

Where,

Y = Dependent variable.

X = Independent, variable.

Z= Independent variable.

α = Constant term

β = Coefficient of the variable X

γ = Coefficient of the variable Z

ε = The "noise" term

Regression models with more than two independent variables can be expressed as follows:

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_p X_p + \varepsilon$$

Where,

β_1, β_2 and β_p = Coefficients of the variable X

X_1, X_2, X_p =Independent variables

3 Methodology

Previous chapter gave an overview of the theoretical framework behind the topic. Chapter 3 outlines the way in which the research project is undertaken. Main data analysis and data collection methods are introduced in detail. The research process and its relation to investigative questions are visualized with illustrative figures.

3.1 Research design

Research design is a structure of scientific work by giving direction and systematizing the thesis. This thesis follows both, quantitative and qualitative approach. There are 11 main stages, and active steps from the author’s point of view, involved in the research – starting with the thesis idea and ending with conclusions and recommendations. The thesis writing process as whole is visualized with a latter figure.

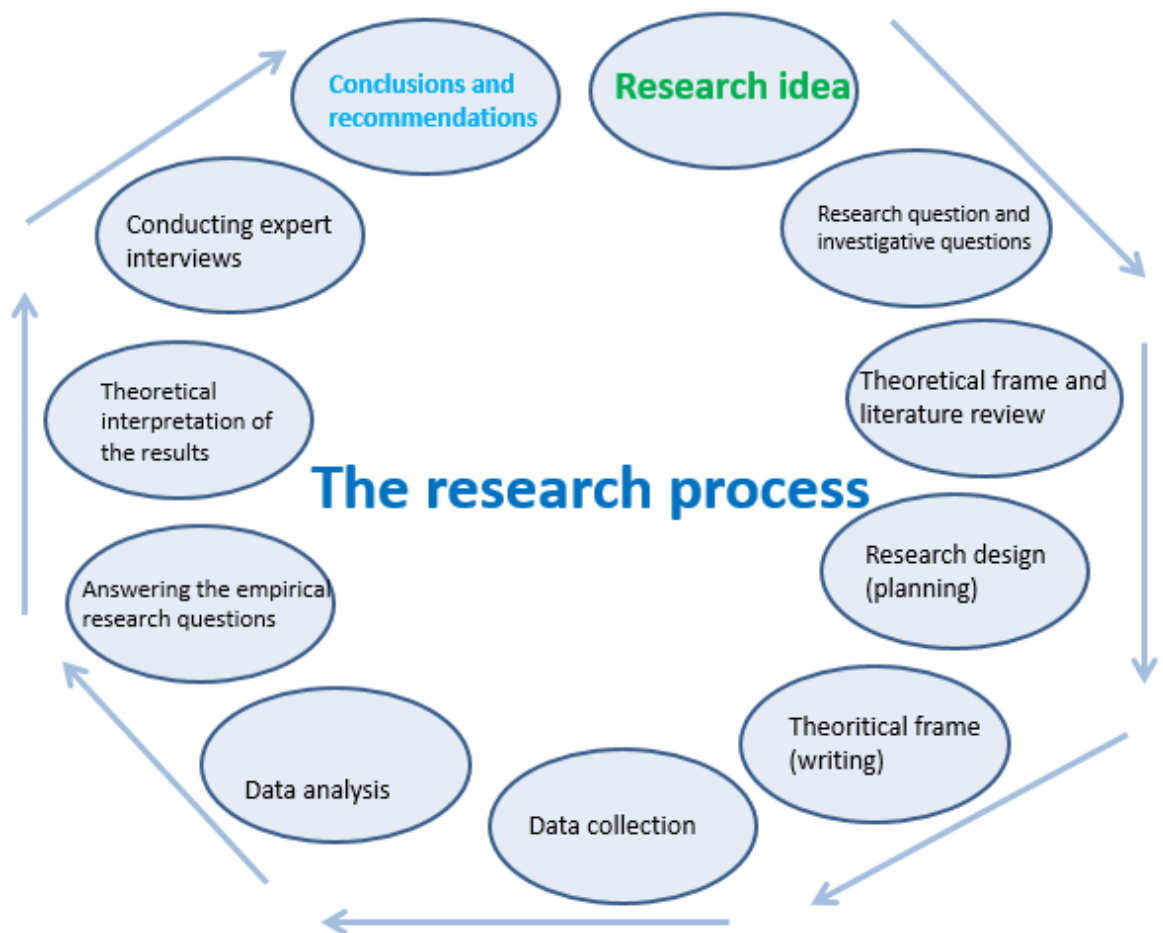


Figure 4. Research process

Quantitative research

Quantitative research deals with collecting numerical data and analysing the information using mathematical methods (Muijs 2011, 3). This type of research is especially well suited for studying relationships between different variables. The thesis follows quantitative approach because most of the information needed for implementing the thesis is in the form of statistical data and the thesis analyses connections between GDP and household financial behaviour.

The thesis will examine whether or not certain predetermined variables are correlated; meaning whether an increase or decrease in one set of variables correspond to an increase or decrease in the other variables. The objective of the thesis is to understand whether household financial behaviour in Nordic countries may have had impact on the corresponding countries' GDP. Most of the information is gathered from Directorate-General of the European Commission – Eurostat. The study is being performed by using regression analysis (simple linear and multiple). Regression analysis is being used because the tool is able to solve complex quantitative research problems. Additionally, contrary to alternative statistical methods, factor analysis and correlation analysis for example, regression analysis also considers the risks of assumptions (multicollinearity problem), thereby the analysis also provides greater reliability.

Qualitative research

Qualitative research is a type of scientific research that aims at understanding respondents' behaviour and attitudes. While used together with quantitative research, qualitative helps to analyse and understand implications of quantitative data. Qualitative research is more flexible than quantitative in a sense that it offers more spontaneity and adaptation of the interaction between the researcher and the respondent. (FHI 2005, 2.)

This type of research is especially used in exploratory research, because unlike in quantitative research, probing in qualitative methods allows respondents' to reply in their own words. One of the qualitative research methods is in-depth interview. According to Boyce & Neale (2006, 3): "In-depth interviewing is a qualitative research technique that involves conducting intensive individual interviews with a small number of respondents to explore their perspectives on a particular idea, program, or situation". In-depth interviews are especially beneficial in cases when detailed information about respondent's actions and feelings is needed in depth. Face-to-face Interviews also offer context to outcome data,

which as a result provide more comprehensive picture of the whole research. (Boyce & Neale 2006, 15.)

Thereby, additional information is collected by interviewing suitable specialist on macroeconomics. The professional brings expert-level light on the applicability of the results in political decision making in Nordic countries. Furthermore, the interviewee comments upon the differences among Nordic countries' results, upon the methods used in this thesis and the final results. By interviewing the expert, extra value and credibility is added to the thesis.

3.2 Research methods

The thesis' research methods can be divided into two stages (Figure 5. Research methods). Phase 1 relates to quantitative research. Raw data is gathered from Eurostat and after putted into investigable form it is analysed with regression analysis. Results from phase 1 are used to answer to all five investigative questions. Phase 2 relates to qualitative research. Results from face-to-face interview with an expert on macroeconomics is used to answer to the last investigative question – How could the results of the thesis applied in macroeconomic policymaking?

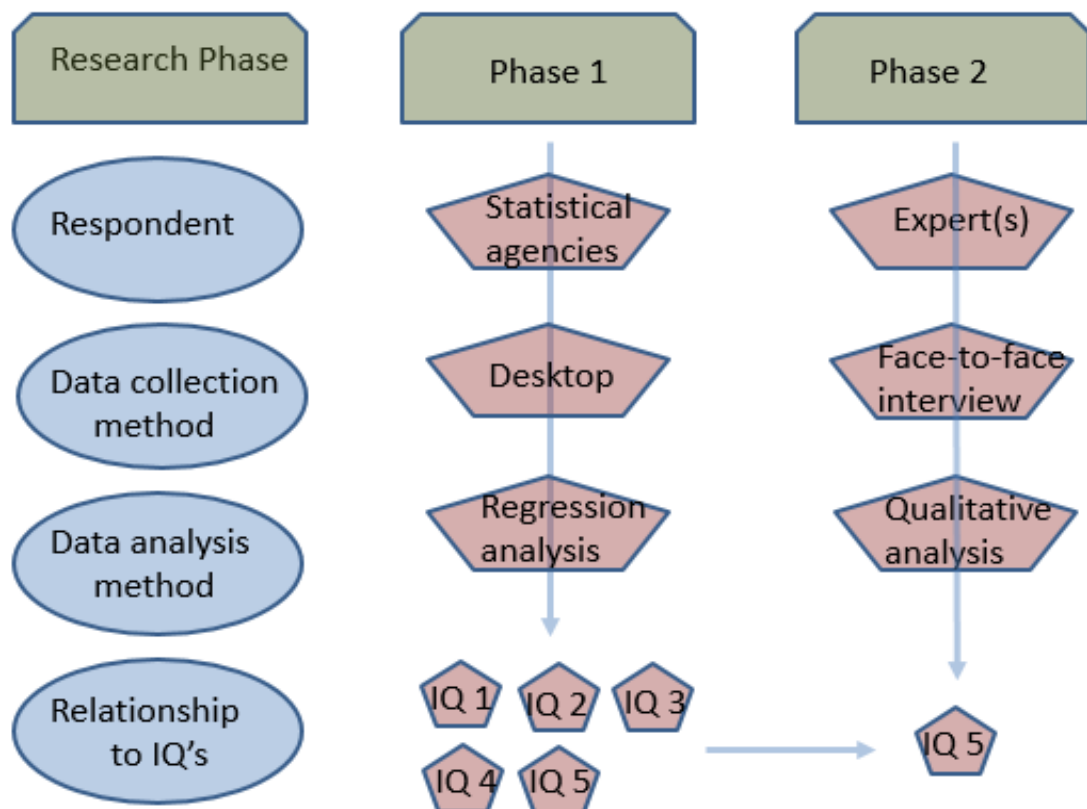


Figure 5. Research methods

Quantitative research

As stated in the previous chapter, the main source of statistical information derives from Directorate-General of the European Commission – Eurostat and the thesis implemented by using regression analysis (both, simple linear and multiple). Regression analysis is performed using a spreadsheet application — Excel 2013.

Datasets exploited in the thesis are Nordic countries’:

- GDP at current prices between 2004 and 2012
- Final consumption expenditure of households by consumption purpose - COICOP 3 digit - aggregates at current prices between 2004 and 2012
- Gross debt-to-income ratio of households between 2004 and 2012
- Household saving rate between 2004 and 2012
- Household investment rate between 2004 and 2012
- Real adjusted gross disposable income of households per capita between 2004 and 2012

Information of GDP at current prices dataset is used as dependent variable in all calculations. Information of final consumption expenditure of households is either used as independent variable during studying the relationship between GDP and consumption and as dependent while studying the relationship between financial behaviour and consumption. Disposable income is used as dependent variable during examining relationships of household financial behaviour. Debt-to-income, saving rate, investment rate and disposable income all relate to household financial behaviour and the datasets are used as independent variables in all calculations.

