Do students understand inflation?

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THESIS IN NATIONAL ECONOMICS

Abstract

Money illusion was for a long time believed by most economists to be non-existent, despite previous large support for it, because it did not fit the neo-classical model of the rational individual. Using a survey to test students' understanding of inflation as proxy for money illusion, this thesis aims to establish the existence of money illusion and develop an understanding of why some students exhibit better understanding of inflation than others. Based on a sample of 275 university students, most of them on their first year, I find strong support for the hypothesis that students in general do not understand inflation beyond its definition. Knowing the definition of inflation is not enough to exhibit a deeper understanding. I find that studying economics or having previously taken courses in national economics at a university introductory level is not enough to significantly improve students' understanding of inflation. My results also confirm the existence of money illusion in support of previous studies on the topic.

Keywords: Inflation; money illusion; student understanding of economics.

Acknowledgements

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Table of Contents

Tables

Figures

1.   Introduction

Inflation has long been debated by economists (e.g. Akerlof, Dickens & Perry, 1996; Baxa, Plašil & Vašíček, 2017; Feldstein, 1983; Fischer & Modigliani, 1978; Fisher, 1928; Greaves, 2010; Keynes, 1936; Shiller, 1997a) and has garnered large attention among the general population as well as in the media[1]. This is because inflation affects society in many ways, and the effects are often far from obvious (Fischer & Modigliani, 1978). Very high levels of inflation, so-called hyperinflation, have caused considerable damage to societies, such as in the Weimar Republic of Germany in 1922-1923 (Webb, 1989), Zimbabwe in 2007-2008 (Koech, 2011), and currently in the ongoing political turmoil of Venezuela (Hanke & Bushnell, 2016). People in general therefore ought to be well aware that hyperinflation poses a real threat to the economy and in some certain situations to society itself (Ehrmann & Tzamourani, 2012). Shiller (1997a) has shown that there is a considerable dislike for inflation in general, but also (Shiller, 1997b) a great resistance to one of the most sensible remedies to the threat that inflation poses to the individual: indexation. This is a puzzle to economists, because a central assumption in classical economics is that individuals are rational in general, and that they do not suffer from money illusion in particular. Consumers are assumed to be constantly aware of the difference between real and nominal values, and to make decisions based only upon the real (Tobin, 1972). That there is a general dislike of inflation and at the same time a general resistance to indexation seems like a violation of the rationality of economic agents, and specifically imply money illusion. The claim that this fundamental assumption of macroeconomic theory – the absence of money illusion – is straight out wrong, or at least very unrealistic, has been made many times before (Acker & Duck, 2013; Bourgeois-Gironde & Guille, 2011; Brunnermeier & Julliard, 2008; Cohen, Polk & Vuolteenaho, 2005; Fehr & Tyran, 2001; Fisher, 1928; Shafir, Diamond & Tversky, 1997), and will surely be made again. Within the field of macroeconomics, there is a growing realization that the model of the rational human, the *homo economicus* or the *economic man*, is insufficient and that a new model is needed (Bourgeois-Gironde & Guille, 2011). There is growing research in this field that often combines economic theory with behavioral science, emerging as the field of behavioral economics (see ed. Camerer, Loewenstein & Rabin, 2004). Its advocates are hoping that behavioral economics will one day solve the issues associated with the *homo economicus* model with a better, more comprehensive model of human decision making, but the field has also been criticized for not having produced an entire framework theory which can be used to supplement the current, neo-classical understanding of the markets. Until that happens, critics claim, it is of little value (ed. Camerer, Loewenstein & Rabin, 2004, p.41). This development is likely to be slow, as the emerging collection of tools and theories are likely to be more complex than the previous ones in order to explain the complex interactions of the people that compose the aggregate economy. I believe that this development, however slow, is important in order to design better functioning societies.

This thesis attempts to contribute to the understanding of money illusion as represented by the understanding of inflation. If people have no money illusion,

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[1] See (Dräger, 2015) for a fascinating discussion on the impact of media reporting on inflation expectations among the general population.

their understanding of inflation should be complete, despite the complexity of the phenomenon, and thereby the understanding inflation works as a proxy for money illusion. This thesis is an effort to contribute to the development of a new economic model, however faint or insignificant that contribution might be. The goal of this paper is to present a conclusion to the question of whether students understand inflation or not. It also aims to present an analysis of, and an explaining model for, the factors that are significant for a greater or poorer understanding of inflation among students.

To achieve this, an empirical study in the form of a simple survey was conducted. The survey consisted of five demographic questions, seven questions that test the respondent's understanding of inflation, and one question about the respondent's attitude towards inflation, and was completed by 275 students at Lund University. Surveys relating to the understanding of inflation have been used on multiple occasions to further the understanding of how we are affected by and relate to inflation; see for example Ehrmann and Tzamourani (2012) for a short review of previous studies on how individuals' experiences of high inflation affect their subsequent well-being, inflationary expectations, investment decisions, redistribution preferences, and levels of happiness. None of these studies primarily test the respondents understanding of inflation, which this thesis attempts through the construction of a composite score based on the respondents' survey answers.

The results of this survey show that students do know the definition of inflation but they do not understand inflation at a deeper level. Despite correctly identifying inflation as a general increase in price level, when asked to guess both the rate of inflation and the general increase in price level, only 44 % correctly gave the same answers to both questions, and out of these, only 56 % made guesses within a reasonable interval of 1 % to the true inflation rate over the last year. Only 2 respondents, or less than 1 %, correctly answered all seven questions designed to test the understanding of inflation. These results lend support to recent research rejecting the absence of money illusion. They cannot, however, be used to present any useful model on why some students exhibit a better understanding of inflation than others. Regression analysis of the responses reveals that men have a minor but statistically significant and better understanding of inflation than women. This may be due to men being more likely to make guesses when in doubt. It is further shown that studying for a bachelor in economics, or having previously taken courses in national economics at a university level, does not significantly impact the understanding of inflation, confirming previous similar observations by Shafir, Diamond and Tversky (1997, p.362, note 14). Most of the students surveyed were first-year students, and it cannot be rejected that having earned a degree in economics (especially in national economics) would significantly improve one's understanding of inflation. It is concluded that gender, age, area of studies, time at the university, and attitude to inflation cannot explain why some students understand inflation better than others.

The layout of this thesis is as follows. Section 2 presents an overview of the theory of money illusion and inflation in the literature, as pertaining to this thesis. Section 3 presents in detail the method used in conducting the survey. Section 4 presents the results of the survey, while section 5 contains the analysis of the responses and the construction of regression models. Section 6 offers a discussion on the results and analysis, and section 7 concludes and summarizes the thesis.

2.   Theory

The theories of money illusion and inflation are part of the broader theory of money, which goes at least as far back as the Scottish philosopher David Hume and his 1752 essay *Of Money* (Fregert, 2007). Money illusion was coined by Fisher (1928) in his book aptly called *The Money Illusion*, and was discussed also by Keynes (1936). Both strongly believed that people suffer from money illusion, pointing to wage stickiness as one proof. In 1930, Fisher published his work on the what became known as the Fisher effect or Fisher hypothesis, stating that the nominal interest rates and inflation should comove as to keep real interest rates unchanged (Fisher, 1930), which implies a long-term and aggregate absence of money illusion as the real interest rates would not be affected by inflation. The banks and financial intermediaries were expected to see through the veil of money. Over the coming decades, the view expressed by the Fisher hypothesis became prevalent in economic thinking, and money illusion was assumed to not exist. For example Tobin (1972, p.3) stated that "An economic theorist can, of course, commit no greater crime than to assume money illusion." One big issue with the view was that for several decades, the Fisher hypothesis did not hold. However, this changed in the 1970s, and Friedman and Schwartz (1976, p.289) concluded that the markets had "learned their Fisher". The issue of money illusion seemed to have been put to rest. After a brief discussion of inflation, we shall return to money illusion.

Fisher and Keynes also discussed inflation, which is essential to the theory of money illusion as it is the reason for the difference between nominal and real values. Both Fisher and Keynes represented what is called the quantity theory of inflation, QTM, which states that inflation is due to the quantity of money expanding faster than the demand for money, making it worth less as more is created. Fisher presented this in the form of the equation of exchange (1922):

$$M \cdot V = P \cdot Q \tag{1}$$

where M is the total quantity of money in the economy, V is the velocity of the money, P is the aggregate price level, and Q is the real-valued output of the economy. Keynes (1936) criticized the focus on the long run that was prevalent among economists of the time, a critique made immortal through his quote: "In the long run we are all dead." (Keynes, 1924, p.65). He supported instead a different version of equation (1), the so-called Cambridge equation:

$$M \cdot \frac{1}{k} = P \cdot Y \tag{2}$$

where M and P are as in (1), k is the proportion of money that is held for convenience and not used for transactions, and Y is the real value of aggregate income. (1) and (2) represent the same identity if $V = 1/k$. The purpose of the difference in formulation is to emphasize different aspects of what drives inflation. The monetarist view of Fisher was that V is stable, so when there is an increase in M there is an equal offsetting rise in P:

$$\frac{\Delta M}{M} = \frac{\Delta P}{P} = \pi \tag{3}$$

where π is the inflation. The Keynesian view is that (3) may be true in the long run, but that it does not hold for the short run. The Keynesian revolution led to the dismissal of the Fisher equation of exchange, but the monetarist view was revived by Milton Friedman (e.g. Friedman & Schwartz, 1963), building upon the work of Keynes but returning to the equation of exchange. Equation (1) by itself is not a theory, just an identity. The theory follows from two main hypotheses. First, that the increase in prices is caused proportionally by an increase in the quantity of money. Second, that the changes in V and Q are, in the long run, unaffected by the rate of inflation. This is also known as the superneutrality of money, and is closely linked to the assumption of no money illusion. In short, the theory is that (3) holds in the long run.

Today, the general view among economists is that Friedman was right when he concluded that (1963): "Inflation is always and everywhere a monetary phenomenon." This is, however, not without question. De Grauwe and Polan (2005) run extensive regression analysis over 160 countries and a time span of 30 years, and conclude that Friedman was right, but only in cases of high inflation and hyperinflation. In times of low inflation, the support for the hypothesis that inflation moves one-to-one with the money supply is found to be weak. The superneutrality of money has also been questioned. Brunnermeier and Sannikov (2016) demonstrate that, given some conditions of constraints on the government, superneutrality falls and the government can achieve a Pareto efficient welfare improvement by printing the right amount of money.

During the high-inflation decade of the 70s, the attention of both the public, the media and academia turned once again to the issue of inflation. A large literature on the effect of inflation on taxation was produced (e.g. Aaron, 1976; Feldstein, Green & Sheshinski, 1978; Tanzi, 1980). Fischer and Modigliani (1978) produced an extensive list of the many possible effects of inflation on the real economy, together with some estimates available of the size of different effects, examining the effects of a fully indexed economy and then subsequently making the economy more and more realistic. Interestingly, they concluded that inflation does have a real impact on the economy even if it is fully indexed. They show that even if the root cause of inflation is simple, the ways it impacts society are far from it. This alone should give reason for paus and reconsideration of the assumption that there is no money illusion, which also threatens the principle of money superneutrality. In 1979, Modigliani and Cohn presented the hypothesis that investors do in fact suffer from a very particular form of money illusion: not properly discounting future earnings with inflation. Because of this, investors should be positively surprised by company financial reports in times of high inflation. Recently, researchers have found support for the Modigliani-Cohn hypothesis (Acker & Duck, 2013; Cohen, Polk & Vuolteenaho, 2005).

Further support of the existence of money illusion came from Akerlof, Dickens and Perry (1996), pointing to both the downward rigidity of nominal wages and to a similar pattern in dividends, stating that nominal cuts to dividends are rare. They also reference a then unpublished paper, which was published one year later by Shafir, Diamond and Tversky (1997) which made a huge contribution to dispelling the resistance to money illusion by thoroughly examining experiments from psychology and behavioral economics that clearly demonstrate money illusion. Fehr and Tyran (2001) showed that the economy does indeed suffer from money illusion. They also showed that it is enough for a small subset of all

individuals in an economy to suffer some degree of money illusion to change the aggregate behavior of the whole economy. They conclude that money illusion matters and has real and measurable impact on the economy, and that the effects of money illusion are asymmetric, being quite substantial and long lasting after a negative nominal shock and rather small after a positive shock.[2]

In the wake of the above-mentioned papers, massive support for money illusion has been produced (e.g. Acker & Duck, 2013; Akerlof & Dickens, 2007; Brunnermeier & Julliard, 2008; Cohen, Polk & Vuolteenaho, 2005), including results from neurology showing that the brain truly does exhibit money illusion (Bernd Weber et al., 2009; Bourgeois-Gironde & Guille, 2011; Yu & Huang, 2013), at least in a laboratory setting. This new stance on money illusion has also been communicated to the general public, perhaps chiefly through the book *Animal Spirits* by Akerlof and Shiller (2009), in which the authors devote all of chapter 4 to discuss the strong evidence for money illusion, and which concludes with:

> We have seen that one of the most important assumptions of modern macroeconomics is that people see through the veil of inflation. That seems to be an extreme assumption. It also seems totally implausible given the nature of wage contracts, of price setting, of bonds contracts, and of accounting. These contracts could easily throw aside the veil of inflation through indexation. Yet the parties to the contracts in most cases choose not to. And these are but a few indications of money illusion. We shall see that taking money illusion into account gives us a different macroeconomics – one that arrives at considerably different policy conclusions. Once again animal spirits play a role in how the economy works (Akerlof & Shiller, 2009, p.50).

Taken all together, it can be concluded that there is an ongoing discussion on the issue of money illusion and inflation. The old tenets of the neo-classical economic theory are being challenged. The relationship between money and inflation is believed to be understood in the long run, yet this understanding is not without issues. The subprime mortgage crisis of 2008-09 has again raised the discussion of the government's role in monetary policy and rekindled the debate between Keynesians and monetarists. Almost 90 years since the publication of Fisher's *The Money Illusion* (1928), and more than 50 years since Friedman and Schwartz's *Monetary History of the United States* (1963), more research is still needed to settle the issue. The following sections describe my effort to contribute to this research.

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[2] These results were criticized with the argument that the data did not actually show any evidence counter to money illusion (Petersen & Winn, 2014). This criticism was effectively rebutted (Fehr & Tyran, 2014).

3.   Method

Data collection

In order to test the hypothesis that students do not understand inflation to the degree that modern macroeconomic theory predicts, a survey consisting of 13 questions was drafted. The first draft of the survey was printed and a test round was performed using 9 respondents from different academic backgrounds. Based on the insights from this test round, the survey was improved for clarity and consistency. The final version of the survey can be found in Appendix A. The survey was constructed in Swedish due to being distributed to Swedish-speaking students.