The research concentrates only on the changes of key variables and not on their absolute values. Therefore, data for year 2004 is set as base year (=100) for all of the datasets and values of the latter years will depend on the percent change compared to the base year 2004 (=100). This as a result, enhances comparability between datasets and analysing the results is more convenient.

Qualitative research

A qualitative research has been performed during investigating applicability of the results in economic policymaking. Expert viewpoint is gathered through face-to-face interview

Soinne 7 April 2015). The interview has been conducted with a national account specialist on household sector from Statistics Finland – Katri Soinne. Mrs. Soinne has a Master’s degree in the field of economics and has dealt with the accounting framework of Finnish national economy for 14 years. Besides working with household sector, Mrs. Soinne is experienced lecturer on national accounts.

The interview included list of questions, with short summary of Mrs. Soinne’s answers, which can be found as an attachment (Appendix 1. Interview questions). The questions can be categorized by three sections: overall comments, comments about the thesis outcome and applicability of the results. The interview design is illustrated with the following figure:

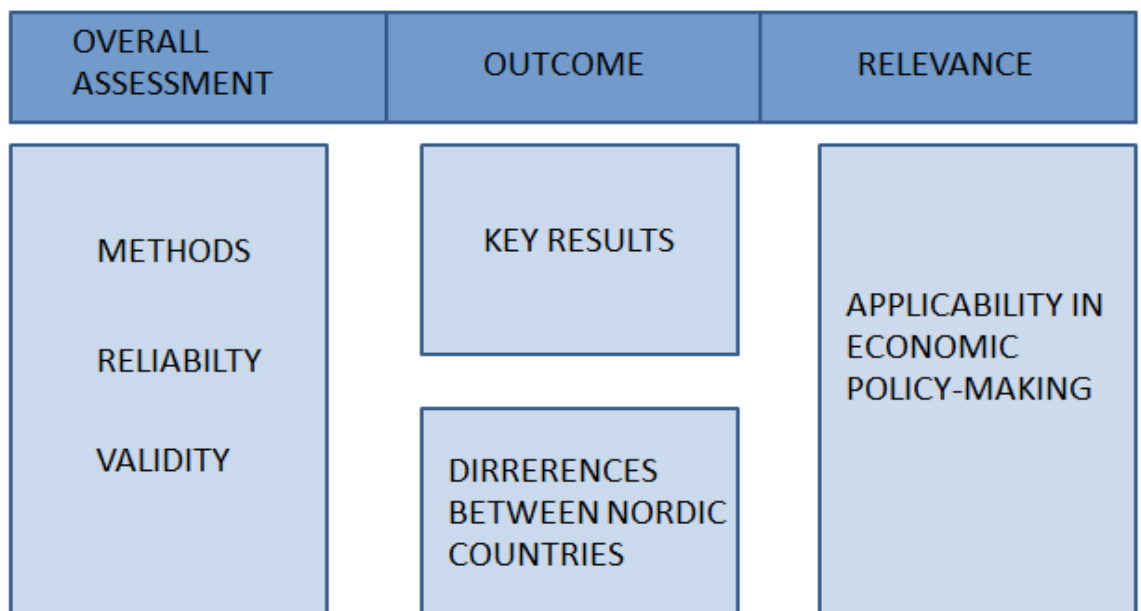


Figure 6. Interview design

4 Empirical findings

This chapter unveils the main results of the regression analyses; performed to the datasets that were mentioned in the previous chapter. All of the findings discuss and relate to developments in Nordic countries (Norway, Sweden, Denmark and Finland) from 2004 to 2012. The results are divided into four parts, each section representing a Nordic country. Special terminology is used in describing the results. Key concepts related to the regression analysis are defined in chapter 2.4 “Regression analysis”.

4.1 Finland

Financial behaviour of households

During a nine-year period, (2004-2012) households in Finland have decreased their saving rate and investment rate. Saving rate in 2004 was 9.83% of disposable income, whereas in 2012 it had dropped to 8.59%. This accounts for almost 13% decline. Investment rate has decreased from 12.22% in 2004 to 11.35% in 2012, a drop of 7%. Meanwhile, debt-to-income ratio has increased by more than 39% from 76.04% in 2004 to 106.01% in 2012. (Appendix 2. Nordic countries’ data & Appendix 3. Nordic countries’ worksheet data)

Regression analysis (Table 2) reveals that there is a clear negative correlation between disposable income (dependent variable), saving rate (independent variable) and investment rate (independent variable). R Square of the analysis is 0.72 and adjusted R Square is 0.62. This means that disposable income’s variance is explained by 72% of the saving and investment rates’ variance. Household disposable income tends to be higher when saving rate and investment rate decline. The results can be considered statistically significant because probability that the regression output could have been obtained by chance is less than 0.05 (Significance F 0.02<0.05 and P-values <0.05).

Table 2. Multiple regression summary for disposable income, saving rate and investment rate

<i>Regression Statistics</i>		<i>ANOVA table</i>			
Multiple R	0.84733	Significance F	0.02243	<i>Coefficients</i>	
R Square	0.71797	Intercept P-value	0.00230	Intercept	403.7275
Adjusted R Square	0.62396	Saving rate P-value	0.03170	Saving rate	-0.89003
Standard Error	7.79620	Investment rate P-value	0.00882	Investment rate	-2.05661

Regression analyses that did not produce statistically significant results, (p-values>0.05 and/or Significance F>0.05) are listed in Appendix 4 (Statistically insignificant results – Finland).

Consumption and financial behaviour of households

Consumption in Finland has increased every year from 2004 to 2012, except in 2009 (decline of 2.3%). Total household consumption in 2004 at current prices was € 74890 million whereas in 2012 it had increased by 39% to € 104072 million. (Appendix 2. Nordic countries' data & Appendix 3. Nordic countries' worksheet data)

As seen in Table 3. There is a strong correlation between consumption level, saving rate and investment rate. As saving rate and investment rate decrease, consumption tends to increase. R Square of the analysis is 0.75 and adjusted R Square is 0.67. This means that consumption's variance is explained by 75% of the saving and investment rates' variance. The results can be considered statistically significant because the value of Significance F and p-values are all under 0.05.

Table 3. Multiple regression summary for consumption, saving rate and investment rate

<i>Regression Statistics</i>			<i>ANOVA table</i>		
Multiple R	0.86951	Significance F	0.01451	<i>Coefficients</i>	
R Square	0.75605	Intercept P-value	0.00128	Intercept	435.0569
Adjusted R Square	0.67474	Saving rate P-value	0.01428	Saving rate	-1.04638
Standard Error	7.48704	Investment rate P-value	0.00514	Investment rate	-2.22167

Table 4 reveals that there is a very high correlation between consumption levels and disposable income – adjusted R square is 0.98. However, the result cannot be considered statistically insignificant because of the high p-value of intercept (0.8). This means that the null hypothesis cannot be rejected. Regression analyses that did not produce statistically significant results, (p-values>0.05 and/or Significance F>0.05) are listed in Appendix 4. (Statistically insignificant results – Finland).

Table 4. Simple linear regression summary for consumption and disposable income

<i>Regression Statistics</i>			<i>ANOVA table</i>		
Multiple R	0.98920	Significance F	0.00000	<i>Coefficients</i>	
R Square	0.97853	Intercept P-value	0.80071	Intercept	-1.78315
Adjusted R Square	0.97546	Disposable income P-value	0.00000	Disposable income	1.02144
Standard Error	2.05622				

GDP and consumption

GDP in Finland was 26.32% higher in 2012 than in 2004 (Appendix 3. Nordic countries' worksheet data). In terms of monetary value, GDP in 2004 was € 152.3 billion and in 2012 € 192.4 billion (Appendix 2. Nordic countries' data). Similarly, to consumption, GDP has increased every year from 2004 to 2012, except in 2009 (decline of 2.3%). Therefore, it is not surprising that there is a significant positive correlation between GDP and consumption. Table 5 shows that GDP's variance is explained by 95% of the consumption level's variance. R-square is 0.89 and the results can be considered statistically significant because Significance F and p-values are all below 0.05.

Table 5. Simple linear regression summary for GDP and consumption

<i>Regression Statistics</i>		<i>ANOVA table</i>			
Multiple R	0.94597	Significance F	0.00011	<i>Coefficients</i>	
R Square	0.89486	Intercept P-value	0.00963	Intercept	36.13760
Adjusted R Square	0.87984	Consumption P-value	0.00011	Consumption	0.66054
Standard Error	3.17763				

GDP and financial behaviour of households

Changes in GDP and financial behaviour of households were discussed in previous pages. Tables 6, 7 and 8, reveal that Finland's GDP is in correlation with multiple aspects of household financial behaviour. All of the results below can be considered statistically significant (Significance F and p-values are below 0.05). Table 6 shows that GDP is highly correlated with disposable income and saving rate (R square is 0.97).

Table 6. Multiple regression summary for GDP, disposable income and saving rate

<i>Regression Statistics</i>		<i>ANOVA table</i>			
Multiple R	0.98656	Significance F	0.00002	<i>Coefficients</i>	
R Square	0.97330	Intercept P-value	0.00033	Intercept	45.34453
Adjusted R Square	0.96439	Disposable income P-value	0.00001	Disposable income	0.71826
Standard Error	1.72974	Saving rate P-value	0.00404	Saving rate	-0.17205

Correlation between GDP, investment rate and saving rate (Table 7) is little lower than in the previous regression analysis but it can be still considered as high (R square is 0.68).

Table 7. Multiple regression summary for GDP, saving rate and investment rate

<i>Regression Statistics</i>			<i>ANOVA table</i>		
Multiple R	0.82512	Significance F	0.03252	<i>Coefficients</i>	
R Square	0.68082	Intercept P-value	0.00159	Intercept	61.17804
Adjusted R Square	0.57442	Investment rate P-value	0.01225	Investment rate	0.41362
Standard Error	5.98013	Saving rate P-value	0.01675	Saving rate	0.24497

Simple linear regression analysis between GDP and disposable income (Table 8) reveals that the variables are highly correlated. R square is 0.88 and adjusted R square is 0.87.

Table 8. Simple linear regression summary for GDP and disposable income

<i>Regression Statistics</i>			<i>ANOVA table</i>		
Multiple R	0.93944	Significance F	0.00017	<i>Coefficients</i>	
R Square	0.88254	Intercept P-value	0.01686	Intercept	34.64633
Adjusted R Square	0.86576	Disposable income P-value	0.00017	Disposable income	0.67736
Standard Error	3.35865				

Regression analyses that did not produce statistically significant results, (p-values>0.05 and/or Significance F>0.05) are listed in Appendix 4 (Statistically insignificant results – Finland).