Selection of questions

To increase probability of getting a high response frequency, the survey was kept short enough to be printed on one single A5 and thereby easily distributed manually. To get data that could be easily analyzed, free response questions were avoided but not excluded. The included questions were grouped into two segments. The first segment, questions 1.1 through 1.5, are about the respondent, and were picked in order to segment the respondents. A translation of the questions and their response options are presented in table 1 below.

Table 1. Translation of questions 1.1 through 1.5 and their responses.

Question	Responses
1.1 Gender	☐ Male, ☐ Female, ☐ Other
1.2 Age (years)	*Free response*
1.3 Number of finished terms at university	*Free response*
1.4 Main area of studies	*Free response*
1.5 Have you previously taken courses in national economics?	☐ Yes, ☐ No

The purpose of asking these questions was testing the hypothesis that these variables may explain why some students have a better or worse understanding of inflation than other students. Questions 2.1 through 2.8 were selected to probe the students understanding of inflation. Below follows an analysis of the choice of each question and their answer alternatives, translated into English.

2.1 How much do you deem the general prices (i.e. the Swedish consumer prices) to have changed in the last 12 months, in percentages?

This is a free response question. The purpose of asking the question is testing if the students are aware of the current level of inflation. If they are very wrong, money illusion becomes harder to reject. If humans were really *homos economicus*, we would be perfectly aware of the current level of inflation in order to incorporate it in our actions. At the very least, we would expect the respondents' estimates of the inflation to be correct on average. The correct answer would be 1.7 %, as the survey was distributed in May, 2017, when the inflation as measured by the CPI was 1.7 % (SCB, 2017b).

2.2 What is inflation?
1) Rise in the economy, 2) Rise in house prices, 3) Rise in price level, 4) Don't know

The purpose of this question was to test the students' knowledge of the definition of inflation. The correct definition is 3). The alternative answers 1) and 2) were selected because they are closely linked to inflation. A lowering of the rent by the central bank is expected to cause both a rise in inflation and boost the economy in the short run, wherefore some may connect inflation as a general rise in the economy. House price inflation is a subset of inflation in general, but not the definition of it. Including these related answers as options was intended to make the question slightly more difficult, and thereby give it greater accuracy as a tool for telling who knows the definition of inflation and who doesn't.

2.3 A higher interest rate causes the inflation to…
1) Rise, 2) Fall, 3) No effect, 4) Don't know

The purpose of this question was to test a deeper understanding of inflation by asking about the correlation between interest rates and inflation predicted by standard macroeconomic theory. The correct answer is 2). The answers have been selected to cover all possible outcomes.

2.4 A lowering of the income tax causes the inflation to…
1) Rise, 2) Fall, 3) No effect, 4) Don't know

The purpose of this question was the same as for 2.3, but goes a little deeper, as the correlation between taxes and inflation is more obscure[3]. In an efficient market, tax is merely a redistribution of wealth between different actors. It does not change the amount of currency in circulation, and as long as it does not change the productivity of the economy (and the real output), a change in income tax should have no effect on the value of money, and therefore inflation remains unchanged. The correct answer is therefore 3). The order of the answer options was kept the same as for question 2.3 to avoid confusing the respondent.

2.5 Who has the main responsibility for monetary policy in Sweden?
1) The Riksbank, 2) The government, 3) The ECB, 4) Don't know

The purpose of this question was to test the students understanding of inflation by checking if they know who oversees the monetary policy in Sweden. Not knowing does not imply money illusion or poor understanding of inflation per se, but not knowing who is in charge of the monetary policy may be an explaining variable that can be used to model why certain people understand inflation better or worse. The correct answer is 1) (Riksbanken, 2011a).

2.6 How do you perceive that inflation affects you?
1) Positively, 2) Negatively, 3) No effect, 4) Don't know

The purpose of this question was *not* to directly test the respondents' understanding, but to try to understand their sentiment towards and relationship

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[3] A study of the correlation between tax and inflation was conducted by Poterba and Rotemberg (1990) with the aim of testing whether governments optimize the inflation level with regard to the tax level, concluding that "higher taxes are just as often associated with lower as with higher inflation" (p.15).

with inflation. This question has no correct answer as it asks about the respondents' perception. It is asked to test the hypothesis that student, and people in general, are negatively predisposed towards inflation, as has been well documented by (Ehrmann & Tzamourani, 2012). Predisposition can also be checked for correlation with better or worse understanding of inflation, to see if those students that well understand inflation are more or less negative than other students.

2.7 What do you deem the inflation to have been over the past 12 months, in percentages?

This is a free response questions. The purpose of this question was to check whether the student realizes that 2.7 and 2.1 are the same question with different wording; that is, it checks if the respondent truly understands the definition of inflation, no matter what they answered on question 2.2. If they answered correctly on question 2.2 (definition of inflation) but do not answer the same percentage on questions 2.1 and 2.7, they have not truly understood the definition. Knowing and understanding are two different concepts, and this question aims to distinguish them from each other. This assumes that inflation is measured by the CPI. This is a reasonable assumption as it is a common definition of inflation.

2.8 What do you think the inflation will be in 12 months, in percentages?

This was a free response question. The purpose of this question is to test whether the students will make reasonable guesses compared with the historical volatility of inflation in Sweden. The question measures the inflationary expectations of the respondent group, and can be interpreted as a measurement of the groups confidence in the Riksbank and its ability to reach its 2 % target rate (Riksbanken, 2011b).

Survey distribution
The survey was distributed manually by the author in four rounds. The survey was distributed during lecture breaks at first-year courses. These courses were selected based on the size of the class and the student groups taking the course, in order to get a good sample of the student body. All courses were given in Swedish only, and the students taking the courses were all required to be fluent in Swedish. Economics students were of particular importance in order to test the hypothesis that students with a formal education in national economics would have a better understanding of inflation than other student groups. The original intention had been to distribute the survey to four different student groups: economics students with focus on business economics, economics students with focus on national economics, engineering students, and social science students. Due to time constraints and a policy against allowing distribution of surveys in connection to lectures at parts of the social science faculty, only the first three groups were eventually targeted. The students spent approximately 10 minutes responding to the survey questions, after which the author collected them.

Data handling and cleaning
To analyze the data, it had to be transcribed from paper to digital form. This was done manually by the author. The complete recording of all 275 answers can be found in Appendix B, including notes by the author (all in Swedish). In order to keep track of all answers and be able to go back and look up the original responses again, all survey response papers were numbered 1 through 275 in the order they

were digitalized. Several answers contain blanks, questions that have not been answered, and questions that have been answered incorrectly by ticking more than one alternative. Below is a detailed summary of the data related issues that arose and how they were resolved.

- For questions 1.1, 1.2, 1.3 and 1.5 no adjustments were made, and blanks were kept as "Blank".

- At question 1.4, the respondents gave a total of 24 different answers. In order to make meaningful inference, the student groups had to be re-grouped into wider categories. Table 2 below summarizes the consolidation from 24 areas of studies to 4.

Table 2. Consolidation from reported main areas of studies to the four fields of Economics, Engineering, Social studies, and Other.

Reported main area of studies	Number of students	Group main area of studies
BCA	1	Other
Bioteknik	1	Engineering
Blank	4	Other
BME	2	Engineering
Civilingenjör	1	Engineering
Datateknik	1	Engineering
Ekonomi/design	1	Economics
Ekonomie kandidat	130	Economics
Elektroteknik	30	Engineering
FEKA90	1	Economics
Företagsekonomi	12	Economics
HR	1	Other
Industriell ekonomi	31	Engineering
Informatik och ekonomi	1	Economics
Juridik	1	Other
Kemiteknik	1	Engineering
Kurs	2	Other
Maskinteknik	6	Engineering
Matematik	1	Other
Nationalekonomi	3	Economics
Personalvetenskap	1	Other
Politisk kandidat	30	Social studies
Program	11	Other
Statsvetenskap	2	Social studies

- For question 2.1, 2.7 and 2.8, the students were asked to answer in percentages. They often provided an interval instead. In such situations, the middle point of that interval was calculated and used in the subsequent analysis.

- For questions 2.1, 2.7 and 2.8, some respondents wrote text instead of a percentage. When possible, these have been translated into numbers. For example, answer 203 reads "Less than 1%" on question 2.1, "<1%" on 2.7, and "About the same" on question 2.8. This has been understood as *slightly less than 1%*, in line with other comments, and recorded as 0.9%.

15

The general rule was: if a text answer reads "slightly more/less than X%", or something to the same apparent meaning, the recorded answer became "X% ± 0.1%". If a translation into numbers was not possible, the answer was recorded as "Blank", as with answer 148 that reads "0.5 kr" on question 2.1.

- For question 2.1, 2.7 and 2.8, all blanks were recorded as "Don't know". A blank is thus interpreted as not wanting to make a guess and thereby truthfully admitting to not knowing.

- For questions 2.2 through 2.6, all blanks have been recorded as "Don't know", for the same reason as above. If a respondent ticked more than one answer on any of these questions, that answer was also recorded as "Don't know".

Statistical analysis

Analysis was performed using RStudio, a free and open-source IDE for the programming language R, developed for statistical computing (RStudio, 2017).

4.   Results

275 students were surveyed using the survey form presented in Appendix A. The digitalized responses are included in Appendix B, including the author's notes. Figures 1 through 13 below present a graphical summary of the responses. The survey was conducted in Swedish, and the titles and answer options shown in the figures below have been translated to English.
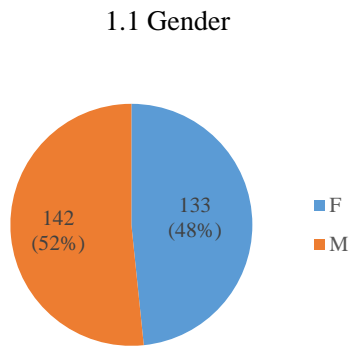
1.1 Gender

Figure 1. Gender distribution of the respondents.

1.2 Age
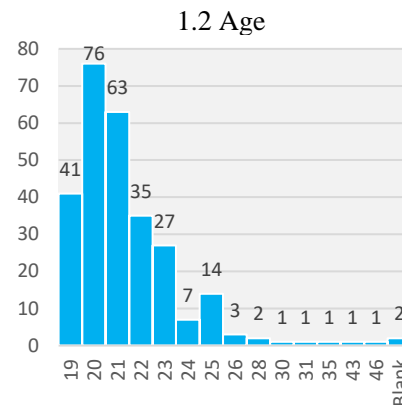
Figure 2. Age distribution of the respondents. A majority of students finished high school less than 3 years ago. Note that the horizontal axis is categorical and not continuous.

1.3 No. of unfinished terms at university
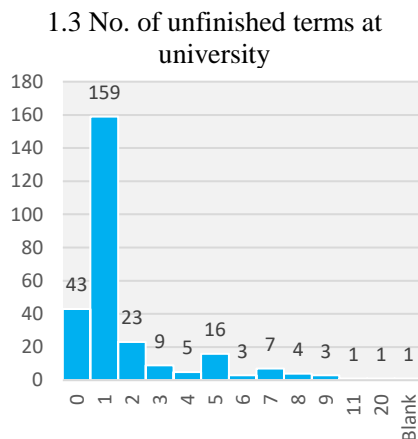
Figure 3. Distribution of number of finished terms at university among the respondents. Due to the selection of first year courses, the distribution is heavily skewed towards the left. Note that the horizontal axis is categorical and not continuous.

1.4 Main area of studies
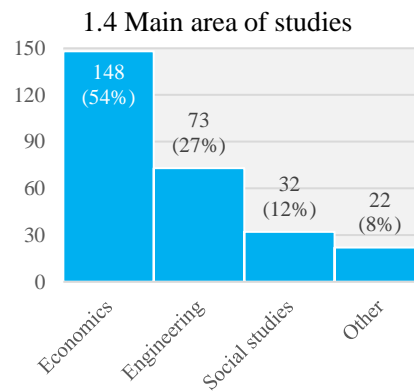
Figure 4. Distribution of the main areas of studies among the respondents. Economics students make up the majority. Social studies and the Other category are so small they can hardly be considered a representative sample, and may be too small to allow any meaningful statistical inference.

17

1.5 Have you previously taken courses in national economics?
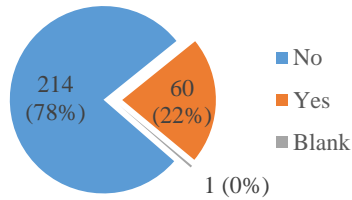
Figure 5. Distribution of who had previously taken courses in national economics.

2.2 What is inflation?
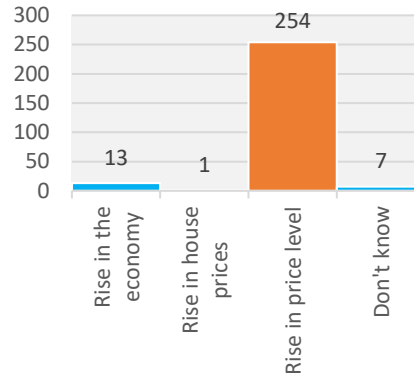
Figure 6. Distribution of answers to question 2.2. Nearly everyone knows what inflation is generally defined. The correct answer has been marked orange.

2.1 How much do you deem the general prices (i.e. the Swedish consumer prices) to have changed in the last 12 months, in percentages?
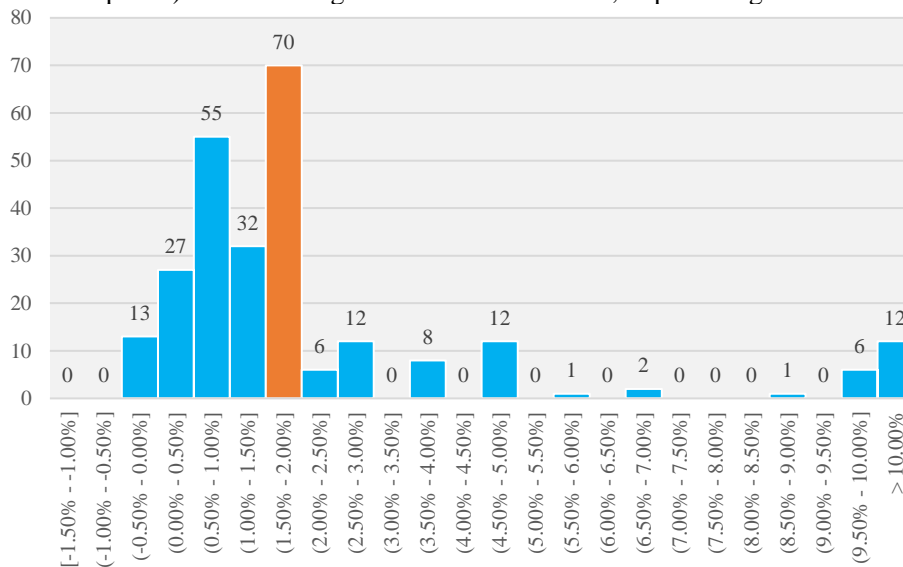
Figure 7. Distribution of answers to question 2.1. There are two large peaks visible, one around the target rate 2.0 %, and one around the 1 % mark. Both are sensible educated guesses expected by someone who does not know but has a sense of the matter nonetheless. The correct interval, that containing 1.7 %, has been marked orange.