4.2 Sweden

Financial behaviour of households

From 2004 to 2012, Swedish households have almost doubled their saving and increased their consumption by more than 40 percent. Disposable income has increased by 26% and debt-to-income ratio is 28% higher in 2012 compared to 2004. Whilst Swedes have increased their liabilities with in a similar pace as their disposable income has risen, households' investment rate has dropped by more than 8%. (Appendix 3. Nordic countries' worksheet data)

Regression analysis (Table 9) between household disposable income and saving rate reveals that the variables are correlated. Disposable income's variance is explained by 88% of the consumption level's variance. Adjusted R-square is 0.86 and the results can be considered statistically significant because Significance F and p-values are all below 0.05.

Table 9. Simple linear regression summary for disposable income and saving rate

<i>Regression Statistics</i>		<i>ANOVA table</i>			
Multiple R	0.93899	Significance F	0.00017	<i>Coefficients</i>	
R Square	0.88171	Intercept P-value	0.00000	Intercept	80.48982
Adjusted R Square	0.86481	Saving rate P-value	0.00017	Saving rate	0.22589
Standard Error	3.35180				

Regression analyses that did not produce statistically significant results, (p-values>0.05 and/or Significance F>0.05) are listed in Appendix 5 (Statistically insignificant results – Sweden).

Consumption and financial behaviour of households

As said in the previous page, consumption has increased by more than 40% during a nine-year period (2004-2012). However, in 2008, consumption level decreased by 0.8% and 7.3% in 2009 compared to the previous year. Since 2010, consumption has increased rapidly – 17.3% in 2010, 9.5% in 2011 and 6.7% in 2012. (Appendix 3. Nordic countries' worksheet data).

Table 10 reveals that Sweden's consumption levels are in correlation with disposable income, saving rate and investment rate. Multiple regression analysis between the variables produces R Square value of 0.96 and Adjusted R Square value of 0.94. Consumption's variance is explained by 96% of saving rate's, investment rate's and disposable income level's variance. The result can be considered statistically significant because Significance F and p-values are all below 0.05.

Table 10. Multiple regression summary for consumption, disposable income, saving rate and investment rate

<i>Regression Statistics</i>		<i>ANOVA table</i>			
Multiple R	0.97994	Significance F	0.00063	<i>Coefficients</i>	
R Square	0.96029	Intercept P-value	0.00984	Intercept	-137.78405
Adjusted R Square	0.93646	Disposable income P-value	0.00066	Disposable income	3.83883
Standard Error	3.70676	Saving rate P-value	0.00385	Saving rate	-0.69342
		Investment rate P-value	0.01120	Investment rate	-0.76560

Simple linear regression analysis between consumption and saving rate (Table 11) produces statistically significant results (Significance F and p-values are all below 0.05) and reveal a slight correlation between the variables. R Square is 0.51 and Adjusted R Square 0.44. Consumption's variance is explained by 51% of saving rate's variance.

Table 11. Simple linear regression summary for consumption and saving rate

<i>Regression Statistics</i>		<i>ANOVA table</i>			
Multiple R	0.71342	Significance F	0.03092	<i>Coefficients</i>	
R Square	0.50897	Intercept P-value	0.00150	Intercept	75.97257
Adjusted R Square	0.43882	Saving rate P-value	0.03092	Saving rate	0.27685
Standard Error	11.01598				

Regression analyses that did not produce statistically significant results, (p-values>0.05 and/or Significance F>0.05) are listed in Appendix 5 (Statistically insignificant results – Sweden).

GDP and consumption

Sweden's GDP has increased and decreased in a similar path as Sweden's consumption levels. GDP in 2012 was 40% higher compared to 2004 (Appendix 3. Nordic countries' worksheet data). In 2008 GDP decreased by 1%, the decline in 2009 was 12%. Simple linear regression analysis (Table 12) between GDP and consumption reveal very high correlation between the variables. R Square is 0.98 and Adjusted R Square is 0.97. However, the result can be considered statistically insignificant, due to Intercept's P-value (0.36943>0.05).

Table 12. Simple linear regression summary for GDP and consumption

<i>Regression Statistics</i>		<i>ANOVA table</i>			
Multiple R	0.98881	Significance F	0.00000	<i>Coefficients</i>	
R Square	0.97774	Intercept P-value	0.36943	Intercept	5.99766
Adjusted R Square	0.97457	Consumption P-value	0.00000	Consumption	0.94359
Standard Error	2.23800				

GDP and financial behaviour of households

Sweden's financial behaviour of households and movements in GDP were discussed in the previous pages. Table 13 shows that Sweden's GDP is in correlation with disposable income, saving rate and investment rate. Multiple regression analysis between the variables produced R Square of 0.96 and Adjusted R Square 0.94. The results can be considered statistically significant (Significance F and P-values<0.05).

Table 13. Multiple regression summary for GDP, disposable income, saving rate and investment rate

<i>Regression Statistics</i>		<i>ANOVA table</i>			
Multiple R	0.98200	Significance F	0.00048	<i>Coefficients</i>	
R Square	0.96433	Intercept P-value	0.00355	Intercept	-159.17990
Adjusted R Square	0.94293	Disposable income P-value	0.00036	Disposable income	3.94393
Standard Error	3.35237	Saving rate P-value	0.00193	Saving rate	-0.73403
		Investment rate P-value	0.01665	Investment rate	-0.624673

Table 14 reveals that Sweden's GDP is in correlation with disposable income and saving rate. Multiple regression analysis between the variables produced R Square of 0.88 and Adjusted R Square 0.83. The results can be considered statistically significant (Significance F and P-values<0.05). GDP's variance is explained by 88% of saving rate's and disposable income level's variance.

Table 14. Multiple regression summary for GDP, disposable income and saving rate

<i>Regression Statistics</i>		<i>ANOVA table</i>			
Multiple R	0.93551	Significance F	0.00195	<i>Coefficients</i>	
R Square	0.87517	Intercept P-value	0.02183	Intercept	-161.54359
Adjusted R Square	0.83356	Disposable income P-value	0.00347	Disposable income	3.00796
Standard Error	5.72493	Saving rate P-value	0.03022	Saving rate	-0.43847

Regression analyses that did not produce statistically significant results, (p-values>0.05 and/or Significance F>0.05) are listed in Appendix 5 (Statistically insignificant results – Sweden).

4.3 Norway

Financial behaviour of households

From 2004 to 2012, Norwegian households have increased their saving rate as a percentage of disposable income by 16% and investment rate by 15% (Appendix 3. Nordic countries' worksheet data). Disposable income has risen 27%. Debt-to-income rate has increased more rapidly than saving rate, investment rate and disposable income. In 2012, Norwegian households owed 180% as a percentage of their disposable income, whereas in 2004 the same figure was 135%. Household saving rate has fluctuated the most during the nine-year period. For example, in 2006, households decreased their saving rate from 14% of disposable income to just 5% (Appendix 2. Nordic countries'

data). By the year 2009, saving rate had again increased to over 10%, to 12% of disposable income.

None of the regression analyses between the variables of financial behaviour of households produced statistically significant results (p -values >0.05 and/or Significance $F>0.05$). Summary of the analyses are listed in Appendix 6 (Statistically insignificant results – Norway).

Consumption and financial behaviour of households

Household consumption, between 2004 and 2012, has increased the most in Nordic countries. Consumption level in 2012 was 64% higher compared to 2004 (Appendix 3. Nordic countries' worksheet data). Consumption has increased steadily throughout the period without any significant decline. Only in 2009 consumption decreased by 4%.

Table 15 reveals that there is a correlation between consumption, debt-to-income rate and disposable income. Consumption's variance is explained by 90% of debt-to-income rate's and saving rate's variance. Adjusted R Square is 0.87 and the results can be considered statistically significant (p -values <0.05 and Significance $F<0.05$).

Table 15. Multiple regression summary for consumption, debt-to-income rate and saving income

<i>Regression Statistics</i>			<i>ANOVA table</i>		
Multiple R	0.94825	Significance F	0.00102	<i>Coefficients</i>	
R Square	0.89918	Intercept P-value	0.02006	Intercept	-97.59981
Adjusted R Square	0.86558	Debt-to-income rate P-value	0.00040	Debt-to-income rate	1.61935
Standard Error	7.42434	Saving rate P-value	0.01921	Saving rate	0.31997

Regression analysis between consumption and disposable income produced statistically significant results (p -values <0.05 and Significance $F<0.05$) and indicate that there is a correlation between the variables. R Square and Adjusted R Square are both 0.94.

Table 16. Simple linear regression summary for consumption and disposable income

<i>Regression Statistics</i>			<i>ANOVA table</i>		
Multiple R	0.97162	Significance F	0.00001	<i>Coefficients</i>	
R Square	0.94404	Intercept P-value	0.00129	Intercept	-117.63130
Adjusted R Square	0.93604	Disposable income P-value	0.00001	Disposable income	2.20243
Standard Error	5.12116				

Regression analyses that did not produce statistically significant results, (p-values>0.05 and/or Significance F>0.05) are listed in Appendix 6 (Statistically insignificant results – Norway).

GDP and consumption

Regression analysis between GDP and consumption indicates that there is a correlation between the variables. R Square is 0.97 and Adjusted R Square is 0.96. However, the results can be considered statistically insignificant because of too high Intercept's P-value (0.086>0.05).

Table 17. Simple linear regression summary for GDP and consumption

<i>Regression Statistics</i>		<i>ANOVA table</i>			
Multiple R	0.98376	Significance F	0.00000	<i>Coefficients</i>	
R Square	0.96779	Intercept P-value	0.08642	Intercept	-22.75410
Adjusted R Square	0.96318	Consumption P-value	0.00000	Consumption	1.27035
Standard Error	5.01731				

GDP and financial behaviour of households

Table 18 reveals that GDP, disposable income and investment rate are in a correlative relationship. R Square is 0.95 and Adjusted R Square is 0.93. The results can be considered statistically significant because Significance F and P-values are below 0.05.

Table 18. Multiple regression summary for GDP disposable income and investment rate

<i>Regression Statistics</i>		<i>ANOVA table</i>			
Multiple R	0.97513	Significance F	0.00012	<i>Coefficients</i>	
R Square	0.95088	Intercept P-value	0.00090	Intercept	-237.31455
Adjusted R Square	0.93451	Disposable income P-value	0.00004	Disposable income	2.77232
Standard Error	6.69202	Investment rate P-value	0.03419	Investment rate	0.61787

Disposable income correlates with GDP (Table 19). GDP's variance is explained by 89% of disposable income's variance. Adjusted R Square is 0.87 and the results can be considered statistically significant (P-values<0.05 and Significance F<0.05).

Table 19. Simple linear regression summary for GDP and disposable income

<i>Regression Statistics</i>		<i>ANOVA table</i>			
Multiple R	0.94333	Significance F	0.00013	<i>Coefficients</i>	
R Square	0.88986	Intercept P-value	0.00470	Intercept	-168.08744
Adjusted R Square	0.87413	Disposable income P-value	0.00013	Disposable income	2.76123
Standard Error	9.27716				

Regression analyses that did not produce statistically significant results, (p-values>0.05 and/or Significance F>0.05) are listed in Appendix 6 (Statistically insignificant results – Norway).

4.4 Denmark

Financial behaviour of households

Danish households have the highest debt-to-income rate as a percentage of disposable income among the Nordic countries (Appendix 2. Nordic countries' data). In 2012, the figure was 266%. However, between 2004 and 2012, the rate has increased the least among the Nordic countries. As a result, Danish households decreased their investment rate. In 2004, the investment rate as a percentage of disposable income was 9.2%, whereas in 2012 it was only 8%. Disposable income has risen 23.7% during the period and saving rate was in a similar proportion with the disposable income in 2012 as it was in 2004 (6.4% and 6.6%).

None of the Regression analyses did not produce statistically significant results, (p-values>0.05 and/or Significance F>0.05) and are listed in Appendix 7 (Statistically insignificant results – Denmark).

Consumption and financial behaviour of households

Similarly to other Nordic countries, consumption has increased steadily every year from 2004 to 2012 except in 2009. Consumption level was 27% higher in 2012 compared to 2004 (Appendix 2. Nordic countries' data). The rise in consumption is the smallest among its neighbouring countries. In 2009, consumption declined 2.4%.

None of the Regression analyses did not produce statistically significant results, (p -values > 0.05 and/or Significance $F > 0.05$) and are listed in Appendix 7 (Statistically insignificant results – Denmark).

GDP and consumption

In 2012 Denmark's GDP was 24% higher compared to 2004 (Appendix 2. Nordic countries' data). Similar to consumption level, the increase in GDP is the lowest among Nordic countries. However, in 2009, GDP declined more than consumption level, by 5%.

Results of simple linear regression analysis between GDP and consumption level indicate that the variables are in a correlative relationship (Table 20). R Square and Adjusted R Square are close to 99%. However, due to high Intercept's P-value (> 0.05), the results can be considered statistically insignificant.

Table 20. Simple linear regression summary for GDP and consumption.

<i>Regression Statistics</i>		<i>ANOVA table</i>			
Multiple R	0.99379	Significance F	0.00000	<i>Coefficients</i>	
R Square	0.98762	Intercept P-value	0.22996	Intercept	6.05147
Adjusted R Square	0.98585	Consumption P-value	0.00000	Consumption	0.94181
Standard Error	0.95792				

GDP and financial behaviour of households

Changes in GDP and financial behaviour of households were discussed in previous pages. None of the Regression analyses between the variables produce statistically significant results, (P -values > 0.05 and/or Significance $F > 0.05$) and are listed in Appendix 7 (Statistically insignificant results – Denmark).

5 Discussion and analysis

The final chapter concludes the findings discussed in the previous section and analyses the results in a detailed manner. Reliability, validity and applicability in practical decision-making are weighed with comments given by Mrs. Katri Soinne – Senior Statistician from Statistics Finland. The chapter ends with the author's review on his personal learning and professional development.

5.1 Key results

Financial behaviour of households

Disposable income has risen in all of the Nordic countries between 2004 and 2012. The largest disposable income in 2012 was in Norway (€ 27413). However, Finnish households increased their disposable income the most (35.8%). In 2012, Danish households' disposable income was the smallest (€ 21147) and it had grown the least (23.7%). Danes had also the highest debt-to-income ratio (265.9%) among the Nordic countries. Least in debt, in 2012, were the Finns (106% of disposable income). However, Finns debt-to-income ratio also increased the most (39.4%). In 2012, the biggest savers were Swedes (14.8%) and highest investment rate belonged to Finns (11.4%). All of the countries' households increased rapidly their saving rate and decreased their investment rate in 2009.

Theoretical part of the thesis (2.1 Financial behaviour of households) implies that there is a relationship between household saving rate (S), debt-to-income ratio (D), investment rate (I) and disposable income. Increases or decreases in S, D and I correlate with the changes (increase or decrease) in disposable income. Regression analyses between the variables produced mixed results between Nordic countries. Although the analyses found several correlative relationships between the variables, most of the results can be considered statistically insignificant ($P\text{-values} > 0.05$ and/or Significance $F > 0.05$).

Finland's household disposable income tends to be higher when saving rate and investment rate decline (Table 2. Multiple regression summary for disposable income, saving rate and investment rate). The results may indicate that an increase in Finnish households' disposable income is most likely channelled to consumption rather than to savings or investments. An increase in saving and investment rate as a percentage of disposable income may imply that disposable income is declining.

Sweden's household disposable income tends to be higher when household saving rate increases (Table 9. Simple linear regression summary for disposable income and saving rate). The results imply that as saving rate as a percentage of disposable income increases so will the disposable income.

It is not plausible to say that **Norway's** and **Denmark's** household disposable income is in a correlative relationship with the factors of household financial behaviour. All of the regression analyses between the variables produced statistically insignificant results. Therefore, the assumptions based on life-cycle model do not imply among Norwegian and Danish households.

Consumption and financial behaviour of households

As mentioned in the previous chapter, consumption has increased in all of the Nordic countries every year between 2004 and 2012, except in 2009. In monetary terms, consumption levels in 2012 were the highest in Sweden (€ million 193 029) and lowest in Finland (€ million 104 072). Between the time period, Norwegian households increased their consumption the most (63.5%) and Danish households the least (26.7%).

Theoretical part of the thesis (2.2 Final consumption expenditure) implies that there is a correlative relationship between consumption as predictable variable and household disposable income, debt-to-income ratio, saving rate, investment rate as independent variables. Furthermore, the Keynesian Income-Expenditure Model suggests that an increase or decrease in disposable income has a positive or negative impact on consumption.

Finland's annual consumption levels are in a correlative relationship with saving rate and investment rate (Table 3. Multiple regression summary for consumption, saving rate and investment rate). Consumption tends to increase when saving rate and investment rate decrease. The finding is consistent with the assumption made in the previous page. However, regression analysis between consumption and disposable income produced statistically insignificant results. Therefore the assumption made based on Keynesian Income-Expenditure Model, does not apply among Finnish households.

Sweden's annual consumption levels are in a correlative relationship between disposable income, saving rate and investment rate (Table 10. Multiple regression summary for consumption, disposable income, saving rate and investment rate). Consumption tends to increase when disposable income increases and both, saving rate and investment rate decrease. Sweden's consumption is also in a correlative relationship with saving

rate. The correlation is not as evident as in the multiple regression summary (Adjusted R Square=0.44). However, it can still be implied that consumption levels tend to increase as saving rate increases (Table 11. Simple linear regression summary for consumption and saving rate). Regression analysis between consumption and disposable income produced statistically insignificant results. Therefore the assumption made based on Keynesian Income-Expenditure Model, does not apply among Swedish households.

Norway's annual consumption is in a correlative relationship with debt-to-income rate and disposable income (Table 15. Multiple regression summary for consumption, debt-to-income rate and disposable income). As Norwegian households increase their debt and saving, consumption tends to also increase. Consumption is also in a correlative relationship with disposable income. As disposable income increases, so will household consumption (Table 16. Simple linear regression summary for consumption and disposable income).

All of the regression analyses between **Danish** household's consumption and household financial behaviour variables produced statistically insignificant results. Therefore, the assumptions based on based on the Keynes' theory on consumption, Keynesian Income-Expenditure Model, and Friedman's permanent income hypothesis do not imply among Danish households.

GDP and consumption

All of the Nordic countries' GDP has grown significantly between 2004 and 2012. Norway's GDP growth has been especially impressive. Norway's GDP in 2012 was 86% higher compared to 2004. Other Nordic countries GDP growth varies from 24% in Denmark to 40% in Sweden. Although, the overall growth has been quick, in 2009, all of the countries faced recession. Denmark suffered the least, with 5% decline, but the country has also recouped the slowest. In Sweden and Norway, the decline was more than 12%. However, as said earlier, Norway's GDP has grown the fastest; in 2012 Norway had the second largest economy in the region (€ million 389 149) just after Sweden (€ million 407 820). Finland's GDP is the smallest (not considering Iceland) among Nordic countries with € million 192 350.

Theoretical part (2.3 National income) of the thesis implies that an increase or decrease in consumption has a positive/negative impact on real GDP and an increase or decrease in disposable income has a positive or negative impact on consumption.

Finland's GDP is in a correlative relationship with consumption levels (Table 5. Simple linear regression summary for GDP and consumption). Finland's GDP tends to be higher as consumption levels increase. The result is consistent with assumption made based on Circular Flow Model and Keynesian Income-Expenditure Model.

Regression analysis of **Sweden's**, **Norway's** and **Denmark's** GDP and annual consumption produced statistically insignificant result. Therefore, the assumption made based on Circular Flow Model and Keynesian Income-Expenditure Model do not imply among Swedish, Norwegian and Danish households.

GDP and financial behaviour of households

Theoretical part of the thesis (2.3 National income) implies that there is a correlative relationship between GDP and household financial behaviour (household saving rate (S), debt-to-income ratio (D), investment rate (I) and disposable income).

Finland's GDP is in correlation with disposable income and saving rate (Table 6. Multiple regression summary for GDP, disposable income and saving rate). The GDP tends to be higher when disposable income increases and saving rate decreases. Finland's GDP is also in a correlative relationship with saving rate and investment rate (Table 7. Multiple regression summary for GDP, investment rate and saving rate). Multiple regression analysis between the variables implies that GDP increases when saving rate and investment rate increase. Table 8 (Simple linear regression summary for GDP and disposable income) suggests that Finland's GDP also tends to be higher when disposable income increases. The results are consistent with the assumptions made based on Circular Flow Model and Keynesian Income-Expenditure Model.

Sweden's GDP is in a correlative relationship with disposable income, saving rate and investment rate (Table 13. Multiple regression summary for GDP, disposable income, saving rate and investment rate). GDP tends to increase when both, saving rate and investment rate, as a percentage of disposable income, decrease and disposable income increases. Table 14 (Multiple regression summary for GDP, disposable income and saving rate) reveals that Sweden's GDP rises when disposable income increases and saving rate as a percentage of disposable income decreases. The results are consistent with the assumptions made based on Circular Flow Model and Keynesian Income-Expenditure Model.

Norway's GDP is in a correlative relationship with disposable income and investment rate (Table 18. Multiple regression summary for GDP disposable income and investment rate). Norway's GDP tends to increase when disposable income and investment rate increase. Table 19 (Simple linear regression summary for GDP and disposable income) reveals that the GDP is also in a relationship with disposable income. GDP tends to be higher when disposable income increases. The results are consistent with the assumptions made based on Circular Flow Model and Keynesian Income-Expenditure Model.

Regression analyses of **Denmark's** GDP and financial behaviour of households produced statistically insignificant results. Therefore, the assumption made based on Circular Flow Model and Keynesian Income-Expenditure Model does not imply among Danish households.

5.2 Conclusions

In order to conclude the thesis, it is reasonable to have a look at the research objective and research questions once again. However, the 5th investigative question about the applicability of the results is covered in the following chapter (5.3 Applicability and recommendations).

Research problem

The thesis examines the relationship between household financial behaviour and GDP in Nordic Countries between 2004 and 2012. Based on chapter 4 (Empirical findings) and chapter 5.1 (Key results), it can be said that household financial behaviour exhibits correlative relationships with GDPs. In three of the Nordic countries (Sweden, Norway and Finland), household financial behaviour has both direct and indirect impact on their national income. All of the regression analyses produced statistically insignificant results for Denmark. Therefore, it cannot be stated that household financial behaviour has a considerable impact on Denmark's GDP. The level of Denmark's national income is determined by other factors.