2.3 A higher interest rate causes the inflation to…

2.4 A lowering of the income tax causes the inflation to…
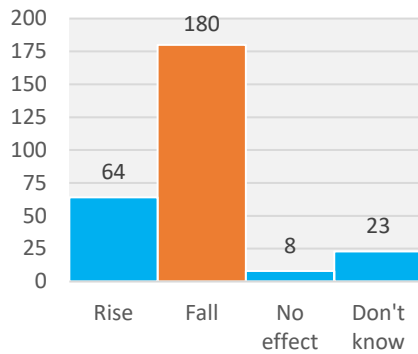
Figure 8. Distribution of answers to question 2.3. A strong majority seem to understand the correlation between interest rates and inflation as explained by standard macroeconomics. The correct answer has been marked orange.
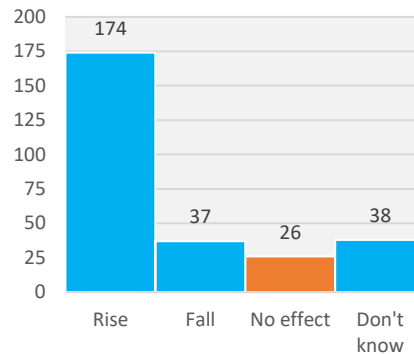
Figure 9. Distribution of answers to question 2.4. Most students seem to correlate falling income tax with increasing inflation. The least common answer category was the correct "No effect" with only 9% answer frequency. The correct answer has been marked orange.

2.5 Who has main responsibility for the monetary policy in Sweden?

2.6 How do you perceive that inflation affects you?
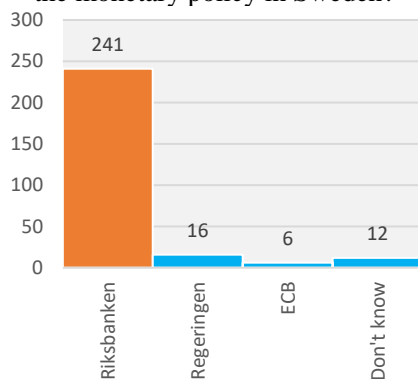
Figure 10. Distribution of answers to question 2.5. Nearly everyone knows that it is Riksbanken that is in charge of the monetary policy of Sweden. The correct answer has been marked orange.
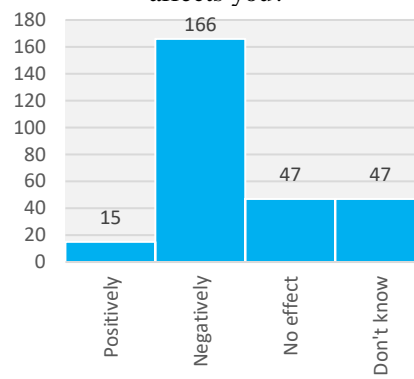
Figure 11. Distribution of answers to question 2.6. There is no correct answer to this question, but the most expected would be "Negatively", which is also the most common answer in the study with an answer frequency of 60%. Only 5% perceive inflation as affecting them positively.

2.7 What do you deem the inflation to have been over the past 12 months, in percentages?
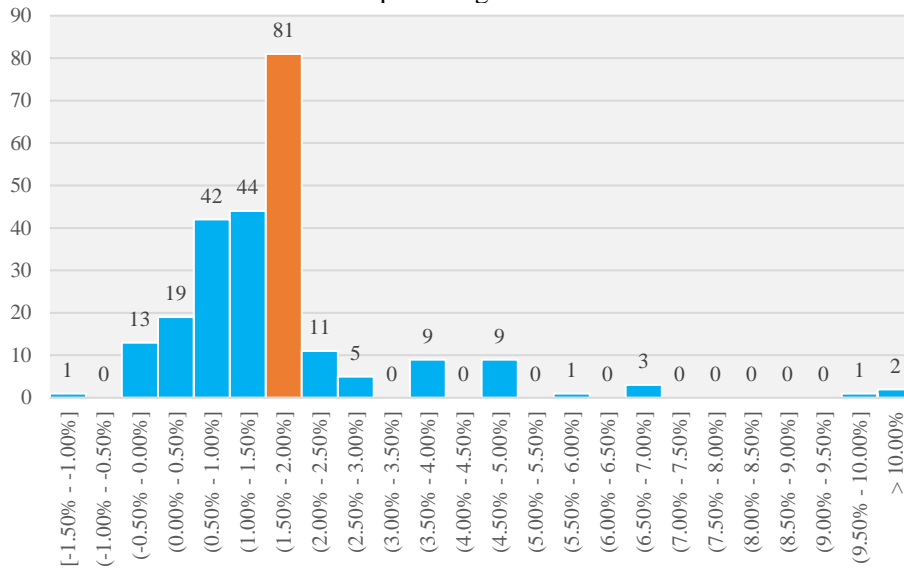
Figure 12. Distribution of respondent answers to question 2.7. There is a clear peak in answer frequency around the correct value 1.7% (an interval which also includes the target rate of 2%). The distribution is left-heavy, but with a long thin right tail, partially due to two large outliers. The correct answer has been marked orange.

2.8 What do you think the inflation will be in 12 months, in percentages?
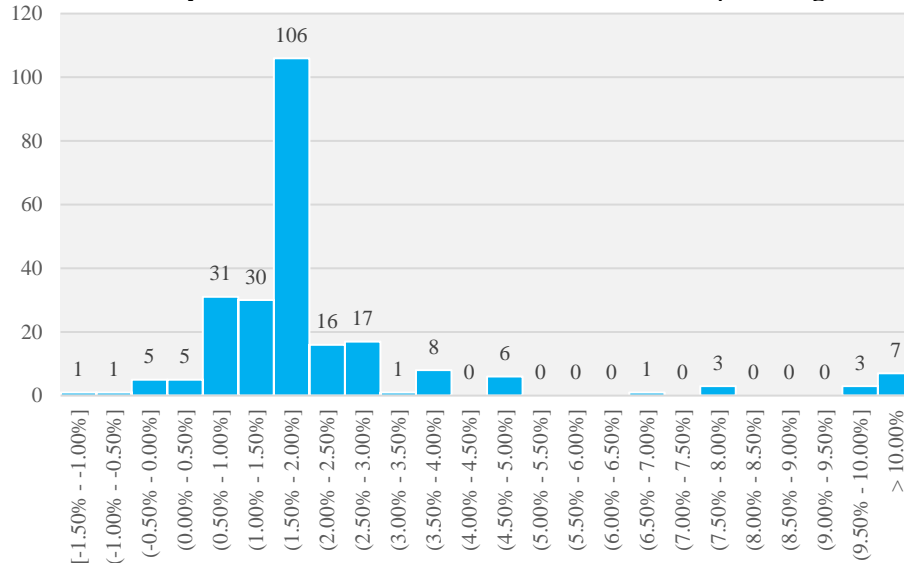
Figure 13. Distribution of respondent answers to question 2.8. This distribution is similar to that of 2.7, but is even more concentrated in the peak around the 2% target rate. In general, students seem to believe that the Riksbank will manage to steer the inflation rate to the target within the next 12 months, and keep it there. However, there is also more outliers that expect inflation to rise to beyond 10%.

5.   Analysis

The purpose of the analysis is to offer a deeper understanding of the results and conclude whether or not students understand inflation and what variables affect that understanding. This section presents first an analysis of how to grade each question as right or wrong, then how to combine these questions into a composite score, and finally presents a regression analysis of the understanding of inflation.

Interval selection

Questions 2.2 through 2.5 have answers that are either right, wrong, or "Don't know". These can be grouped into two categories: "Right" and "Not right", or "Know" and "Don't know". For questions 2.1 and 2.7, the correct answer would be 1.7 %, but if that would be the only correct answer, only three respondents would be right, and only one of them would be right on both 2.1 and 2.7. Besides, the purpose of the question is not to check if the respondents know the exact number, but if they are approximately right, so an interval would be better suited as the correct answer. An intuitive interval would be ±1%-point from the true value, or $[0.7\%, 2.7\%]$. Another would be using the historical volatility of inflation, such as the standard deviation or average deviation from the mean. A fourth approach would be to look at the empirical probability of the true inflation to be on the interval surrounding the correct guess, and setting the interval to a width that makes that probability suitably large. Table 3 on the following page contains a sensitivity analysis to the choice of interval used for 2.1, 2.7 and 2.8, with the fourth approach being called "Historical adjusted". The correct value for 2.1 and 2.7 is 1.7 % (SCB, 2017b), while the probable value for 2.8 is 2 %, the Riksbanken target rate (Riksbanken, 2011a). Also included is the combination of 2.1 and 2.7, which checks if the respondent gave the same answer on both.

Table 3. Sensitivity analysis of four different choices of interval used for assessing the answers to questions 2.1, 2.7 and 2.8 as well as the combination of 2.1 and 2.7. For question 2.1, 2.7 and 2.8, an observation is counted if it falls on the given interval. For the combined question 2.7-2.1, an observation is counted as OK if the answer to 2.1 and 2.7 is identical and not "Don't know" and is on the given interval. All answers "Don't know" have been excluded from the analysis, wherefore the total number of observations for each question varies.

Questions	Metric	Approach			
		1 Intuitive	2 Average deviation	3 Standard deviation	4 Historical adjusted
	Interval radius (%)	**1.00**	**1.11**	**1.38**	**0.50**
2.1 & 2.7	Correct value (%)	1.70	1.70	1.70	1.70
	Interval (%)	[0.70, 2.70]	[0.59, 2.81]	[0.32, 3.08]	[1.20, 2.20]
2.1	# obs. on interval	162	163	192	103
	# total obs.	251	251	251	251
	% obs. on interval	64.5%	64.9%	76.5%	41.0%
	% of historical obs.	51.5%	56.4%	62.3%	25.9%
2.7	# obs. on interval	178	178	198	129
	# total obs.	240	240	240	240
	% obs. on interval	74.2%	74.2%	82.5%	53.8%
	% of historical obs.	51.5%	56.4%	62.3%	25.9%
2.1-2.7	# OK obs. on interval	98	98	108	67
	# total obs.	230	230	230	230
	% OK obs.	42.6%	42.6%	47.0%	29.1%
	# obs. on interval	136	137	169	80
	% OK obs. on interval	72.1%	71.5%	63.9%	83.8%
2.8	Probable value (%)	2.00	2.00	2.00	2.00
	Interval (%)	[1.00, 3.00]	[0.89, 3.11]	[0.62, 3.38]	[1.50, 2.50]
	# obs. on interval	195	198	200	143
	# total obs.	238	238	238	238
	% obs. on interval	81.9%	83.2%	84.0%	60.1%
	% of historical obs.	44.9%	49.5%	57.4%	26.6%

The average deviation from the mean and the standard deviation of historical inflation has been calculated using monthly CPI-based inflation data from January 1990 to May 2017 (SCB, 2017a). All observations larger than 7.5 % have been excluded as they were considered extreme. Excluding these values led to a considerably more normally distributed data sample, as seen by comparing figures 14 and 15 on the following page. This led to smaller deviations.
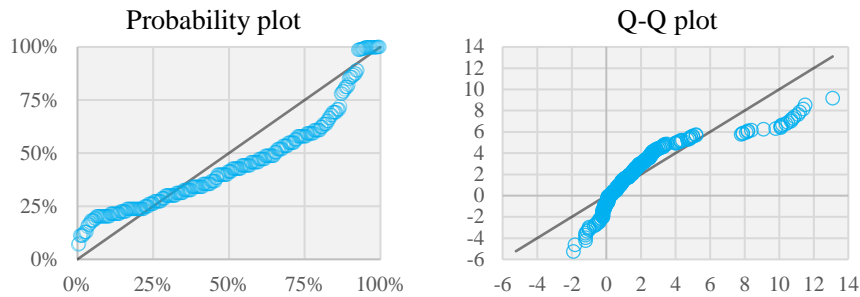
*Figure 14. Probability and Q-Q plot of inflation **before** removing extremes. Mean: 1.97, Std.: 2.63. Source:* (SCB, 2017a).
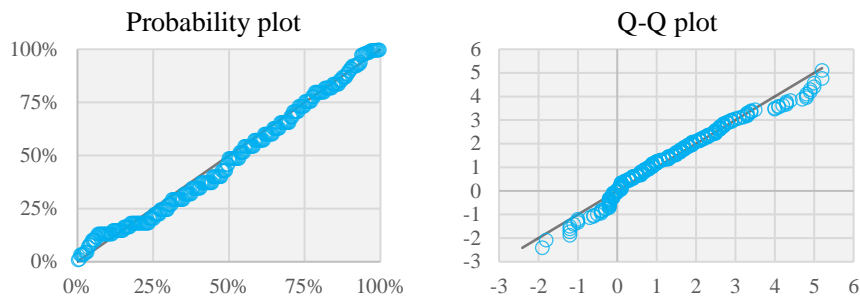
*Figure 15. Probability and Q-Q plot of inflation **after** removing extremes. Mean: 1.35, Std.: 1.38. Source:* (SCB, 2017a).

The first approach and second approach are nearly identical as the historical average deviation is almost 1 %, indicating that this is indeed a reasonable intuitive choice of interval. The standard deviation interval is 38 % wider than the intuitive one, leading to an increase in correct answers by 19 % for question 2.1, 11 % for 2.7, 10 % for 2.1-2.1, and 3 % for 2.8. For approach 1 through 3, at least 40 % of historical observations (since 1990 and not including the extremes discussed above) can be expected to be found in the resulting interval. In other words, guessing correctly that 1.7 % is the current rate of inflation would give the respondent right at least 40 % of the time. For question 2.8, that number is approximately the same when guessing that the future inflation will be 2.0 %. This causes these approaches to be highly vulnerable to false positives, i.e. respondents making correct guesses without having any idea about the inflation. Approach 4 attempts to solve the issue of false positives by setting the interval width narrow enough that approximately 25 % of historical observations fall within the interval. This implies that if the true value of inflation changes, the respondents would have to change their answer more often to still be right than would have been required if the interval was wide enough to contain 50 % of all historical observations. This leads to an interval width of 1.00 %.

Composite score construction

To say anything meaningful about the degree of which a respondent understands inflation, each question 2.1 thorough 2.5, 2.7 and 2.8 can be analyzed individually. The questions can also be analyzed together through the creation of a composite score. Creating a composite score includes attaching score weights to each question, and potentially to each possible answer. Answers to questions 1.1 through 1.5 and 2.6 can then be used as explaining variables in a regression analysis attempting to explain the composite score.