1st Investigative question

Household financial behaviour has changed greatly in all of the Nordic countries. As an underlying trend, households' disposable income has risen and they have increased their consumption. The rise in consumption levels has been greater than increase in disposable income. This has resulted in greater debt ratio of disposable income in all of the

Nordic countries. Changes in households' saving rate and investment rate vary a lot between the countries. Finnish households have decreased the both, while Norwegian households have increased both saving rate and investment rate. Swedish and Danish households have increased their saving rate and decreased investment rate.

2nd investigative question

There are statistically significant relationships between consumption levels and household financial behaviour in all of the Nordic countries, except in Denmark. Surprisingly, only in Norway consumption exhibits statistically significant relationship with disposable income.

3rd investigative question

GDP has increased in all of the Nordic countries between 2004 and 2012. As a surprise, consumption and GDP have statistically significant correlative relationship only in Finland and GDP growth has surpassed the increase in consumption only in Norway. Meaning that in rest of the Nordic countries, consumption levels have increased more than GDP.

4th investigative question

Based on the key findings discussed in the previous chapter (5.1 Key results), GDP and parts of household financial behaviour are in correlative relationships in all of the Nordic countries except in Denmark. Six of the regression analyses between two or more variables (two analyses per country) produced statistically significant results. As an underlying trend, investment rate is a part of all of the statistically significant multiple regression analyses. However, all of the simple linear regression analyses between GDP and investment rate produced statistically insignificant results. The most surprising finding is that only Norway's GDP is directly correlated with disposable income. The result means that one of the most basic assumptions made based Circular Flow Model and Keynesian Income-Expenditure Model does not hold in Sweden, Denmark and Finland.

5.3 Applicability and recommendations

Results of the thesis indicate that Nordic countries' GDP, consumption and financial behaviour of households are in a correlative relationship. However, the key findings are not

consistent in all of the Nordic countries and they vary significantly. Therefore, the outcomes cannot be adapted directly to each of the Nordic country. Instead, a further and more detailed investigation of the topic is in order. Although the countries share similar values towards social and economic policies, their household financial behaviour differs greatly. As a result, four of the Nordic countries are in a need of individually tailored macroeconomic program to increase their national output. Furthermore, relatively low number of statistically significant regression analyses may indicate to the presence of multicollinearity and/or singularity (see chapter 2.4 Regression analysis). This, combined with possible effect of currency fluctuations and low number of sample years, potentially decreased the amount of applicable results. However, based on the key findings, certain recommendations can be made. All of the recommendations are based on author's own thoughts and learning throughout his studies. Most of the suggestions made for a specific country may as well be implemented in all of the Nordic countries. List of suggestions, alongside with reasoning, are presented in table formats.

Finland

Table 21. Recommendations for Finland

Regression analysis		Recommendations
(dv=dependent variable; iv=independent variable)		
disposable income (dv), saving rate (id) and investment rate (id)		Policy makers may use this information to predict changes in disposable income.
Analysis reveals that as saving rate and investment rate as a percentage of disposable income increase, disposable income tends to be lower.		
consumption (dv), saving rate (id) and investment rate (id)		Policy makers may motivate households to consume, thereby also national input, by lowering VAT and removing opening hour restrictions from retail stores.
Analysis reveals that as saving rate and investment rate as a percentage of disposable income increase, consumption tends to be lower.		
GDP (dv) and consumption (id)		Policy makers may use this information to further stimulate consumption by supporting innovations and ventures that provide new services/products for consumers.
Analysis reveals that as consumption increases, GDP tends to be higher.		

GDP (dv), disposable income (id) and saving rate (id)	Policy makers may use this information to learn more about consumer behaviour. Households tend to increase their saving rate when they are uncertain about their future income.
Analysis reveals that as disposable income increases and saving rate as a percentage of disposable income decreases, GDP tends to be higher.	
GDP (dv), saving rate (id) and investment rate (id)	Policy makers may use this information to predict changes in GDP if at the same time disposable income increases in a similar pace.
Analysis reveals that as nominal saving and nominal investments increase, GDP tends to be higher.	
GDP (dv) and disposable income (id)	Policy makers may decide to invest in high technology and value-creation industries, in order to increase nation's average salary.
Analysis reveals that as disposable income increases, GDP tends to be higher.	

Sweden

Table 22. Recommendations for Sweden

Regression analysis <small>(dv=dependent variable; iv=independent variable)</small>	Recommendations
disposable income (dv) and saving rate (id)	Policy makers may use this information to predict changes in disposable income, in case disposable income increases in a similar pace as nominal saving.
Analysis reveals that as nominal saving rate as a percentage of disposable income increases, disposable income tends to be higher.	
consumption (dv), disposable income (id), saving rate (id) and investment rate (id)	Policy makers may stimulate consumption, and thereby also GDP, by creating incentives to consume larger part of households increase in disposable income. This may be implemented by increasing list of reduced VAT products.
Analysis reveals that as disposable income increases, combined with decreases in saving rate and investment rate as disposable income, consumption tends to be higher.	
consumption (dv) and saving rate (id)	Policy makers may use this information to increase consumption levels, in case disposable income increases in a similar pace as nominal saving.
Analysis reveals that as nominal saving increases, consumption tends to be higher.	
GDP (dv), disposable income (id), saving rate (id) and investment rate (id)	Policy makers may use this information to predict changes in consumption and GDP.

Analysis reveals that as disposable income increases, combined with decreases in saving rate and investment rate as a percentage of disposable income, GDP tends to be higher.	
GDP (dv), disposable income (id) and saving rate (id)	Policy makers may use this information to learn about households' confidence towards future income
Analysis reveals that as disposable income increases and saving rate as a percentage of disposable income decreases, GDP tends to be higher.	

Norway

Table 23. Recommendations for Norway

Regression analysis		Recommendations
(dv=dependent variable; iv=independent variable)		
consumption (dv), debt-to-income ratio (id) and saving income (id)		Policy makers may use this information to further stimulate consumption by increasing money supply and lowering interest rates.
Analysis reveals that as debt-to-income ratio and saving rate as a percentage of disposable income increase, consumption tends to be higher.		
consumption (dv) and disposable income (id)		Policy makers may stimulate consumption, and thereby GDP, by lowering personal income taxation.
Analysis reveals that as disposable income increases, consumption tends to be higher.		
GDP (dv), disposable income (id) and investment rate (id)		High investment rate suggest availability of loans and high income. Thereby, policy makers may use this information to start with new projects, which demand private funding.
Analysis reveals that as disposable income and investment rate as a percentage of disposable income increase, GDP tends to be higher.		
GDP (dv) and disposable income (id)		Policy makers may use this information to lower employer related taxation on businesses, thereby indirectly increasing disposable income.
Analysis reveals that as disposable income increases, GDP tends to be higher.		

Denmark

None of the regression analyses between Denmark's variables produced both, statistically significant results and exhibited signs of correlation. Therefore, by purely focusing on the outcomes of the thesis, recommendations cannot be given. Danish households, however, are significantly in debt. While the average household debt-to-income rate in OECD countries in 2012 was 130% (The Economist 2013), in Denmark it peaked as high as 266%. As a percentage of disposable income, Danes are the most indebted population in Europe. High indebtedness increases the risk of bankruptcy and lowers marginal propensity to consume unless disposable income rises in a faster pace.

Between 2004 and 2012, debt-to-income rate increased from 210% to 266%. Danes are already facing the restrictions of high debt on their consumption levels and thereby on GDP. Both of which have risen the least among Nordic countries. In order to increase national input, Denmark's policy makers should find a way to stabilize the indebtedness growth of households, without harming Danes' purchasing power. By increasing the cost of new borrowings, Denmark can lower the rate at which the households increase their indebtedness. Lower inflation, in the other hand, will improve households' ability to consume. Therefore, very simplified, possible solution would be to slowly increase capital demands for Danish banks, increase interest rates and lower VAT rates.

Applicability of the results in macroeconomic policymaking and recommendations based on the interview with Katri Soinne cannot be given. Reasons behind the anomaly are explained in the following chapter.

5.4 Reliability and validity

Interview with Katri Soinne revealed several of structural mistakes within the thesis. The research does not have any references to System of National Accounts (SNA) and European System of Accounts (ESA). These guidelines are international accounting framework of economies and its components. According to Mrs. Soinne, absence of the framework is a significant lacking. Furthermore, Soinne pointed out that the casual relationships of the author's assumptions in theoretical frame, empirical findings and analysis are not consistent with key principals in national accounting. For example, saving rate cannot be used to predict disposable income because it is calculated by subtracting consumption expenditure from disposable income. Therefore, as Mrs. Soinne literally put it: "the thesis is trying to explain speed of a car with car crashes". Actually, car crashes can be explained with speed. Based on Soinne's comments, it can be said that the thesis

does not offer any kind of value to a wider audience. Besides structural mistakes, the use of regression analysis is questionable in national accounting because of interdependence of the variables. Finally, Mrs. Soinne said that the currency fluctuations might influence the findings significantly. Therefore, none of the key results cannot be considered reliable.

Every scientific work can be broadly divided to three sections: planning, implementation and analysis. In order to understand trustworthiness of the thesis, each of the category is weighed in the context of author's choices and actions.

Planning

All of the processes during planning stage were conducted under the supervision of Haaga Helia University of Applied Sciences Thesis presentation workshop lecturer. Additional comments and assistance were gathered from other students and lecturers. Thesis topic, research questions, theoretical frame (planning) and research method were all accepted as trustworthy and reliable. However, the thesis does not take into consideration the possible impact of fluctuations in currencies. This may have resulted in low number of statistically significant regression analyses. Furthermore, during the planning phase, author of the thesis failed to take into consideration key characteristics of national accounting. This has resulted in invalid and unreliable key findings.

Implementation

Processes involved in the implementation stage included: theoretical frame (writing), data collection, data analysis (processing) and qualitative research (interview). All of the actions were done independently without supervision and assistance. However, the author has been selective while deciding which theoretical source to implement and data processing is been done by using a familiar tool (Excel). Furthermore, the thesis is written by keeping the reader in mind. The author has aimed to write as simplistically as possible with logical layout. This as a result maximizes readability and credibility. Therefore, the implementation stage can be considered valid, easily repeatable and generalizable to a similar research topic.

Analysis

The latter part of a research should reflect upon the research problem and theoretical frame. Credibility of the author's decision-making and conclusions is guaranteed through

consistent and transparent dialogue between well-known theoretical framework and the author's own analysis. Analysis included theoretical interpretation of the results, answering to empirical questions and writing conclusions. However, as said earlier, basic assumptions within the thesis are not valid. Therefore, the author's analysis can be considered invalid and unreliable.

5.5 Personal learning and professional development

As mentioned in chapter 3.1 (Research design), the thesis writing process involved 11 main stages and active steps from the author's point of view. The following table provides detailed information of how each of the limestone has had a contribution on the writer's personal learning and professional development.

Table 24. Personal learning and professional development

Process	Mistakes made	Obtained competences
1. Research idea	Preliminary thesis idea was chosen without confirming that there is enough available data	Ability to analyse own professional traits and set ambitious yet reachable goals
2. Research question and investigative questions	Preliminary RQ and IQ's were not subject specific enough	Ability to clearly define problems and design process to solve them
3. Theoretical frame and literature review	Underestimated the workload and the time it took to find suitable theoretical frame for the thesis. Did not take into consideration national accounting framework	Ability to screen a lot of information and focus only on the main issues
4. Research design (planning)	Did not take into consideration the possible impact of exchange rates while deciding on the secondary data	Understanding of the processes involved in the planning of scientific research
5. Theoretical frame (writing)	Tried to write the most challenging part of the thesis while being too tired or	Ability to paraphrase unfamiliar and demanding scientific writing

	involved with other processes (multitasking)	
6. Data collection	Did not detect anomalies in the figures while processing the data	Competence of working with large amount of data and processing it to a suitable form
7. Data analysis	Did not plan data analysis and recording of the results which eventuated in loss of time and extra work	Learning of using advanced techniques in excel (regression analysis)
8. Answering the empirical research questions	Did not find an economical way to present key findings which resulted in that chapter 5.1 and chapter 4 somewhat replicate each other	Ability to analyse results in the context of theoretical frame and research problem
9. Theoretical interpretation of the results	Should have consulted with an expert before interpreting the results	Ability to analyse figures and put them in context
10. Conducting expert interview	Should have been more prepared for the negative feedback	Interpersonal skills and ability to create an interview framework
11. Conclusions and recommendations	Recommendations' tables could be more country-specific and based on facts	Ability to summarize key results and present them in a professional manner

Overall, the thesis writing process has given me the opportunity to strengthen my analytical abilities and academic writing skills. I have done most of the work independently, without the guidance of my lectures. This has grown my confidence and professional self-awareness. It has been rewarding to see how the theoretical background can be tested with actual data. However, the amount of statistically significant results out of 120 regression analyses was a personal disappointment. This can be explained with high interdependence of the variables.

Mrs. Soinne's thoughts on the thesis have thought me how to deal with great disappointments. This experience has also made me a better listener and a more humble person. Nevertheless, I do not regret choosing an ambitious topic with all of its unfamiliarity because have learned a great deal about basic economic theories and regression analysis.

From the beginning of thesis process, I knew that the thesis would be considered excellent within my degree programme or it would end with a complete disaster. Unfortunately, the latter came true. However, after becoming acquainted with SNA and ESA, my motivation is still high and I will further analyse household financial behaviour during my Master's degree studies because I believe that the subject is worth further investigation.

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Appendices

Appendix 1. Interview questions

Questions	Summary of answers
Overall comments about the thesis	
Do you consider the use of regression analysis appropriate method for the thesis topic?	The method is questionable because of the high interdependence of the variables.
Do you consider results of the thesis reliable in nature?	Results of the thesis cannot be considered reliable because of structural mistakes within the topic.
Do you consider results of the thesis valid in nature?	Results of the thesis cannot be considered valid because of structural mistakes within the topic
Is there something else which you would like to comment considering the thesis overall?	The theoretical frame is quite good and regression analyses seem correct.
Comments about key results	
What could be the causes of relatively low number of statistically significant regression analyses?	High interdependence between the variables and possible impact of the currency fluctuations
Do you consider the key results being in accordance to the theoretical frame of the thesis?	Mrs. Soinne was unable to answer this question because of lack of validity and reliability of the results.
What is the most surprising result?	Mrs. Soinne was unable to answer this question because of lack of validity and reliability of the results.
Is there something else that you would like to comment about the key results?	Mrs. Soinne explained me about basic fundamentals in national accounting system
Comments about the differences between Nordic countries	
What difference do you find to be the most surprising?	Mrs. Soinne was unable to answer this question because of lack of validity and reliability of the results.
What do you consider the key driver behind differences among Nordic countries?	Mrs. Soinne was unable to answer this question because of lack of validity and reliability of the results.

What could be the reasons behind Denmark's lack of, both, statistically significant and exhibit correlation between variables, regression analyses?	Mrs. Soinne was unable to answer this question because of lack of validity and reliability of the results.
Is there something else that you would like to comment about the differences between Nordic countries?	Mrs. Soinne was unable to answer this question because of lack of validity and reliability of the results.
Comments about the applicability of the results in economic policy-making	
How can the results of the thesis be used in economic policy-making?	None of the results are applicable because of reliability and validity issues.
Based on the results, what would you recommend to Finnish economic policy makers?	Statistics Finland does not make recommendations. The agency gathers analyses and reports data.
How could this topic be researched in further in order to maximize applicability?	Mrs. Soinne was unable to answer this question because of lack of validity and reliability of the results
Is there something else that you would like to comment about applicability of the results?	Author's recommendations are not based on facts and they are in some cases illogical.

Appendix 2. Nordic countries' data

Finland						
Year	GDP (Millions of €)	Consumption (Millions of €)	Disposable income (€)	Debt-to-income rate (% of disposable income)	Saving rate (% of disposable income)	Investment rate (% of disposable income)
2004	152266.00	74890.00	16808.00	76.04%	9.83%	12.22%
2005	157429.00	77847.00	17195.00	85.14%	8.46%	13.20%
2006	165765.00	82380.00	18090.00	92.43%	6.80%	13.61%
2007	179830.00	86940.00	19603.00	96.76%	7.24%	13.80%
2008	185670.00	91699.00	20485.00	97.87%	7.83%	12.29%
2009	172318.00	89572.00	20482.00	100.00%	11.71%	10.28%
2010	178724.00	94443.00	21411.00	102.18%	10.70%	11.25%
2011	188744.00	100730.00	22095.00	103.99%	8.74%	11.64%
2012	192350.00	104072.00	22817.00	106.01%	8.59%	11.35%
Sweden						
Year	GDP (Millions of €)	Consumption (Millions of €)	Disposable income (€)	Debt-to-income rate (% of disposable income)	Saving rate (% of disposable income)	Investment rate (% of disposable income)
2004	291634.10	135387.00	18033.00	115.20%	7.59%	5.33%
2005	298353.30	138721.50	18065.00	123.76%	6.93%	5.61%
2006	318170.80	145571.00	18966.00	130.42%	7.82%	6.19%
2007	337944.20	153393.90	20436.00	132.51%	10.11%	6.51%
2008	333255.70	152153.90	21037.00	136.46%	11.83%	5.77%
2009	292472.10	141027.10	20696.00	142.04%	13.81%	5.10%
2010	349945.10	165484.50	20977.00	148.89%	11.26%	5.73%
2011	385450.70	181144.10	21810.00	148.29%	13.10%	5.34%
2012	407820.30	193029.70	22800.00	147.19%	14.79%	4.89%
Norway						
Year	GDP (Millions of €)	Consumption (Millions of €)	Disposable income (€)	Debt-to-income rate (% of disposable income)	Saving rate (% of disposable income)	Investment rate (% of disposable income)
2004	209423.50	88083.30	21528.00	134.96%	11.64%	9.77%
2005	244582.10	96697.80	22530.00	140.64%	14.30%	10.37%
2006	271001.20	102563.50	21965.00	165.09%	5.25%	11.95%

2007	287712.20	110211.70	23740.00	170.05%	6.61%	12.45%
2008	311284.90	112707.30	24139.00	168.96%	9.13%	11.07%
2009	272958.80	108622.00	24331.00	169.34%	12.06%	9.67%
2010	317862.40	125736.30	25252.00	173.55%	10.83%	9.55%
2011	352962.80	133079.90	25961.00	176.00%	12.67%	10.72%
2012	389148.50	143978.80	27413.00	180.33%	13.47%	11.20%

Denmark

Year	GDP (Millions of €)	Consumption (Millions of €)	Disposable income (€)	Debt-to-income rate (% of disposable income)	Saving rate (% of disposable income)	Investment rate (% of disposable income)
2004	197069.90	93615.20	17095.00	210.43%	6.37%	9.16%
2005	207366.90	98684.50	17093.00	232.00%	3.71%	11.28%
2006	218747.40	104177.00	18085.00	238.08%	5.45%	12.49%
2007	227533.90	108253.20	18883.00	254.60%	4.25%	12.83%
2008	235133.00	110800.60	19212.00	261.91%	5.10%	12.00%
2009	223575.80	108140.70	19442.00	269.92%	8.40%	8.41%
2010	236334.10	112933.50	20504.00	266.81%	7.70%	8.00%
2011	240487.10	115308.00	20556.00	266.45%	7.70%	8.48%
2012	245252.00	118608.00	21147.00	265.88%	6.61%	8.00%

(Eurostat 2014.)

Appendix 3. Nordic countries' worksheet data

Finland						
Year	GDP (2004=100)	Consumption (2004=100)	Disposable income (2004=100)	Debt-to- income ratio (2004=100)	Saving rate (2004=100)	Investment rate (2004=100)
2004	100.00	100.00	100.00	100.00	100.00	100.00
2005	103.39	103.95	102.30	111.97	86.06	108.02
2006	108.87	110.00	107.63	121.55	69.18	111.37
2007	118.10	116.09	116.63	127.25	73.65	112.93
2008	121.94	122.44	121.88	128.71	79.65	100.57
2009	113.17	119.60	121.86	131.51	119.13	84.12
2010	117.38	126.11	127.39	134.38	108.85	92.06
2011	123.96	134.50	131.46	136.76	88.91	95.25
2012	126.32	138.97	135.75	139.41	87.39	92.88

Sweden						
Year	GDP (2004=100)	Consumption (2004=100)	Disposable income (2004=100)	Debt-to- income ratio (2004=100)	Saving rate (2004=100)	Investment rate (2004=100)
2004	100.00	100.00	100.00	100.00	100.00	100.00
2005	102.30	102.46	100.18	107.43	91.30	105.25
2006	109.10	107.52	105.17	113.21	103.03	116.14
2007	115.88	113.30	113.33	115.03	133.20	122.14
2008	114.27	112.38	116.66	118.45	155.86	108.26
2009	100.29	104.17	114.77	123.30	181.95	95.68
2010	119.99	122.23	116.33	129.24	148.35	107.50
2011	132.17	133.80	120.94	128.72	172.60	100.19
2012	139.84	142.58	126.43	127.77	194.86	91.74

Norway						
Year	GDP (2004=100)	Consumption (2004=100)	Disposable income (2004=100)	Debt-to- income ratio (2004=100)	Saving rate (2004=100)	Investment rate (2004=100)
2004	100.00	100.00	100.00	100.00	100.00	100.00
2005	116.79	109.78	104.65	104.21	122.85	106.14
2006	129.40	116.44	102.03	122.33	45.10	122.31
2007	137.38	125.12	110.27	126.00	56.79	127.43
2008	148.64	127.96	112.13	125.19	78.44	113.31
2009	130.34	123.32	113.02	125.47	103.61	98.98
2010	151.78	142.75	117.30	128.59	93.04	97.75
2011	168.54	151.08	120.59	130.41	108.85	109.72
2012	185.82	163.46	127.34	133.62	115.72	114.64

Denmark						
Year	GDP (2004=100)	Consumption (2004=100)	Disposable income (2004=100)	Debt-to- income ratio (2004=100)	Saving rate (2004=100)	Investment rate (2004=100)
2004	100.00	100.00	100.00	100.00	100.00	100.00
2005	105.23	105.42	99.99	110.25	58.24	123.14
2006	111.00	111.28	105.79	113.14	85.56	136.35
2007	115.46	115.64	110.46	120.99	66.72	140.07
2008	119.31	118.36	112.38	124.46	80.06	131.00
2009	113.45	115.52	113.73	128.27	131.87	91.81
2010	119.92	120.64	119.94	126.79	120.88	87.34
2011	122.03	123.17	120.25	126.62	120.88	92.58
2012	124.45	126.70	123.70	126.35	103.77	87.34

(Eurostat 2014.)