The way the composite score is constructed matters for the conclusions regarding the understanding of inflation. Figure 17 illustrates the distribution of correct answers and which questions caused the respondents the biggest problems. The conclusions are used to construct different composite scores.

a) | Distribution of each occurring answer combination

b) | Number of correct answers for each question

c) | Number of respondents without any error after each question
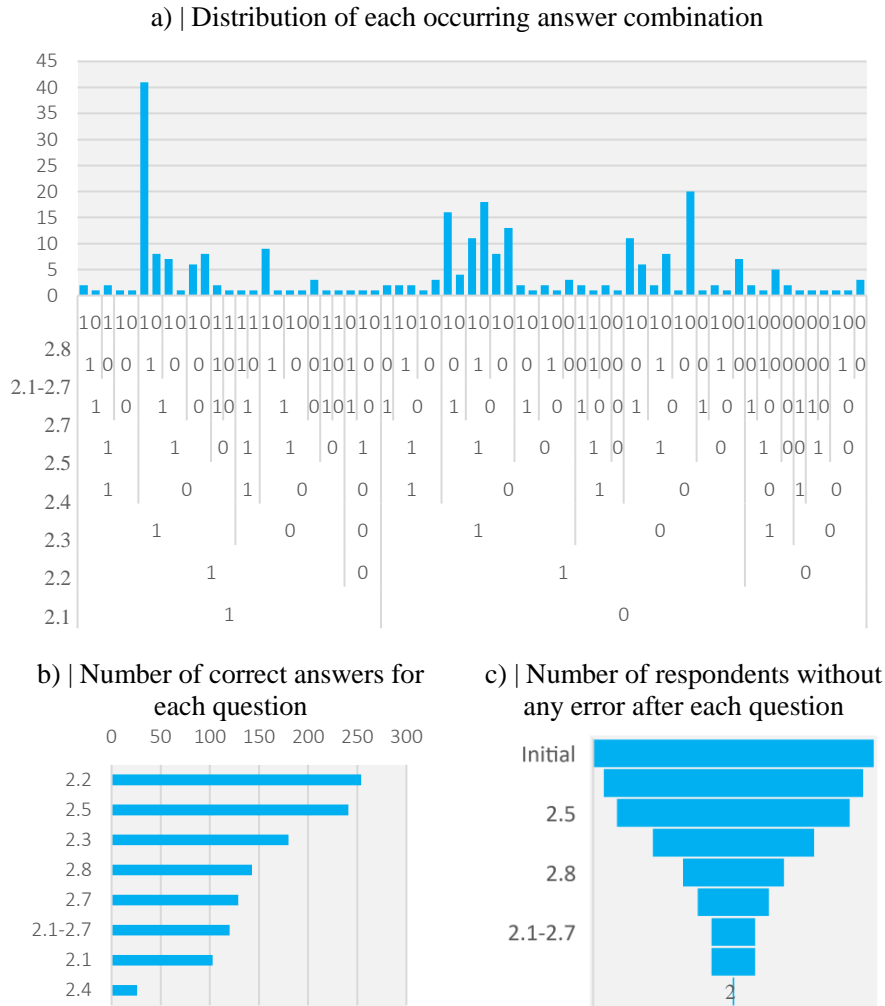
Figure 16. Illustration of the distribution of correct answers. a): Each answer has been coded "1" for correct and "0" for wrong. The x-axis shows the combination of right and wrong answers to each question (read vertically). The y-axis shows the number of respondents giving each possible answer combination. b): Number of correct answers for each question, in descending order. c): Funnel illustration of the number of respondents without any error after each question was asked. Questions have been re-ordered to match the order in graph b).

Figure 16a) shows that the largest density of identical answers composes 41 respondents who answered every question except 2.4 correctly. This is not surprising since, as discussed in the method, the effect of changed income tax on taxation is obscure. Question 2.4 also causes the by far biggest percentage drop-off from the previous level in the funnel of figure 16c). There are only two respondents managing to get all questions right.

Based in the insights from figure 1.6, three different approaches to structuring composite scores are tested. The first is the linear approach, whereby each question is weighted equally, and the answer to each question can be either correct or wrong only. The second approach is a weighted approach where the questions

have been given different weight based on their difficulty. The idea is that questions that reveal a greater understanding of inflation are given a higher score when answered correctly. Figure 16b) suggests at least three categories of answers, ranging from hard (Q2.4), to medium (Q2.1, 2.1-2.7, 2.7, 2.8, 2.3), to easy (Q2.5, 2.2). Recognizing that the answer to 2.8 may not matter that much for the understanding of inflation and that 2.1-2.7 on the other hand is very important, the grouping instead becomes: Important (Q2.4, 2.1-2.7), Medium (Q2.1, 2.7, 2.3), and Less (Q2.8, 2.5, 2.2). These categories are given the weights 3, 2, and 1 respectively.

The third approach is to score each answer differently, so that a correct answer gives a positive score, while a faulty answer gives a negative score. This way, answering "Don't know" can be less penalized than being straight out wrong. The reasoning is that it is worse to believe that you know the answer and then be wrong about it than it is to be aware of and admit that you do not know the answer. Here, the same correct answer weighting is used as for the weighted approach, while a faulty answer has weight –1. Table 4 summarizes the three approaches.

Table 4. Composite score structuring approaches.

Question	Approach				
	Linear	Weighted questions	Weighted answers		
			Correct answer	Don't know	Faulty answer
2.1	1	2	2	0	-1
2.2	1	1	1	0	-1
2.3	1	2	2	0	-1
2.4	1	3	3	0	-1
2.5	1	1	1	0	-1
2.7	1	2	2	0	-1
2.1-2.7	1	3	3	0	-1
2.8	1	1	1	0	-1
Max score	8	15	15		
Min score	0	0	-8		
Normalized score range	[0, 1]	[0, 1]	[0, 1]		

Figure 17 below illustrates the score distribution for the three approaches.
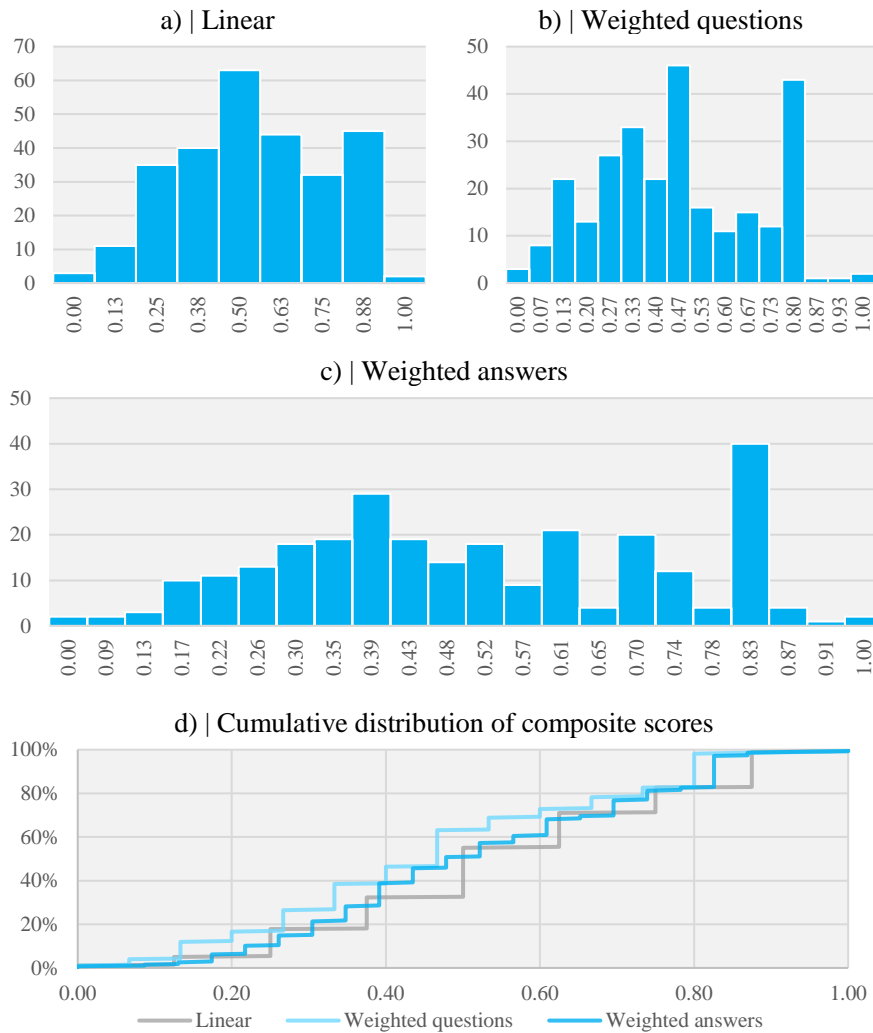
Figure 17. Score distribution for each composite structure. a)-c): Composite score along the x-axis, vs. number of responses along the y-axis. d): Composite score along the x-axis, vs. the percentage of respondents achieving the score or worse.

Approach a) enables 9 different scores, approach b) enables 16 different scores, and approach c) enables 23 different scores. Approach c) is thus the one most like a continuous variable, which makes it more suitable for modelling. Approach a) leads to a distribution of scores that is almost normal, with a mean of 0.54 and standard deviation 0.23. Normality for approach b) and c) is primarily ruined by the big spikes at 0.80 and 0.83 respectively. These are caused primarily by the 41 respondents who answered everything correct except question 2.4[4]. as seen in figure 16a). However, histograms like these only indicate the marginal distribution of the composite score. The scores may still be Gaussian with respect to some explaining parameters such as age, gender, or main area of studies. The third approach is selected as the most accurate and useful and is used for the reminder of the paper.

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[4] One of these 41, respondent 150, answered "Don't know", thereby gaining a score of 0.87, leading to only 40 observations in the spike at 0.83 in approach c).

Regression models

To attempt to explain why certain students gained higher scores, statistical regression models were created and analyzed. In Table 5 below, 8 models are formulated. In all models, the explained variable is the weighted answer score and is assumed to be multivariate normal with respect to the included parameters. This assumption was tested in the further analysis.

Table 5. Formulation of regression models. Variables: G = Gender (c); A = Age (n); T = Terms (n); S = Studies (c); N = NEK (c); Att = Attitude (c). c = Categorical variable; n = Continuous variable.

Model	Model equation
1	$Score = \beta_0 + \beta_1 G + \beta_2 A + \beta_3 (G * A)$
2	$Score = \beta_0 + \beta_1 T + \beta_2 S + \beta_3 N + \beta_4 Att$
3	$Score = \beta_0 + \beta_1 S + \beta_2 N + \beta_3 Att$
4	$Score = \beta_0 + \beta_1 S + \beta_2 N + \beta_3 Att + \beta_4 (S * N) + \beta_5 (S * Att) + \beta_6 (N * Att)$
5	$Score = \beta_0 + \beta_1 (S * Att)$
6	$Score = \beta_0 + \beta_1 G + \beta_2 A + \beta_3 T + \beta_4 S + \beta_5 N + \beta_6 Att$
7	$Score = \beta_0 + \beta_1 G + \beta_2 A + \beta_5 Att + \beta_6 (Att * G)$
8	$Score = \beta_0 + \beta_1 G + \beta_2 S + \beta_5 Att$

These are all simple linear regression models. Table 6 presents a comparison of the goodness of fit between the models.

Table 6. Assessment of goodness of fit for each regression model.

Model	DF	R^2	R^2 Adj.	F-stat	p-value	AIC	BIC
1	268	0.02997	0.01911	2.76	4.26E-02	-56.70324	-38.67423
2	263	0.09808	0.07064	3.575	5.90E-04	-66.5015	-30.44713
3	264	0.0979	0.07398	4.093	2.76E-04	-68.45021	-35.998
4	250	0.1291	0.05599	1.765	2.67E-02	-50.03992	32.89353
5	257	0.1036	0.05477	2.122	1.13E-02	-56.17686	1.515969
6	261	0.141	0.1081	4.286	1.51E-05	-75.7818	-32.51218
7	260	0.1446	0.1085	3.997	2.13E-05	-74.92313	-28.0477
8	264	0.1335	0.1105	5.808	2.82E-06	-79.3881	-46.93588

Model 8 had the highest adjusted R^2 value, the highest F-statistic value, and the lowest Akaike and Bayesian information criteria values, and was therefore

considered the best of the fitted models. Table 7 below shows the resulting model parameter estimates.

Table 7. Parameter estimation in Model 8.

Parameter	Estimate	Std. Error	t value	Pr(>|t|)	
(Intercept)	0.402509	0.052242	7.705	2.66E-13	***
Gender Male	0.089013	0.025651	3.47	0.000607	***
Attitude Negative	0.085539	0.034471	2.481	0.013706	*
Attitude Positive	0.038872	0.061011	0.637	0.524588	
Attitude Don't know	-0.005436	0.042749	-0.127	0.898915	
Studies Economy	0.030886	0.04814	0.642	0.521707	
Studies Engineering	-0.060877	0.051149	-1.19	0.235036	
Studies Social studies	0.127487	0.058901	2.164	0.031328	*

Significance codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1.

Respondent being male predicts a slight but significant improvement of score to female respondents. Having a negative attitude to inflation predicts a similar increase in score compared to being indifferent. The only area of studies that has any significance compared with "Other" is social studies, which has the greatest positive impact of all included variables.

Figure 18 on the following page shows a graphical analysis of the validity of Model 8 based on the assumption of the score following a multivariate normal distribution with regards to the explaining parameters. The mean of the residuals is -1.9E-17, or essentially zero; there is no autocorrelation nor any trend in the residuals, and the residuals and the standardized residuals appear approximately normal. The conclusion is that the model, although not perfect, is valid. Since a normal distribution has infinite tails and the constructed score is limited to the range [0, 1], the model has worse validity for values close to 0 and 1. Since all parameters included in the final model are categorical, the model can only predict values on [0.34, 0.70], which is a shortcoming.
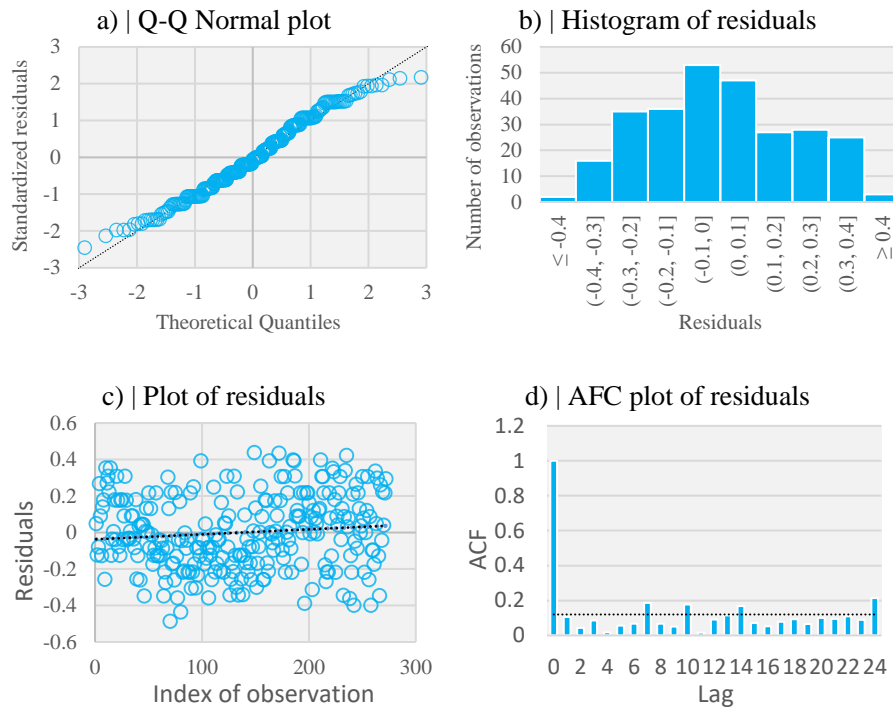
Figure 18. Graphical analysis of Model 8 validity. a) and b) show that the residuals are not perfectly normal distributed, but good enough for the model to not be rejected; c) shows that there is no trend in the residuals; d) shows that there is no autocorrelation between residuals.