Appendix 4. Statistically insignificant regression analyses (Finland)

Financial behaviour of households			
Multiple regression			
<i>Dependent variable</i>	<i>Independent variable(s)</i>	<i>Significance F</i>	<i>P-values</i>
<i>Disposable income</i>	Debt-to-income rate	0.00131	0.00570
	Saving rate		0.28539
	Investment rate		0.13183
Intercept			0.159775
<i>Disposable income</i>	Debt-to-income rate	0.00068	0.00024
	Saving rate		0.35363
Intercept			0.64966
<i>Disposable income</i>	Debt-to-income rate	0.00032	0.00038
	Investment rate		0.13493
Intercept			0.19464
Simple linear regression			
<i>Dependent variable</i>	<i>Independent variable(s)</i>	<i>Significance F</i>	<i>P-values</i>
<i>Disposable income</i>	Debt-to-income rate	0.0001	0.0001
Intercept			0.97056
<i>Disposable income</i>	Saving rate	0.63355	0.00535
Intercept			0.63355
<i>Disposable income</i>	Investment rate	0.09163	0.00174
Intercept			0.09163
Consumption and financial behaviour of households			
Multiple regression			
<i>Dependent variable</i>	<i>Independent variable(s)</i>	<i>Significance F</i>	<i>P-values</i>
<i>Consumption</i>	Disposable income	0.00018	0.00566
	Debt-to-income rate		0.53995
	Saving rate		0.12966
	Investment rate		0.34273
Intercept			0.29072
<i>Consumption</i>	Debt-to-income rate	0.00208	0.01340
	Saving rate		0.10745
	Investment rate		0.07682
Intercept			0.08594
<i>Consumption</i>	Disposable income	0.00002	0.00059
	Debt-to-income rate		0.34683
	Saving rate		0.06212
Intercept			0.39492
<i>Consumption</i>	Disposable income	0.00005	0.00216
	Debt-to-income rate		0.45543
	Investment rate		0.19342
Intercept			0.21172
<i>Consumption</i>	Disposable income	0.00001	0.00008
	Saving rate		0.08255

	Investment rate		0.21204
Intercept			0.19381
<i>Consumption</i>	Debt-to-income rate	0.00208	0.00070
	Saving rate		0.86789
Intercept			0.87146
<i>Consumption</i>	Debt-to-income rate	0.00146	0.00132
	Investment rate		0.40983
Intercept			0.50770
<i>Consumption</i>	Debt-to-income rate	0.00001	0.00154
	Disposable income		0.86870
Intercept			0.86905
<i>Consumption</i>	Disposable income	0.00000	0.00000
	Saving rate		0.07458
Intercept			0.61785
<i>Consumption</i>	Disposable income	0.00000	0.00000
	Investment rate		0.23548
Intercept			0.23841
Simple linear regression			
<i>Dependent variable</i>	<i>Independent variable(s)</i>	<i>Significance F</i>	<i>P-values</i>
<i>Consumption</i>	Disposable income	0.0000	0.00000
Intercept			0.80071
<i>Consumption</i>	Debt-to-income rate	0.00023	0.00023
Intercept			0.91492
<i>Consumption</i>	Saving rate	0.82193	0.82193
Intercept			0.00478
<i>Consumption</i>	Investment rate	0.14058	0.14058
Intercept			0.00318
GDP and financial behaviour of households			
Multiple regression			
<i>Dependent variable</i>	<i>Independent variable(s)</i>	<i>Significance F</i>	<i>P-values</i>
<i>GDP</i>	Disposable income	0.00205	0.03956
	Debt-to-income rate		0.90728
	Saving rate		0.32690
	Investment rate		0.84760
Intercept			0.52649
<i>GDP</i>	Disposable income	0.00023	0.00923
	Debt-to-income rate		0.94628
	Saving rate		0.01143
Intercept			0.00179
<i>GDP</i>	Disposable income	0.00023	0.00070
	Saving rate		0.25472
	Investment rate		0.85272
Intercept			0.44455
<i>GDP</i>	Debt-to-income rate	0.00430	0.01435
	Saving rate		0.13535
	Investment rate		0.23912

Intercept			0.11476
<i>GDP</i>	Disposable income	0.00045	0.01124
	Debt-to-income rate		0.77200
	Investment rate		0.02270
Intercept			0.33293
<i>GDP</i>	Disposable income	0.00125	0.17174
	Debt-to-income rate		0.48998
Intercept			0.04075
<i>GDP</i>	Disposable income	0.00004	0.00002
	Investment rate		0.00963
Intercept			0.30734
<i>GDP</i>	Debt-to-income rate	0.00279	0.00130
	Investment rate		0.53325
Intercept			0.57676
<i>GDP</i>	Debt-to-income rate	0.00160	0.00055
	Saving rate		0.23452
Intercept			0.03108
Simple linear regression			
<i>Dependent variable</i>	<i>Independent variable(s)</i>	<i>Significance F</i>	<i>P-values</i>
<i>GDP</i>	Investment rate	0.38966	0.38966
Intercept			0.00356
<i>GDP</i>	Saving rate	0.75416	0.75416
Intercept			0.00042
<i>GDP</i>	Debt-to-income rate	0.00041	0.00041
Intercept			0.05104

Appendix 5. Statistically insignificant regression analyses (Sweden)

Financial behaviour of households			
Multiple regression			
<i>Dependent variable</i>	<i>Independent variable(s)</i>	<i>Significance F</i>	<i>P-values</i>
<i>Disposable income</i>	Debt-to-income rate	0.00201	0.31098
	Saving rate		0.02934
	Investment rate		0.29533
Intercept			0.09380
<i>Disposable income</i>	Debt-to-income rate	0.00052	0.14476
	Saving rate		0.03122
Intercept			0.02447
<i>Disposable income</i>	Debt-to-income rate	0.00573	0.00274
	Investment rate		0.64926
Intercept			0.37175
<i>Disposable income</i>	Saving rate	0.00050	0.00023
	Investment rate		0.13707
Intercept			0.01779
Simple linear regression			
<i>Dependent variable</i>	<i>Independent variable(s)</i>	<i>Significance F</i>	<i>P-values</i>
<i>Disposable income</i>	Debt-to-income rate	0.00087	0.00087
Intercept			0.34709
<i>Disposable income</i>	Investment rate	0.38698	0.38698
Intercept			0.00467
Consumption and financial behaviour of households			
Multiple regression			
<i>Dependent variable</i>	<i>Independent variable(s)</i>	<i>Significance F</i>	<i>P-values</i>
<i>Consumption</i>	Disposable income	0.00420	0.00399
	Debt-to-income rate		0.68356
	Saving rate		0.00952
	Investment rate		0.02247
Intercept			0.020316
<i>Consumption</i>	Debt-to-income rate	0.14868	0.26897
	Saving rate		0.94679
	Investment rate		0.74468
Intercept			0.88613
<i>Consumption</i>	Disposable income	0.02012	0.04743
	Debt-to-income rate		0.97289
	Saving rate		0.16347
Intercept			0.09605
<i>Consumption</i>	Disposable income	0.05463	0.16432
	Debt-to-income rate		0.99291
	Investment rate		0.80264

Intercept			0.68050
<i>Consumption</i>	Debt-to-income rate	0.0560	0.23989
	Saving rate		0.73006
Intercept			0.97792
<i>Consumption</i>	Debt-to-income rate	0.05234	0.02881
	Investment rate		0.62203
Intercept			0.88377
<i>Consumption</i>	Debt-to-income rate	0.01522	0.98130
	Disposable income		0.11202
Intercept			0.30001
<i>Consumption</i>	Disposable income	0.00423	0.01289
	Saving rate		0.12398
Intercept			0.06591
<i>Consumption</i>	Disposable income	0.01460	0.00743
	Investment rate		0.78188
Intercept			0.64918
Simple linear regression			
<i>Dependent variable</i>	<i>Independent variable(s)</i>	<i>Significance F</i>	<i>P-values</i>
<i>Consumption</i>	Disposable income	0.00246	0.00246
Intercept			0.25807
<i>Consumption</i>	Debt-to-income rate	0.01307	0.01307
Intercept			0.67738
<i>Consumption</i>	Investment rate	0.36959	0.36959
Intercept			0.00150
GDP and financial behaviour of households			
Multiple regression			
<i>Dependent variable</i>	<i>Independent variable(s)</i>	<i>Significance F</i>	<i>P-values</i>
<i>GDP</i>	Disposable income	0.00359	0.00217
	Debt-to-income rate		0.79554
	Saving rate		0.00604
	Investment rate		0.03463
Intercept			0.00974
<i>GDP</i>	Disposable income	0.01004	0.01314
	Debt-to-income rate		0.73158
	Saving rate		0.04854
Intercept			0.03758
<i>GDP</i>	Debt-to-income rate	0.24556	0.36827
	Saving rate		0.87257
	Investment rate		0.97313
Intercept			0.96160
<i>GDP</i>	Disposable income	0.07676	0.12872
	Debt-to-income rate		0.76426
	Investment rate		0.81223
Intercept			0.54637
<i>GDP</i>	Disposable income	0.02326	0.09723

	Debt-to-income rate		0.75144
Intercept			0.45825
<i>GDP</i>	Disposable income	0.02378	0.00989
	Investment rate		0.80734
Intercept			0.50725
<i>GDP</i>	Debt-to-income rate	0.10268	0.04759
	Investment rate		0.93504
Intercept			0.98612
<i>GDP</i>	Debt-to-income rate	0.10102	0.27735
	Saving rate		0.84820
Intercept			0.93361
<i>GDP</i>	Saving rate	0.17246	0.08529
	Investment rate		0.65983
Intercept			0.47932
Simple linear regression			
<i>Dependent variable</i>	<i>Independent variable(s)</i>	<i>Significance F</i>	<i>P-values</i>
<i>GDP</i>	Investment rate	0.56127	0.56127
Intercept			0.03350
<i>GDP</i>	Saving rate	0.05767	0.05767
Intercept			0.00130
<i>GDP</i>	Debt-to-income rate	0.02592	0.02592
Intercept			0.93512
<i>GDP</i>	Disposable income	0.00439	0.00439
Intercept			0.40828

Appendix 6. Statistically insignificant regression analyses (Norway)

Financial behaviour of households			
Multiple regression			
<i>Dependent variable</i>	<i>Independent variable(s)</i>	<i>Significance F</i>	<i>P-values</i>
<i>Disposable income</i>	Debt-to-income rate	0.00065	0.00023
	Saving rate		0.00319
	Investment rate		0.34767
Intercept			0.87505
<i>Disposable income</i>	Debt-to-income rate	0.00012	0.00006
	Saving rate		0.00093
Intercept			
<i>Disposable income</i>	Debt-to-income rate	0.01889	0.00661
	Investment rate		0.22801
Intercept			0.06234
<i>Disposable income</i>	Saving rate	0.41967	0.20584
	Investment rate		0.39871
Intercept			0.39176
Simple linear regression			
<i>Dependent variable</i>	<i>Independent variable(s)</i>	<i>Significance F</i>	<i>P-values</i>
<i>Disposable income</i>	Debt-to-income rate	0.00834	0.00834
Intercept			0.12326
<i>Disposable income</i>	Saving rate	0.30599	0.30599
Intercept			0.00004
<i>Disposable income</i>	Investment rate	0.96874	0.96874
Intercept			0.01553
Consumption and financial behaviour of households			
Multiple regression			
<i>Dependent variable</i>	<i>Independent variable(s)</i>	<i>Significance F</i>	<i>P-values</i>
<i>Consumption</i>	Disposable income	0.00355	0.07755
	Debt-to-income rate		0.86456
	Saving rate		0.63557
	Investment rate		0.78194
Intercept			0.02161
<i>Consumption</i>	Debt-to-income rate	0.00395	0.00121
	Saving rate		0.02707
	Investment rate		0.35180
Intercept			0.03903
<i>Consumption</i>	Disposable income	0.00048	0.02908
	Debt-to-income rate		0.74817
	Saving rate		0.37437
Intercept			0.00247
<i>Consumption</i>	Disposable income	0.00053	0.00328
	Debt-to-income rate		0.53533
	Investment rate		0.43887

Intercept			0.00679
<i>Consumption</i>	Disposable income	0.00046	0.00014
	Saving rate		0.42554
	Investment rate		0.68555
Intercept			0.00884
<i>Consumption</i>	Disposable income	0.00008	0.00128
	Debt-to-income rate		0.21339
Intercept			0.00143
<i>Consumption</i>	Disposable income	0.00005	0.00002
	Saving rate		0.12227
Intercept			0.00088
<i>Consumption</i>	Disposable income	0.00007	0.00002
	Investment rate		0.17837
Intercept			0.00187
<i>Consumption</i>	Debt-to-income rate	0.01428	0.00513
	Investment rate		0.44085
Intercept			0.63847
<i>Consumption</i>	Saving rate	0.52613	0.29066
	Investment rate		0.35908
Intercept			0.91432
Simple linear regression			
<i>Dependent variable</i>	<i>Independent variable(s)</i>	<i>Significance F</i>	<i>P-values</i>
<i>Consumption</i>	Debt-to-income rate	0.00336	0.00336
Intercept			0.25439
<i>Consumption</i>	Saving rate	0.52510	0.52510
Intercept			0.00402
<i>Consumption</i>	Investment rate	0.77809	0.77809
Intercept			0.23103
GDP and financial behaviour of households			
Multiple regression			
<i>Dependent variable</i>	<i>Independent variable(s)</i>	<i>Significance F</i>	<i>P-values</i>
<i>GDP</i>	Disposable income	0.00605	0.16039
	Debt-to-income rate		0.90726
	Saving rate		0.90173
	Investment rate		0.29565
Intercept			0.01308
<i>GDP</i>	Disposable income	0.00191	0.06546
	Debt-to-income rate		0.76918
	Saving rate		0.33738
Intercept			0.00500
<i>GDP</i>	Disposable income	0.00090	0.00030
	Saving rate		0.57319
	Investment rate		0.22550
Intercept			0.00493
<i>GDP</i>	Debt-to-income rate	0.00351	0.00122
	Saving rate		0.02480

	Investment rate		0.13202
Intercept			0.01363
<i>GDP</i>	Disposable income	0.00090	0.00588
	Debt-to-income rate		0.57449
	Investment rate		0.12891
Intercept			0.00369
<i>GDP</i>	Disposable income	0.00044	0.01130
	Debt-to-income rate		0.15230
Intercept			0.00366
<i>GDP</i>	Disposable income	0.00025	0.00009
	Saving rate		0.07967
Intercept			0.00203
<i>GDP</i>	Debt-to-income rate	0.01366	0.00561
	Investment rate		0.83821
Intercept			0.23920
<i>GDP</i>	Debt-to-income rate	0.00223564	0.00080
	Saving rate		0.06566
Intercept			0.01943
<i>GDP</i>	Saving rate	0.44872297	0.27939
	Investment rate		0.24923
Intercept			0.65052
Simple linear regression			
<i>Dependent variable</i>	<i>Independent variable(s)</i>	<i>Significance F</i>	<i>P-values</i>
<i>GDP</i>	Investment rate	0.54717	0.54717
Intercept			0.47324
<i>GDP</i>	Saving rate	0.67405	0.67405
Intercept			0.00859
<i>GDP</i>	Debt-to-income rate	0.00222	0.00222
Intercept			0.09826

Appendix 7. Statistically insignificant regression analyses (Denmark)

Financial behaviour of households			
Multiple regression			
Dependent variable	Independent variable(s)	Significance F	P-values
<i>Disposable income</i>	Debt-to-income rate	0.01203	0.00724
	Saving rate		0.72368
	Investment rate		0.24396
Intercept			0.12743
<i>Disposable income</i>	Debt-to-income rate	0.00551	0.00742
	Saving rate		0.26739
Intercept			0.27904
<i>Disposable income</i>	Debt-to-income rate	0.00244	0.00252
	Investment rate		0.09804
Intercept			0.08294
<i>Disposable income</i>	Saving rate	0.25044	0.48066
	Investment rate		0.78288
Intercept			0.05444
Simple linear regression			
Dependent variable	Independent variable(s)	Significance F	P-values
<i>Disposable income</i>	Debt-to-income rate	0.00161	0.00161
Intercept			0.37349
<i>Disposable income</i>	Saving rate	0.08710	0.08710
Intercept			0.00004
<i>Disposable income</i>	Investment rate	0.11922	0.11922
Intercept			0.00002
Consumption and financial behaviour of households			
Multiple regression			
Dependent variable	Independent variable(s)	Significance F	P-values
<i>Consumption</i>	Disposable income	0.00027	0.00166
	Debt-to-income rate		0.35011
	Saving rate		0.24524
	Investment rate		0.25816
Intercept			0.32645
<i>Consumption</i>	Debt-to-income rate	0.01505	0.00453
	Saving rate		0.48309
	Investment rate		0.44051
Intercept			0.23454
<i>Consumption</i>	Disposable income	0.00004	0.00069
	Debt-to-income rate		0.11520
	Saving rate		0.01478
Intercept			0.93439
<i>Consumption</i>	Disposable income	0.00005	0.00077
	Debt-to-income rate		0.57567
	Investment rate		0.01558

Intercept			0.10822
<i>Consumption</i>	Disposable income	0.00003	0.00001
	Saving rate		0.33704
	Investment rate		0.08312
Intercept			0.16537
<i>Consumption</i>	Debt-to-income rate	0.00438	0.00261
	Saving rate		0.91315
Intercept			0.30977
<i>Consumption</i>	Debt-to-income rate	0.00409	0.00203
	Investment rate		0.71092
Intercept			0.28935
<i>Consumption</i>	Disposable income	0.00012	0.00983
	Debt-to-income rate		0.20018
Intercept			0.50616
<i>Consumption</i>	Disposable income	0.00001	0.00001
	Saving rate		0.01569
Intercept			0.96059
<i>Consumption</i>	Disposable income	0.00000	0.00000
	Investment rate		0.00375
Intercept			0.05997
<i>Consumption</i>	Saving rate	0.56881	0.57083
	Investment rate		0.99878
Intercept			0.08420
Simple linear regression			
<i>Dependent variable</i>	<i>Independent variable(s)</i>	<i>Significance F</i>	<i>P-values</i>
<i>Consumption</i>	Disposable income	0.00002	0.00002
Intercept			0.41954
<i>Consumption</i>	Debt-to-income rate	0.00056	0.00056
Intercept			0.25491
<i>Consumption</i>	Saving rate	0.26790	0.26790
Intercept			0.00004
<i>Consumption</i>	Investment rate	0.35723	0.35723
Intercept			0.00006
GDP and financial behaviour of households			
Multiple regression			
<i>Dependent variable</i>	<i>Independent variable(s)</i>	<i>Significance F</i>	<i>P-values</i>
<i>GDP</i>	Disposable income	0.00047	0.00228
	Debt-to-income rate		0.54679
	Saving rate		0.30120
	Investment rate		0.13029
Intercept			0.33385
<i>GDP</i>	Disposable income	0.00018	0.00248
	Debt-to-income rate		0.17911
	Saving rate		0.01650
Intercept			0.57733
<i>GDP</i>	Disposable income	0.00005	0.00001

	Saving rate		0.32488
	Investment rate		0.03856
Intercept			0.18228
<i>GDP</i>	Debt-to-income rate	0.02092	0.00562
	Saving rate		0.49683
	Investment rate		0.58436
Intercept			0.24568
<i>GDP</i>	Disposable income	0.00008	0.00095
	Debt-to-income rate		0.79506
	Investment rate		0.00677
Intercept			0.11435
<i>GDP</i>	Disposable income	0.00060	0.03889
	Debt-to-income rate		0.25551
Intercept			0.30396
<i>GDP</i>	Disposable income	0.00001	0.00000
	Investment rate		0.00143
Intercept			0.06699
<i>GDP</i>	Disposable income	0.00005	0.00002
	Saving rate		0.01367
Intercept			0.54217
<i>GDP</i>	Debt-to-income rate	0.00540	0.00275
	Saving rate		0.65492
Intercept			0.21860
<i>GDP</i>	Debt-to-income rate	0.00601	0.00260
	Investment rate		0.96606
Intercept			0.29880
<i>GDP</i>	Saving rate	0.66389	0.57846
	Investment rate		0.92085
Intercept			0.08442
Simple linear regression			
<i>Dependent variable</i>	<i>Independent variable(s)</i>	<i>Significance F</i>	<i>P-values</i>
<i>GDP</i>	Investment rate	0.46825	0.46825
Intercept			0.00006
<i>GDP</i>	Saving rate	0.34841	0.34841
Intercept			0.00003
<i>GDP</i>	Debt-to-income rate	0.00081	0.00081
Intercept			0.15934
<i>GDP</i>	Disposable income	0.00012	0.00012
Intercept			0.24645