Figure 19 on the following page breaks down the average of scores for each sub-question composing the composite score for each gender, area of studies, and attitude to inflation. This reveals that the only reason why male respondents get a higher average score than women is that they more often answer questions 2.1, 2.7 and 2.8 correctly and also getting better scores at the implicit 2.1-2.7 question, meaning that they are better at estimating current rate of inflation, making sensible guesses at the rate of inflation in one year, and correctly giving the same answer to 2.1 and 2.7. Respondents having studied social studies are the best at answering five out of the eight questions, and much better at correctly answering 2.4 and 2.1-2.7. However, the sample of social studies respondents is too limited to make any generalizations. Notably, engineers are worse at estimating the current rate of price evolution in question 2.1, but they do better when asked about the inflation in question 2.7, compared to other areas of studies. Finally, having a negative outlook on inflation correlates with a much better score at questions 2.7 and 2.1-2.7. This implies that having a negative outlook indeed correlates with a deeper understanding of inflation. Overall, the difference in score seems to be driven primarily, almost solely, by the respondents' different answers to questions 2.1, 2.7 and 2.8, except for the social studies respondents who are also pulled up by question 2.4. This reveals that the selection of interval for judging the correctness of an answer to these questions matters for the outcome of the analysis.

Figure 19. Comparison of average scores for each question and of the total normalized score, broken down by a) gender, b) area of studies, and c) attitude to inflation.

6. Discussion

The first purpose of this thesis is to check for money illusion through testing the understanding of inflation among students. The average composite score constructed to test this hypothesis is 0.52, which reveals that students in general do not understand inflation very well. They know the definition of inflation (92 % correctly answer question 2.2 – the highest rate of any question), but only 47 % of these respondents are logically consistent and give the same answers to both question 2.1 and 2.7. As explained in the method, the purpose of asking both 2.1 and 2.7 is to examine if the students have integrated their understanding of the definition, and the results are clear: most have not. This alone is enough to refute the hypothesis that students in general understand inflation: even when they know the definition of inflation, they still don't understand that definition.

Questions 2.3 and 2.5 were easily answered by most respondents (65 % and 88 %). This is not surprising, given that these are issues often discussed in the media, and as Dräger (2015) has shown, the media discussion matters. Even so, 35 % could not correctly identify the relationship between interest rates and inflation.

Then perhaps it is not strange that students do not understand question 2.4 about the effect of lowered income tax on inflation, with 63 % of respondents thinking that a lowered income tax would lead to a rise in inflation. This connection is much more obscure and rarely discussed in the media, so a worse performance is to be expected. The logic behind the students' reasoning when answering that inflation should rise might be as follows: "If the government lowers the income tax, I will have more money to spend. That means there will be more money in the system chasing fewer goods, and that means inflation." If other words, lower income tax would increase demand. However, if the government reduces its tax income, it should also be excepted to reduce its own expenditures to keep the budget balanced, leading to a reduced government consumption demand. The net result is an unchanged total demand and merely a redistribution of wealth between the private and public sector. However, if the government didn't decrease its own spending, but instead financed the spending with an inflation tax, that is, started printing more money to pay for the deficit, inflation would indeed increase. If, instead, the government ran a large deficit, this would drive interest rates up due to increased worry of the government debt, and this would drive inflation down. Poterba and Rotemberg (1990) discuss the optimal way for governments to balance inflation tax and regular tax, and argue that inflation and taxation should rise in tandem if the government optimized. They review the empirical data and conclude that this seems to hold for the US and Japan, but does not hold in general. Thus, theory stipulates that a decrease in taxation should be followed by a reduction in inflation, but in reality this is not the case. Another potential explanation is that respondents believe a lower income tax will boost the economy and associate a booming economy with higher inflation. First, it is not given that a cut in taxes will boost the economy (Ljungqvist & Smolyansky, 2016). Even if it does, a faster growing economy will, in the long run, lead to lower inflation if the increase in money production by the central bank remains constant according to the quantity theory of money. This is easily seen by rewriting equation (1) by deriving P with respect to time and dividing with P to get the growth rate:

$$\frac{dP/dt}{P} = \pi = m + v - q \qquad (4)$$

where π is the inflation, m is the growth rate of money, v is the growth rate in money velocity, and q is the growth rate of the economy. Thus, if the central bank keeps m constant, v stays constant, and q increases, the rate of inflation falls. In the long run, therefore, the argument that a tax decrease leads to higher economic growth and therefore inflation fails. The actions of the central bank is of course crucial and is mentioned in briefly Ljungqvist and Smolyansky (2016), who point out that the central bank may change its monetary policy as a result of the changed tax rate, and thereby affecting the interest rates, inflationary expectations, and eventually also inflation. If a lowering of the taxes would prompt the central bank to also lower interest rates, then m would increase and potentially lead to increased inflation. In the short run, the well-known Philips curve implies a correlation between economic activity and inflation, and it may be due to this short-run correlation that students answer as they do. To establish the real reason as to why students have answered as they have, a different kind of study would be required, such as deep interviews with a large number of individuals, far beyond the scope of this thesis.

Second to question 2.4, questions 2.1 caused the biggest problem for the respondents, which reveals that students do not have a good intuitive sense of how much prices have increased. Only 37 % of respondents gave answers within the 1 %-interval of the correct answer of 1.7 %. One possible explanation for this poor result could be that students have just recently started buying things such as food for themselves, no longer relying on their parents, and have therefore not had time to notice any changes in prices. However, this would imply that as students get older, they would get better at this guessing. The survey data strongly refutes any link between age and ability to answer question 2.1. They were considerably better at guessing the rate of inflation when asked directly about it in question 2.7, but still only 47 % got it right (using the same interval). A possible explanation for the difference is that the word inflation is used in the news and respondents therefore have a better intuitive picture of the current rate. Another possible explanation is that students know that the Riksbanken target rate is 2 % and therefore make guesses close to this, but don't realize that the same is true for question 2.1.

Taken together, the inability of respondents to correctly 1) identify current levels of inflation, 2) identify that a general increase in prices and inflation are the same thing, and 3) answer questions regarding the workings of inflation in the macroeconomy, reveal that students do not fully understand inflation, and this in turn implies money illusion. Even if we were to consider scores of 0.40 and above as indicative of good understanding of inflation, an entire 39 % of respondents would not pass, and as Fehr and Tyran (2001) demonstrates, it is enough that a small number of individuals suffer from money illusion to change the outcome and behavior of the aggregate economy.

The second purpose of this thesis is to attempt to explain why some students appear to understand inflation better than others. The result of the regression analysis is clear: the included variables are not enough to explain the variance in composite score. There are a number of possible reasons for this, including a poor choice of questions or choice of wording in the questions posed to the students, a

poor way of weighting the answers, faulty model assumptions, a too small sample of students, a lack of explaining variables, or even that there are no decent explaining variables and that the understanding of inflation is truly random. The true explaining variables may be something like "interest in the economy/ economics", "interest in politics", "economically interested parents", "socio-economic background", or even "political affiliation". These and similar questions could easily have been added to the survey, but they were not believed to be significant on the outset.

The final regression model seems to fit the underlying assumptions of multivariate normality, but has very limited explaining power. Even though the model is clearly unable to explain why some students understand inflation better than others, it gives some interesting hints and insights.

First, we can conclude that male respondents on average have a better understanding of inflation than women. As discussed in the analysis with regards to figure 19, this difference is completely driven by the male respondents' ability to better answer questions 2.1, 2.7 and 2.8. It is, however, not clear why men would be better at this. There is no correlation between gender and any other explaining variable in the data, so the explanation must lie outside what has been measured by the survey. One potential answer is that men are more likely than women to make a guess even when they don't know the answer. This phenomenon has been well-documented (Nave et al., 2017), and has in Sweden gained its own term, "killgissning" (guy-guessing). If the male respondents randomly guess at a value that is sufficiently close to the Riksbank's target rate, they would be noted as correct and their composite score increases.

Second, the hypothesis that having previously taken courses in national economics or to be currently studying economics would improve the understanding of inflation has been soundly refuted. Similarly, Shafir, Diamond and Tversky (1997, p.362 note 14) point out that an experimental study by the authors on students' understanding of value today versus value tomorrow conducted at Princeton University garnered identical responses from students with no formal education in economics as from students with at least a one-semester course in economics. Thus, having received just basic courses in national economics at university level is not enough to significantly improve your understanding of inflation compared with other students at the same university. However, it may be that receiving enough education tips the scale. It seems plausible that attaining a master's degree in national economics would make the individual much more likely to get a higher score and exhibit a deeper understanding of inflation. The sample used in this study does not allow us to reject the hypothesis that graduating with a bachelor's degree (or higher) in national economics significantly improves one's understanding of inflation.

Third, age has no significant impact on the understanding of inflation. This matter because it implies that the results are likely to be generalizable. If getting older (or having studied longer at university) does not improve your understanding of inflation, graduating and leaving university does not automatically improve your understanding either. This suggests that if this study was conducted on non-students, the results would be similar. Arguing against this generalizability is that many other things than age changes once a student graduates, for example

monthly income, expenditure, and habits. If, as hypothesizes by Dräger (2015), media, and in the extension media consumption, is essential for people's understanding of inflation, changed habits upon graduation shifting to more media consumption, or a shift in what type of media is consumed to more economics related news, may significantly alter the outcome of this survey.

Fourth, being negatively dispositioned to inflation is the most common stance, in line with Shiller (1997a), and this correlates with better understanding of the definition of inflation as measured by the implicit 2.1-2.7 question. Interestingly, only 5 % of respondents reported a positive attitude to inflation.

The discussion above regarding question 2.4 raises a weakness of the method. Have respondents answered what they believe will happen in the long or in the short run? Are they at all aware that there is a difference? The intention was to ask about the long-run effects as these are better understood in theory and because, in the short run, almost anything can happen. Despite this intention, the questionnaire does not prompt either long-run or short-run answers, which means that we do not know how students reasoned. In the experience of this author, the confusion between the long-run and short-run perspective is a common issue among economics students, and it seems plausible that it would be even more an issue for non-economists who may not even be aware that there is a significant distinction in the theory. Shiller (1997b, p.177) points out that inflation is a very complicated subject that respondents may believe they understand but in fact do not. This makes it possible to question the survey approach used both in this study and by Shiller himself, as it is hard to construct multiple-choice questions that adequately discern the reasoning of the respondent.

7.   Conclusions

This thesis supports previous studies in concluding that money illusion is real. It does so by showing that students do not understand inflation beyond the mere definition and the correlations widely reported by the media. It is further argued that these results are likely to be generalizable, and that even if they are not generalizable to all people, it is enough that there is a subset of actors on the market suffering from money illusion to change the aggregate behavior and outcomes of that market. This implies that money illusion is both real and does matter. It has been shown that although students understand the definition of inflation when asked about it directly, they do not understand the implications of that definition. This is not surprising considering how complicated the matter of inflation and its workings in the economy are. What is surprising is that money illusion was for so long rejected by the economist profession. Potentially surprising, yet also in line with previous studies, is that having studied economics at a university entry level makes no difference and does not significantly improve students understanding of inflation. Men have a better sense of the current level of inflation, or are at least better at guessing it, but are not otherwise better at understanding inflation than women.

The aim of the thesis was to examine money illusion and inflation, and to try to explain why some students have better or worse understanding than others. While the existence of money illusion has been established by implication of poor understanding of inflation, further research is needed to explain the varying degrees of understanding observed among students. Further research could also aim at generalizing the results by studying a wider segment of the general population.

References

Aaron, H. (1976). Inflation and the Income Tax, *The American Economic Review*, vol. 66, no. 2, pp.193–199.

Acker, D. & Duck, N. W. (2013). Do Investors Suffer from Money Illusion? A Direct Test of the Modigliani–Cohn Hypothesis, *Review of Finance*, vol. 17, no. 2, pp.565–596.

Akerlof, G. A. & Dickens, W. T. (2007). Unfinished Business in the Macroeconomics of Low Inflation: A Tribute to George and Bill by Bill and George, *Brookings Papers on Economic Activity*, vol. 2007, no. 2, pp.31–46.

Akerlof, G. A., Dickens, W. T. & Perry, G. L. (1996). The Macroeconomics of Low Inflation, *Brookings papers on economic activity*, vol. 1996, no. 1, pp.1–76.

Akerlof, G. A. & Shiller, R. J. (2009). Animal Spirits: How Human Psychology Drives the Economy, and Why It Matters for Global Capitalism., Princeton, New Jersey: Princeton University Press.

Baxa, J., Plašil, M. & Vašíček, B. (2017). Inflation and the Steeplechase between Economic Activity Variables: Evidence for G7 Countries, *The B.E. Journal of Macroeconomics*, vol. 17, no. 1, pp.1–42.

Bernd Weber, Antonio Rangel, Matthias Wibral & Armin Falk. (2009). The Medial Prefrontal Cortex Exhibits Money Illusion, *Proceedings of the National Academy of Sciences of the United States of America*, vol. 106, no. 13, pp.5025–5028.

Bourgeois-Gironde, S. & Guille, M. (2011). Keynes's Animal Spirits Vindicated: An Analysis of Recent Empirical and Neural Data on Money Illusion, *Journal of Post Keynesian Economics*, vol. 34, no. 2, pp.331–352.

Brunnermeier, M. K. & Julliard, C. (2008). Money Illusion and Housing Frenzies, *Review of Financial Studies*, vol. 21, no. 1, pp.135–180.

Brunnermeier, M. K. & Sannikov, Y. (2016). On the Optimal Inflation Rate, *American Economic Review*, vol. 106, no. 5, pp.484–489.

Camerer, C., Loewenstein, G. & Rabin, M. (eds). (2004). Advances in Behavioral Economics, New York: Princeton, N.J: Russell Sage Foundation; Princeton University Press.

Cohen, R. B., Polk, C. & Vuolteenaho, T. (2005). Money Illusion in the Stock Market: The Modigliani-Cohn Hypothesis, *The Quarterly Journal of Economics*, vol. 120, no. 2, pp.639–668.

Dräger, L. (2015). Inflation Perceptions and Expectations in Sweden - Are Media Reports the Missing Link?, *Oxford Bulletin Of Economics And Statistics*, vol. 77, no. 5, pp.681–700.

Ehrmann, M. & Tzamourani, P. (2012). Memories of High Inflation, *European Journal of Political Economy*, vol. 28, no. 2, pp.174–191.

Fehr, E. & Tyran, J.-R. (2001). Does Money Illusion Matter?, *The American Economic Review*, vol. 91, no. 5, pp.1239–1262.

Fehr, E. & Tyran, J.-R. (2014). Does Money Illusion Matter?: Reply†, *American Economic Review*, vol. 104, no. 3, pp.1063–1071.

Feldstein, M., Green, J. & Sheshinski, E. (1978). Inflation and Taxes in a Growing Economy with Debt and Equity Finance, *Journal of Political Economy*, vol. 86, no. 2, pp.53–70.

Feldstein, M. S. (1983). Inflation, Tax Rules, and Capital Formation, [e-book] Chicago: University of Chicago Press, Available Online: http://papers.nber.org/books/feld83-1 [Accessed 11 August 2017].

Fischer, S. & Modigliani, F. (1978). Towards an Understanding of the Real Effects and Costs of Inflation, *Review of World Economics*, vol. 114, no. 4, pp.810–833.

Fisher, I. (1922). The Purchasing Power of Money, [e-book] Library of Economics and Liberty, Available Online: http://www.econlib.org/library/YPDBooks/Fisher/fshPPM2.html [Accessed 5 August 2017].

Fisher, I. (1928). The Money Illusion, New York: Adelphi.

Fisher, I. (1930). The Theory of Interest, New York: Macmillan.

Fregert, K. (2007). Inflation, Stokholm: SNS.

Friedman, M. (1963). Inflation: Causes and Consequences, New York: Asia Publishing House.

Friedman, M. & Schwartz, A. J. (1963). Monetary History of the United States, Princeton: Princeton University Press.

Friedman, M. & Schwartz, A. J. (1976). From Gibson to Fisher, in *Explorations in Economic Research*, Vol. 3, [e-book] NBER, pp.130–133, Available Online: http://www.nber.org/chapters/c9922 [Accessed 4 August 2017].

Greaves, B. B. (2010). Ludwig von Mises on Money and Inflation: A Synthesis of Several Lectures, Auburn: Ludwig von Mises Institute.

Hanke, S. H. & Bushnell, C. (2016). Venezuela Enters the Record Book – The 57th Entry in the Hanke-Krus World Hyperinflation Table, *The Johns Hopkins Institute for Applied Economics, Global Health, and the Study of Business Enterprise*, [e-journal] vol. 69, Available Online: http://sites.krieger.jhu.edu/iae/files/2017/04/Venezuela_Enters_the_Record_Book.pdf [Accessed 31 July 2017].

Keynes, J. M. (1924). A Tract on Monetary Reform, edited by E. Johnson & D. Moggridge, 2nd edn, Vol. 4, Cambridge: Cambridge University Press for the Royal Economic Society.

Keynes, J. M. (1936). The General Theory of Employment, Interest, and Money, London: Macmillan.

Koech, J. (2011). Hyperinflation in Zimbabwe, *Annual Report, Globalization and Monetary Policy Institute*, vol. 2011, pp.2–12.

Ljungqvist, A. & Smolyansky, M. (2016). To Cut or Not to Cut? On the Impact of Corporate Taxes on Employment and Income, *Finance and Economics Discussion Series*, vol. 2016, no. 6, pp.1–60.

Nave, G., Nadler, A., Zava, D. & Camerer, C. (2017). Single Dose Testosterone Administration Impairs Cognitive Reflection in Men, *Psychological Science*, preprint pp.1–13. Available Online: http://resolver.caltech.edu/CaltechAUTHORS:20170428-091020875, [Accessed 6 August 2017].

Paul De Grauwe, author & Magdalena Polan, author. (2005). Is Inflation Always and Everywhere a Monetary Phenomenon?, *The Scandinavian Journal of Economics*, vol. 107, no. 2, pp.239–259.

Petersen, L. & Winn, A. (2014). Does Money Illusion Matter?: Comment†, *American Economic Review*, vol. 104, no. 3, pp.1047–1062.

Poterba, J. M. & Rotemberg, J. J. (1990). Inflation and Taxation with Optimizing Governments, *Journal of Money, Credit and Banking*, vol. 22, no. 1, pp.1–18.

Riksbanken. (2011a). The Tasks and Role of the Riksbank, *Sveriges Riksbank*, Available Online: http://www.riksbank.se/en/The-Riksbank/The-Riksbanks-role-in-the-economy/ [Accessed 17 July 2017].

Riksbanken. (2011b). How Changes in the Repo Rate Affect Inflation, Available Online: http://www.riksbank.se/en/Monetary-policy/Forecasts-and-interest-rate-decisions/How-changes-in-the-repo-rate-affect-inflation/ [Accessed 19 July 2017].

RStudio. (2017). *RStudio*, Available Online: https://www.rstudio.com/products/rstudio/ [Accessed 17 July 2017].

SCB. (2017a). Inflationstakten enligt KPI och KPIF, Available Online: http://www.scb.se/hitta-statistik/statistik-efter-amne/priser-och-konsumtion/konsumentprisindex/konsumentprisindex-kpi/pong/tabell-och-diagram/underliggande-inflation-kpix-kpif-och-kpif-ks/inflationstakten-enligt-kpi-och-kpif/ [Accessed 25 June 2017].

SCB. (2017b). Konsumentprisindex, 12-månadersförändring, procent (Inflationstakten), *Statistiska Centralbyrån*, Available Online: http://www.scb.se/hitta-statistik/statistik-efter-amne/priser-och-konsumtion/konsumentprisindex/konsumentprisindex-kpi/pong/tabell-och-diagram/konsumentprisindex-kpi/kpi-12-manadersforandring-inflationstakten/ [Accessed 17 July 2017].

Shafir, E., Diamond, P. & Tversky, A. (1997). Money Illusion, *The Quarterly Journal of Economics*, vol. 112, no. 2, pp.341–374.

Shiller, R. J. (1997a). Why Do People Dislike Inflation?, in C. D. Romer & D. H. Romer (eds), *Reducing Inflation: Motivation and Strategy*, [e-book]

Chicago: University of Chicago Press, pp.13–70, Available Online: http://www.nber.org/chapters/c8881 [Accessed 30 July 2017].

Shiller, R. J. (1997b). Public Resistance to Indexation: A Puzzle, *Brookings Papers on Economic Activity*, vol. 1997, no. 1, pp.159–228.

Tanzi, V. (1980). Inflation and the Personal Income Tax: An International Perspective, Cambridge: Cambridge University Press.

Tobin, J. (1972). Inflation and Unemployment, *The American Economic Review*, vol. 62, no. 1, pp.1–18.

Webb, S. B. (1989). Hyperinflation and Stabilization in Weimar Germany, Oxford: Oxford University Press.

Yu, R. & Huang, Y. (2013). A Nickel Ain't Worth a Dime Anymore: The Illusion of Money and the Rapid Encoding of Its True Value, *PLoS ONE*, vol. 8, no. 1, pp.1–8.

Appendix A – Survey

Undersökning av förståelsen för inflation och penningpolitik bland studenter

1. Personuppgifter

1.1 Kön: ☐ **F** ☐ **M** ☐ **Annat**	**1.2 Ålder** (*år*):
1.3 Antal avslutade terminer vid universitet:	**1.4 Studerar huvudsakligen** (*inriktning, kurs, program, eller dylikt.*):
1.5 Har du tidigare läst kurser inom nationalekonomi? ☐ **Ja** ☐ **Nej**	

2. Inflation och penningpolitik

2.1 Hur många procent bedömer du att priserna i allmänhet (dvs de svenska konsumentpriserna) har förändrats de senaste 12 månaderna?

2.2 Vad är inflation? (*Välj 1 alternativ.*)

☐ **Uppgång i ekonomin**   ☐ **Uppgång i huspriser**
☐ **Uppgång i prisnivån**   ☐ **Vet ej**

2.3 En högre räntenivå leder till att inflationen i allmänhet… (*Välj 1 alternativ.*)

☐ **Stiger**   ☐ **Sjunker**
☐ **Ingen effekt**   ☐ **Vet ej**

2.4 En sänkning av inkomstskatten leder till att inflationen… (*Välj 1 alternativ.*)

☐ **Stiger**   ☐ **Sjunker**
☐ **Ingen effekt**   ☐ **Vet ej**

2.5 Vem har huvudansvaret för penningpolitiken i Sverige? (*Välj 1 alternativ.*)

☐ **Riksbanken**   ☐ **Regeringen**
☐ **Europeiska centralbanken**   ☐ **Vet ej**

2.6 Hur upplever du att hög inflation påverkar dig? (*Välj 1 alternativ.*)

☐ **Positivt**   ☐ **Negativt**
☐ **Ingen påverkan**   ☐ **Vet ej**

2.7 Hur många procent bedömer du att inflationen var de senaste 12 månaderna?

2.8 Hur många procent tror du att inflationen är om 12 månader?

Tack för ditt svar!

Kontaktuppgifter till undersökningsansvarig:
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0730 – 26 18 39
Ällingavägen 3J lgh 1422, 227 34, LUND

Svarsblad	1.1 Kön	1.2 Ålder (år)	1.3 Antal avslutade terminer vid högskola eller motsvarande	1.4 Studerar huvudsakligen (program)	1.5 Har du tidigare läst kurser inom nationalekonomi?	2.1 Hur många procent bedömer du att priserna i allmänhet (dvs de svenska konsumentpriserna) har förändrats de senaste 12 månaderna?	2.2 Vad är inflation? (välj 1 alternativ)	2.3 En högre räntenivå leder till att inflationen… (Välj 1 alternativ.)	2.4 En sänkning av inkomstskatten leder till att inflationen… (Välj 1 alternativ.)	2.5 Vem har huvudansvaret för penningpolitiken i Sverige? (Välj 1 alternativ.)	2.6 Hur upplever du att hög inflation påverkar dig? (Välj 1 alternativ.)	2.7 Hur många procent bedömer du att inflationen var de senaste 12 månaderna?	2.8 Hur många procent tror du att inflationen är om 12 månader?	Not
1	F	20	1	Industriell ekonomi	Nej	3.0%	3	2	1	1	3	2.0%	2.0%	
2	F	22	1	Industriell ekonomi	Nej	Vet ej	3	1	2	1	2	2.0%	2.0%	
3	F	20	1	Industriell ekonomi	Nej	3.0%	3	2	2	4	2	1.6%	2.0%	
4	F	23	5	Maskinteknik	Ja	0.5%	3	2	1	1	2	0.5%	1.7%	
5	M	23	5	Maskinteknik	Ja	1.0%	3	2	1	2	2	1.0%	2.0%	
6	M	23	3	Maskinteknik	Ja	0.0%	3	1	4	1	3	1.5%	1.5%	
7	F	22	5	Maskinteknik	Nej	Blank	3	2	Blank	1	1	Blank	Blank	
8	M	21	5	Elektroteknik	Nej	2.0%	3	2	3	1	2	1.5%	1.8%	
9	M	23	5	Maskinteknik	Ja	1.0%	3	1	1	1	2	1-2%	2.0%	
10	F	22	5	Elektroteknik	Nej	1.5%	3	4	4	1	2	1.5%	1.5%	
11	F	21	1	Industriell ekonomi	Nej	0.0%	3	2	1	1	4	0.0%	0.0%	
12	M	21	1	Industriell ekonomi	Nej	2.0%	3	2	1	1	2	2.0%	2.0%	
13	M	20	1	Industriell ekonomi	Nej	2.0%	3	2	1	1	2	2.0%	3.0%	
14	F	20	1	Industriell ekonomi	Nej	2.0%	3	4	4	1	2	2.0%	1.5%	
15	M	20	1	Industriell ekonomi	Nej	2-3%	3	2	1	1	2	Vet ej	Vet ej	
16	F	23	7	BME	Ja	1.0%	3	2	1	1	3	0.0%	0.0%	
17	F	24	9	BME	Nej	2.0%	3	4	2	1	3	0.5%	0.5%	
18	M	20	2	Industriell ekonomi	Nej	1.0%	3	2	1	1	2	1.0%	2.0%	
19	M	19	1	Industriell ekonomi	Nej	0.5%	3	1	1	1	2	0.5%	1.0%	
20	M	20	1	Industriell ekonomi	Nej	2.0%	3	2	2	1	2	2.0%	2.0%	
21	M	20	1	Industriell ekonomi	Nej	6.0%	3	2	1	1	3	6.0%	8.0%	
22	M	21	1	Industriell ekonomi	Nej	0.0%	3	4	4	1	4	1.0%	2.0%	
23	M	19	1	Industriell ekonomi	Nej	1.5%	1	1	4	1	2	Vet ej	1.9%	
24	M	22	1	Industriell ekonomi	Nej	1.0%	3	2	1	1	2	1.0%	1.5%	
25	M	22	5	Industriell ekonomi	Nej	0.5-1%	3	2	2	1	2	0.5-1%	1.5%	
26	M	19	1	Industriell ekonomi	Nej	0.4%	3	1	1	1	2	0.4%	0.4%	
27	M	19	1	Industriell ekonomi	Nej	1.0%	3	2	2	2	3	1.0%	0.0%	
28	M	20	1	Industriell ekonomi	Nej	2.0%	3	2	1	1	2	2.0%	2.0%	
29	M	23	3	Industriell ekonomi	Ja	1.0%	3	2	1	1	3	1.0%	1.0%	
30	M	22	1	Industriell ekonomi	Nej	0.5%	3	1	2	1	2	0.5%	1.0%	
31	F	21	1	Industriell ekonomi	Nej	0.1%	3	2	1	1	4	-0.1%	-0.1%	
32	F	20	1	Industriell ekonomi	Nej	1.0%	3	2	1	3	4	2.0%	2.0%	

33	F	20	1	Industriell ekonomi	Nej	1.5%	3	2	1	1	2	2.0%	3.0%	
34	M	20	1	Industriell ekonomi	Nej	1.0%	3	1	4	1	3	1.0%	1.0%	
35	M	23	5	Industriell ekonomi	Ja	0.0%	3	2	1	1	2	0.0%	1.0%	
36	M	21	5	Industriell ekonomi	Ja	Vet ej	3	2	1	1	1	1.5%	2.0%	
37	M	22	5	Industriell ekonomi	Ja	Vet ej	3	2	1	1	2	1.8%	1.9%	
38	F	23	5	Industriell ekonomi	Ja	0.5%	3	2	1	1	2	0.5%	1.0%	
39	F	22	5	Industriell ekonomi	Ja	1.0%	3	1	1	1	2	1-2%	1.0%	
40	M	21	1	Industriell ekonomi	Nej	0.7%	3	2	1	1	3	70.0%	1.0%	
41	M	19	0	Kurs	Nej	1-2%	3	2	1	1	4	0-1%	2-3%	
42	M	21	0	Ekonomie kandidat	Nej	Vet ej	3	1	4	4	2	Vet ej	Vet ej	
43	M	19	1	Företagsekonomi	Nej	2.0%	3	1	2	4	2	2.0%	2.0%	
44	F	25	4	Företagsekonomi	Ja	1.0%	3	2	3	1	2	2.0%	2.0%	
45	F	20	0	Ekonomie kandidat	Ja	5.0%	3	1	1	1	3	5.0%	8.0%	
46	M	21	0	Ekonomie kandidat	Ja	1.0%	3	1	1	1	2	2.0%	2.0%	
47	F	21	0	Ekonomie kandidat	Nej	2.0%	3	2	1	1	4	4.0%	4.0%	
48	F	28	6	Ekonomie kandidat	Nej	Vet ej	3	2	3	1	2	Vet ej	Vet ej	
49	M	22	1	Ekonomie kandidat	Nej	2.0%	3	2	1	1	4	1.5%	2.0%	
50	M	21	0	Ekonomie kandidat	Nej	1.5%	3	2	1	1	2	1.5%	2.0%	
51	F	23	0	Ekonomie kandidat	Nej	2.0%	3	2	1	1	2	0.0%	3.0%	
52	M	21	0	Ekonomie kandidat	Nej	1.2%	3	2	1	3	2	1.2%	1.9%	
53	M	22	2	Program	Nej	2-3%	3	1	2	1	2	2-3%	2-3%	
54	F	21	0	Ekonomie kandidat	Nej	3.0%	3	1	2	1	3	Vet ej	Vet ej	
55	F	21	0	Ekonomie kandidat	Nej	4.0%	3	4	4	1	4	2.0%	Vet ej	
56	F	20	0	Ekonomie kandidat	Nej	2.0%	3	2	1	1	2	7.0%	8.0%	
57	M	19	1	Ekonomie kandidat	Nej	1-2%	3	2	2	1	2	1-2%	1-2%	
58	M	Blank	Blank	Program	Nej	10.0%	3	1	1	1	2	0.0%	50.0%	Oklart om seriös. Överväg att ta bort ur resultatet.
59	M	30	4	Ekonomie kandidat	Ja	2.0%	3	2	1	1	1	1.0%	1.0%	
60	F	20	0	Ekonomie kandidat	Nej	18-20%	3	2	1	1	2	2.5%	2.5%	
61	F	19	0	Företagsekonomi	Nej	8-10%	3	2	3	1	2	6-8%	10.0%	
62	M	20	0	Företagsekonomi	Nej	3.8%	3	2	1	1	4	2.0%	2.0%	
63	M	20	0	Företagsekonomi	Nej	2.0%	3	2	1	1	3	5.0%	Blank	
64	F	31	1	Ekonomi/design	Nej	5.0%	3	4	4	1	3	Vet ej	Vet ej	
65	F	20	0	Ekonomie kandidat	Nej	5.0%	1	1	2	1	3	2.0%	5.0%	
66	F	20	2	Ekonomie kandidat	Nej	5.0%	3	2	1	1	2	2.0%	3.0%	
67	M	20	0	Program	Nej	7.0%	1	2	1	1	3	4.0%	5.0%	
68	M	20	2	Ekonomie kandidat	Nej	1-2%	3	2	1	3	4	1.0%	2.0%	
69	M	19	0	Ekonomie kandidat	Nej	2.0%	3	2	2	1	3	2.0%	2.0%	
70	M	21	0	Ekonomie kandidat	Nej	2.0%	3	2	1	1	2	2.0%	3.0%	
71	M	20	0	Program	Nej	10.0%	1	1	2	2	4	4.0%	3.0%	
72	M	21	0	Ekonomie kandidat	Nej	1.5%	3	2	1	2	4	1.5%	1.5%	
73	F	20	1	Ekonomie kandidat	Nej	1.0%	3	1	3	1	2	3.0%	4.0%	
74	F	22	0	Ekonomie kandidat	Nej	1.0%	3	2	1	1	1	0.2%	0.3%	
75	M	22	1	Ekonomie kandidat	Ja	2.0%	3	Blank	1	1	2	3.0%	3.0%	
76	F	21	2	Ekonomie kandidat	Nej	1.5%	3	2	1	1	2	1.5%	3-4%	
77	M	20	0	Ekonomie kandidat	Nej	Blank	3	1	3	1	2	1.9%	2.0%	

78	F	23	6	HR	Nej	7.0%	3	1	4	2	2	4.0%	12.0%	
79	M	21	0	Ekonomie kandidat	Nej	2.0%	3	4	4	1	4	Vet ej	Vet ej	
80	F	23	2	Politisk kandidat	Ja	1.5%	3	2	3	1	4	1.0%	2.0%	
81	M	21	1	Ekonomie kandidat	Nej	5.0%	3	1	1	1	2	1.0%	-0.5%	
82	M	19	0	Ekonomie kandidat	Nej	2.0%	3	2	Blank	1	2	2.5%	2.0%	
83	M	23	2	Ekonomie kandidat	Nej	3.0%	3	Blank	3	1	2	5.0%	5.0%	
84	F	23	2	Ekonomie kandidat	Nej	1.0%	3	1	4	2	4	Vet ej	Vet ej	
85	M	21	0	Ekonomie kandidat	Nej	1.0%	1	2	1	1	3	1.0%	1.0%	
86	F	20	0	Ekonomie kandidat	Nej	13.0%	4	2	1	1	3	Blank	Blank	
87	F	20	0	Ekonomie kandidat	Nej	5.0%	4	2	4	1	3	Vet ej	Vet ej	
88	F	19	0	Ekonomie kandidat	Nej	10.0%	3	2	1	1	2	5.0%	10.0%	
89	M	25	1	Företagsekonomi	Nej	1.0%	3	2	1	1	2	1-2%	2.0%	
90	M	19	0	Företagsekonomi	Nej	1.2%	3	2	1	1	2	1.2%	1.9%	
91	M	21	2	Företagsekonomi	Nej	Blank	2	1	3	3	3	2.0%	3.0%	
92	F	22	1	Ekonomie kandidat	Nej	4.0%	3	2	1	2	3	0.0%	1.0%	
93	F	28	4	BCA	Ja	1.2%	3	2	1	1	2	1.2%	1.2%	
94	F	19	0	Ekonomie kandidat	Nej	Blank	3	1	1	1	2	Blank	Blank	
95	M	21	1	Företagsekonomi	Nej	15.0%	3	2	2	1	2	5.0%	7.0%	
96	F	21	0	Ekonomie kandidat	Nej	Vet ej	3	4	4	1	2	Vet ej	Vet ej	
97	M	20	1	Program	Nej	1.0%	3	1	1	1	3	1.5%	2.0%	
98	M	20	0	Ekonomie kandidat	Nej	Blank	3	4	4	1	4	Blank	Blank	
99	F	19	0	Ekonomie kandidat	Nej	5.0%	3	2	1	1	2	Blank	Blank	
100	F	46	20	FEKA90	Nej	2.0%	3	2	3	1	2	2.0%	4.0%	Intressant outlier - svarar helt rätt på alla frågor och är MYCKET äldre än alla andra respondenter. Påstår sig ha hela 20 terminer på universitet, motsvarande 10 år. PostDoc som tar extra kurser för att det är kul? Fakultetsanställd?
101	F	26	0	Ekonomie kandidat	Nej	10.0%	3	2	2	1	4	Vet ej	Vet ej	
102	F	25	7	Informatik och ekonomi	Ja	Blank	3	2	4	1	2	2.3%	2.4%	
103	F	22	2	Ekonomie kandidat	Ja	10.0%	3	2	1	1	2	2.0%	Vet ej	
104	M	21	0	Ekonomie kandidat	Nej	3.0%	3	2	3	1	Blank	1.5%	1.8%	
105	F	21	2	Program	Nej	0.0%	Blank	1	2	2	2	0.0%	0.0%	Respondenten har försökt kryssa I både 1 och 3 på fråga 2.2. Jag har tolkat det som "Blank" I detta fall.
106	F	21	1	Ekonomie kandidat	Nej	2.0%	3	2	2	1	2	5.0%	20.0%	
107	F	21	5	Blank	Nej	1.0%	3	1	4	3	2	2.0%	5.0%	
108	F	20	0	Ekonomie kandidat	Nej	0.5%	3	4	4	1	4	2.0%	2.0%	
109	F	25	8	Ekonomie kandidat	Nej	3.0%	1	2	1	1	4	Vet ej	Vet ej	
110	F	19	0	Ekonomie kandidat	Nej	10-20%	3	1	1	1	2	Vet ej	Vet ej	

111	M	19	0	Ekonomie kandidat	Nej	Vet ej	3	4	4	1	4	Vet ej	Vet ej	
112	M	19	1	Program	Ja	1.8%	3	2	1	1	2	1.8%	1.7%	
113	F	19	1	Företagsekonomi	Nej	5.0%	3	2	1	2	2	Blank	Blank	
114	F	25	8	Personalvetenskap	Nej	1.0%	3	2	1	1	3	3.0%	2.0%	
115	M	21	0	Företagsekonomi	Nej	Blank	1	2	1	1	4	2.0%	2.0%	
116	F	21	1	Ekonomie kandidat	Nej	25.0%	3	2	1	1	3	4.0%	2.0%	Kommentar rörande 25% prisuppgång: "piggelin .. jeez" - Upplevelsen att specifika produkter, här glassen Piggelin, har gått upp mycket I pris kan tydligen påverka uppfattningen om den generella prisnivån starkt, I alla fall för vissa individer.
117	F	20	0	Ekonomie kandidat	Nej	Blank	3	4	4	4	4	Blank	Blank	Verkar ha haft svårt att välja mellan "Riksbanken" och "Vet ej" på fråga 2.5. Ser ut som att valet blev "Vet ej" men inte helt klart. Kan också anses blank. I så fall blir annalysen I alla fall "Vet ej" varför det har valts.
118	F	20	0	Ekonomie kandidat	Nej	0.1%	3	2	1	2	4	0.5%	1.0%	
119	M	24	7	Statsvetenskap	Ja	1.0%	3	2	3	1	2	1.0%	2.0%	
120	F	43	8	Juridik	Nej	3.0%	3	2	1	1	1	1.0%	1.0%	Outlier I ålder
121	M	20	1	Ekonomie kandidat	Nej	5.0%	3	1	3	4	2	Vet ej	Vet ej	
122	M	21	1	Elektroteknik	Nej	2.0%	3	2	2	1	1	1.0%	2.0%	
123	M	19	1	Elektroteknik	Nej	1.0%	3	1	4	4	2	1.0%	2.0%	
124	M	19	1	Elektroteknik	Nej	1.5%	3	2	1	1	2	1.5%	2.0%	
125	F	21	1	Elektroteknik	Nej	0.5%	3	4	4	1	2	Vet ej	Vet ej	
126	M	19	1	Elektroteknik	Nej	1.0%	4	1	4	4	3	1.0%	2.0%	
127	F	19	2	Elektroteknik	Nej	4.0%	1	1	2	3	3	3.0%	3.0%	
128	M	19	1	Elektroteknik	Nej	0.0%	3	4	1	4	2	Blank	Blank	
129	M	19	2	Elektroteknik	Nej	Blank	3	1	2	1	2	Vet ej	Vet ej	Kommentar på 2.8: "Typ samma som idag"
130	M	20	1	Elektroteknik	Nej	10.0%	1	2	1	1	3	5.0%	10.0%	
131	M	23	1	Elektroteknik	Nej	2.0%	3	2	1	1	2	2.0%	2-3%	
132	M	24	1	Elektroteknik	Nej	1.0%	4	2	4	1	2	1.5%	1.5%	
133	M	23	5	Datateknik	Nej	1.0%	3	4	2	1	2	2.2%	2.8%	
134	M	20	1	Elektroteknik	Nej	2.0%	3	1	4	1	2	2.0%	2.0%	
135	M	20	1	Elektroteknik	Nej	0.8%	3	1	2	1	2	0.9%	0.8%	
136	M	19	1	Elektroteknik	Nej	5.0%	3	2	1	1	2	2.0%	2.0%	
137	M	22	4	Elektroteknik	Nej	3.0%	3	2	2	1	2	1.5%	1.5%	
138	F	22	3	Maskinteknik	Nej	0.2%	3	1	1	1	2	0.3%	0.2%	

139	F	25	7	Kemiteknik	Nej	0.5%	Blank	3	2	4	2	0.8%	0.9%	Respondenten har försökt kryssa I både 1 och 3 på fråga 2.2. Jag har tolkat det som "Blank" I detta fall.
140	M	25	7	Bioteknik	Nej	4.0%	3	1	1	2	2	4.0%	4.0%	
141	M	20	1	Elektroteknik	Nej	2.0%	3	2	4	1	4	5.0%	Vet ej	
142	M	19	1	Elektroteknik	Nej	0.5%	3	2	1	4	4	2.0%	5.0%	
143	M	20	0	Elektroteknik	Nej	1.5%	3	4	4	1	4	2.0%	3.0%	
144	M	19	1	Elektroteknik	Nej	5.0%	3	3	4	2	3	Vet ej	Vet ej	
145	F	20	1	Elektroteknik	Nej	2.0%	3	3	4	2	2	4.0%	2.0%	
146	F	20	1	Elektroteknik	Nej	4.0%	1	2	2	4	2	Vet ej	Vet ej	
147	M	25	7	Civilingenjör	Nej	12.0%	3	1	2	1	3	5.0%	3.0%	
148	M	19	1	Elektroteknik	Nej	Blank	3	1	2	1	4	Vet ej	Vet ej	Svarade I absolut antal kronor som priserna hade ökat med I fråga 2.1 ("0.5 kr")
149	M	20	1	Elektroteknik	Nej	2.3%	3	1	1	2	1	2.3%	2.4%	
150	M	20	1	Elektroteknik	Nej	2.0%	3	2	4	1	3	2.0%	2.0%	
151	M	19	1	Elektroteknik	Nej	2.0%	3	1	2	1	2	2.0%	Blank	
152	M	22	1	Elektroteknik	Nej	2.0%	1	1	1	1	2	3.0%	5.0%	
153	F	21	1	Elektroteknik	Nej	3.0%	3	1	1	1	3	7.0%	3.0%	
154	F	21	1	Elektroteknik	Nej	1.0%	3	4	4	4	1	Vet ej	Vet ej	
155	F	21	1	Ekonomie kandidat	Nej	1.0%	3	3	3	1	3	2.0%	2.0%	
156	F	21	1	Politisk kandidat	Nej	2.0%	3	1	3	1	2	2.0%	2.0%	
157	M	20	1	Ekonomie kandidat	Ja	1.0%	3	2	1	1	2	1.0%	2.0%	
158	F	22	2	Ekonomie kandidat	Ja	1.0%	3	3	1	1	2	1.5%	1.5%	
159	F	19	1	Ekonomie kandidat	Ja	0.6%	3	1	2	1	2	2.0%	2.0%	
160	M	21	1	Ekonomie kandidat	Nej	1.0%	3	2	1	1	4	1.0%	2.0%	
161	F	21	1	Ekonomie kandidat	Nej	1.0%	3	2	1	1	2	1.0%	1.5%	
162	F	20	1	Ekonomie kandidat	Nej	0.5%	3	1	1	1	4	1.9%	2.0%	
163	F	22	1	Ekonomie kandidat	Nej	3.0%	3	1	2	1	1	2.0%	2.0%	
164	F	19	1	Ekonomie kandidat	Nej	1.8%	3	2	1	1	3	1.8%	2.0%	1.4 "Program" har ersatts med "Ekonomie kandidat" baserat på att alla omgivande enkäter är ekonomie kandidater, åldern och tidigare studieerfarenheter stämmer överens med de förväntade för ekonomie kandidat, och kollen på inflation tycks god.
165	M	19	1	Ekonomie kandidat	Nej	1.0%	3	2	1	1	2	1.0%	1.2%	
166	M	19	1	Politisk kandidat	Ja	2.0%	3	1	1	1	2	2.0%	2.0%	
167	M	20	1	Kurs	Nej	2.0%	3	2	1	1	2	0.4%	1.5%	
168	F	21	1	Politisk kandidat	Nej	Vet ej	3	2	1	1	3	2.0%	2.0%	
169	M	23	7	Nationalekonomi	Ja	0.0%	3	2	1	1	3	0.0%	2.0%	

170	F	20	1	Ekonomie kandidat	Nej	0.2%	3	2	1	1	4	Vet ej	2.0%	
171	F	22	1	Ekonomie kandidat	Ja	1.5%	3	2	1	1	4	2.0%	2.0%	
172	F	19	1	Ekonomie kandidat	Ja	1.0%	3	2	1	1	4	1-1.7%	2.0%	
173	F	20	1	Ekonomie kandidat	Ja	0.5%	3	2	3	1	3	0.5%	2.0%	
174	F	22	1	Ekonomie kandidat	Ja	1.0%	3	2	1	1	2	1.0%	2.0%	
175	F	26	11	Ekonomie kandidat	Nej	1-2%	3	2	1	1	2	1-2%	1-2%	
176	F	25	5	Politisk kandidat	Nej	2.0%	3	2	1	1	2	1-2%	1-2%	
177	M	22	3	Politisk kandidat	Ja	-0.1%	3	2	3	1	2	0.0%	1.5-2%	
178	F	23	1	Ekonomie kandidat	Nej	1.5%	3	2	1	1	2	1.5%	2.0%	
179	M	21	1	Ekonomie kandidat	Nej	0.0%	3	2	1	1	2	1.2%	1.7%	
180	F	21	1	Ekonomie kandidat	Nej	1.6%	3	2	1	1	2	1.5%	1.6%	
181	M	23	1	Ekonomie kandidat	Nej	1.8%	3	2	1	1	2	1.8%	2.0%	
182	F	26	1	Ekonomie kandidat	Ja	1.0%	3	2	3	1	2	0.5%	1.0%	
183	M	20	1	Politisk kandidat	Nej	1.0%	3	1	3	1	2	1.0%	2.0%	
184	M	19	1	Ekonomie kandidat	Nej	1.0%	3	4	1	1	2	1.0%	1.0%	
185	M	20	1	Ekonomie kandidat	Nej	2.5%	3	2	1	1	2	2.0%	2.0%	
186	F	19	1	Ekonomie kandidat	Nej	2.0%	3	2	1	1	4	2.0%	2.0%	
187	F	20	1	Ekonomie kandidat	Nej	2.0%	3	2	1	1	3	2.0%	2.0%	
188	F	19	1	Ekonomie kandidat	Nej	2.0%	3	2	1	1	4	2.0%	3.0%	
189	F	20	2	Ekonomie kandidat	Nej	4.0%	3	2	1	1	2	4.0%	4.0%	
190	M	23	1	Politisk kandidat	Nej	1.3%	3	2	1	1	2	1.3%	1.5%	Noterade att 2.1 och 2.7 är samma fråga.
191	F	21	3	Ekonomie kandidat	Ja	0.2%	3	2	1	1	2	0.2%	0.5%	
192	F	21	1	Ekonomie kandidat	Ja	0.2%	3	2	1	1	2	0.2%	1.0%	
193	M	20	1	Ekonomie kandidat	Nej	2.0%	3	2	1	1	2	2.0%	2.0%	
194	M	19	1	Ekonomie kandidat	Nej	1-2%	3	2	1	1	2	0.0%	1.0%	
195	M	20	1	Ekonomie kandidat	Nej	0.0%	3	2	1	1	2	0.0%	1.0%	
196	M	25	9	Företagsekonomi	Ja	2.0%	3	2	1	1	2	2.0%	2.0%	
197	M	19	1	Ekonomie kandidat	Ja	1.0%	3	3	1	1	1	2.0%	3.0%	
198	M	20	1	Ekonomie kandidat	Nej	1.0%	3	2	1	2	1	1.0%	2.0%	
199	M	20	1	Ekonomie kandidat	Nej	1.3%	3	2	1	1	2	1.3%	1-3%	
200	M	21	1	Ekonomie kandidat	Nej	2.0%	3	2	1	1	2	2.0%	2.2%	
201	M	21	1	Politisk kandidat	Nej	0.5%	3	2	3	1	3	0.5%	0.8%	
202	F	21	1	Politisk kandidat	Nej	1.0%	3	2	1	1	2	1.0%	1.3%	
203	F	20	1	Politisk kandidat	Nej	0.9%	3	2	1	1	Blank	0.9%	0.9%	2.1: "Mindre än 1%". 2.7: "Antar inflation = KPI. Dvs <1%". 2.8: "Ungefär samma."
204	F	21	1	Politisk kandidat	Nej	0.9%	3	2	1	1	2	1.0%	1.4%	
205	M	Blank	3	Politisk kandidat	Ja	1.9%	3	2	1	1	2	1.7%	2.1%	
206	F	20	1	Program	Ja	2.0%	3	2	3	1	2	-1.0%	-1.0%	
207	F	23	2	Ekonomie kandidat	Ja	Blank	3	4	4	1	3	Blank	Blank	
208	M	19	1	Politisk kandidat	Ja	1.0%	3	2	3	1	2	1.0%	1.0%	
209	F	20	1	Ekonomie kandidat	Nej	2.0%	3	2	2	1	1	1.0%	2.0%	
210	F	22	1	Politisk kandidat	Ja	0.5%	3	2	1	1	2	0.5%	1.0%	
211	F	23	1	Politisk kandidat	Nej	1.9%	3	2	1	1	2	1.9%	1.1%	
212	F	20	1	Ekonomie kandidat	Ja	2.0%	3	2	1	1	3	Blank	2.0%	

213	F	21	1	Ekonomie kandidat	Nej	2.0%	3	2	1	1	Blank	2.0%	2.0%	
214	F	20	1	Ekonomie kandidat	Ja	2.0%	3	2	1	1	2	2.0%	1.5%	
215	F	19	1	Ekonomie kandidat	Nej	2.0%	3	2	1	1	2	2.0%	2.0%	
216	M	24	2	Ekonomie kandidat	Ja	1.5%	3	2	1	1	2	1.5%	2.0%	
217	M	21	1	Ekonomie kandidat	Blank	1.2%	3	2	1	1	2	1.2%	1.6%	
218	F	25	6	Politisk kandidat	Ja	Vet ej	1	4	4	1	4	Vet ej	Vet ej	
219	F	23	8	Politisk kandidat	Ja	Blank	3	1	2	1	2	Blank	Blank	
220	F	21	1	Ekonomie kandidat	Nej	0.1%	3	2	1	1	2	1.3%	1.4%	
221	F	24	1	Ekonomie kandidat	Nej	0.1%	3	2	1	1	2	1.3%	1.4%	
222	M	21	2	Nationalekonomi	Nej	1.5%	3	2	1	1	2	1.5%	2.0%	
223	F	23	1	Politisk kandidat	Nej	1.0%	3	2	1	1	2	1.0%	1.5%	
224	F	21	1	Ekonomie kandidat	Nej	0.5%	3	2	1	1	2	1.0%	2.0%	
225	F	22	2	Ekonomie kandidat	Nej	1.5%	3	2	1	1	1	1.5%	2.0%	
226	M	22	1	Blank	Nej	1.5%	3	2	1	1	3	1.5%	2.0%	
227	F	22	1	Ekonomie kandidat	Nej	0.5%	3	2	1	1	4	0.5%	1.0%	
228	M	22	1	Ekonomie kandidat	Nej	1.0%	3	2	2	1	2	2.1%	2.1%	
229	F	20	1	Ekonomie kandidat	Ja	1.0%	3	2	1	1	2	1.0%	1.0%	
230	M	21	1	Ekonomie kandidat	Nej	1.3-1.6%	3	1	3	1	3	1.9%	2.1%	
231	M	20	1	Ekonomie kandidat	Nej	1.5-1.8%	3	2	1	1	2	1.5-1.8%	1.8%	
232	F	20	2	Ekonomie kandidat	Nej	2.0%	3	2	1	1	2	2.0%	2.0%	
233	M	25	2	Ekonomie kandidat	Nej	0.0%	3	1	1	1	4	0.0%	1.0%	
234	M	24	1	Ekonomie kandidat	Ja	1.3%	3	2	1	1	2	1.3%	1.0%	
235	M	22	1	Ekonomie kandidat	Nej	4.0%	3	1	2	1	4	2.0%	4.0%	
236	M	25	9	Ekonomie kandidat	Nej	1.5%	3	1	1	1	2	1.5%	1-3%	
237	M	20	1	Program	Nej	2.0%	3	2	1	1	Blank	2.0%	1.5%	
238	M	21	3	Program	Nej	1.7%	3	2	3	1	2	1.7%	1.8%	
239	F	21	1	Program	Nej	3.0%	3	2	4	1	3	2-3%	2-3%	
240	F	21	1	Politisk kandidat	Nej	2-3%	3	2	1	1	2	2-3%	2-3%	
241	M	22	4	Matematik	Nej	5.0%	1	2	1	2	3	10.0%	11.0%	
242	M	20	1	Ekonomie kandidat	Nej	0.0%	3	2	1	1	Blank	1.0%	1.5%	
243	M	22	1	Ekonomie kandidat	Nej	0-1%	3	2	1	1	2	1-2%	1-2%	
244	F	20	1	Politisk kandidat	Nej	1.5%	3	2	1	1	2	1.5%	2.0%	
245	F	23	3	Politisk kandidat	Nej	Vet ej	3	1	2	1	2	4.0%	4.0%	
246	F	23	2	Politisk kandidat	Nej	Vet ej	3	2	1	1	4	Vet ej	Vet ej	
247	M	20	1	Ekonomie kandidat	Nej	2.0%	3	2	1	1	1	2.0%	2.0%	
248	M	20	1	Ekonomie kandidat	Ja	2.0%	3	2	1	1	2	1.8%	2.0%	
249	M	21	1	Ekonomie kandidat	Ja	2.0%	3	2	1	1	2	2.0%	2.0%	
250	M	22	1	Ekonomie kandidat	Nej	2.0%	3	2	1	1	2	2.0%	4.0%	2.8: "~2 procentenheter högre" - Tolkar som att inflationen kommer vara 2 %-enheter högre än den antas vara idag.
251	M	22	1	Ekonomie kandidat	Nej	1.5%	3	2	1	1	3	1.8%	1.9%	
252	F	20	1	Politisk kandidat	Nej	2.0%	4	4	4	1	2	2.0%	3.0%	
253	F	21	1	Ekonomie kandidat	Nej	2.1%	3	2	1	1	2	2.1%	2.1%	

254	F	23	1	Politisk kandidat	Nej	1.9%	3	2	3	1	2	1-2%	1-2%
255	M	20	1	Ekonomie kandidat	Ja	3.0%	3	2	1	1	2	1.8%	2.3%
256	M	22	1	Ekonomie kandidat	Nej	1.0%	3	2	1	1	2	1.0%	1.2%
257	M	23	5	Politisk kandidat	Nej	1.8%	3	2	1	1	2	1.8%	2.0%
258	F	20	1	Ekonomie kandidat	Ja	2.0%	3	2	1	1	2	2.0%	2.0%
259	F	20	1	Ekonomie kandidat	Ja	1.0%	3	1	1	1	2	1.5%	1.8%
260	M	35	1	Ekonomie kandidat	Nej	1.9%	3	1	1	1	2	1.9%	2.1%
261	F	21	1	Politisk kandidat	Nej	0.0%	3	1	4	1	2	1.0%	1.2%
262	M	21	2	Statsvetenskap	Nej	0.7%	3	2	1	1	2	0.7%	0.9%
263	M	20	1	Politisk kandidat	Nej	1.0%	3	2	1	1	2	1.0%	1.0%
264	M	24	1	Ekonomie kandidat	Nej	Blank	3	2	1	1	2	1.5%	2.0%
265	F	21	1	Blank	Ja	2.0%	3	2	1	1	2	2.0%	2.0%
266	F	21	1	Ekonomie kandidat	Nej	0.5%	3	1	1	1	4	0.5%	1.0%
267	F	20	1	Blank	Nej	2.0%	3	1	1	1	4	2.0%	2.0%
268	F	21	1	Ekonomie kandidat	Nej	0.3%	3	2	1	1	2	2.2%	2.3%
269	F	20	1	Ekonomie kandidat	Nej	0.2%	3	1	2	1	2	2.0%	3.0%
270	F	21	1	Ekonomie kandidat	Ja	1-2%	3	3	1	1	3	1.5%	1.7%
271	F	20	1	Ekonomie kandidat	Ja	2.0%	3	3	1	1	3	1.6%	1.6%
272	F	20	1	Ekonomie kandidat	Ja	2.0%	3	1	1	1	1	2.0%	2.0%
273	F	22	3	Politisk kandidat	Ja	1.0%	3	1	1	1	4	1.0%	2.0%
274	M	25	1	Nationalekonomi	Ja	2.0%	3	2	1	1	2	2.0%	2.0%
275	M	22	1	Politisk kandidat	Nej	2.0%	3	2	3	1	2	2.0%	2.0%