Charles University in Prague

Faculty of Social Sciences
Institute of Economic Studies

MASTER THESIS

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Earnings profiles and money illusion

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Declaration of Authorship

The author hereby declares that he compiled this thesis independently, using only the listed resources and literature.

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Prague, May, 20, 2010

Signature

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Abstract

The main goal of the thesis is to test the existence of money illusion among the working population of the Republic of Moldova. The author of the thesis conducted a survey in March 2010, and results suggest that under the presence of rather high inflation, and a larger increase in nominal wage relative to real wage, Moldovan workers are prone to money illusion, this influences their earning profiles over time and across economic sectors; more than that this finding is important in explaining why workers change the economic sector, or why some sectors of the economy are characterized by grater fluctuations than other. To the author's best knowledge, this represents the first time a study of this kind is conducted in the Republic of Moldova.

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Specialization	Economics & Finance	Defence Planned	June 2010

Proposed topic: Earnings profiles and money illusion

Behavioural economic models bring a new perspective to shortcomings of the standard economic models. Standard economic models have a great deal of limitations to predict economic behaviour of individuals, and a lot are covered by behavioural economics.

Hypothesis: The thesis will try to replicate and verify the findings of Shafir, Diamond and Tversky, namely to prove that individuals tend to behave differently when the situation is presented in nominal and real terms, when they misinterpret and fall victims to money illusion, and that all this leads to a bias when nominal evaluation occurs.

Topic characteristic: The topic is important to illustrate that people show preferences not entirely consistent with rationality; therefore it might be helpful for companies to adequately motivate their workers in other terms rather than wages, but to emphasize for example the importance of fairness among workers. Earning profiles and money illusion could represent an interesting torn point for economic policies implication, for instance the importance of delivering correctly the message about the real and nominal terms of the changes that are to come along with the implementation. The topic that is to be covered by the thesis is interesting as one cannot be absolutely sure about the final results, and that there is space to bring something new to the field, as individuals are complex and they tend to act in most surprising ways given certain circumstances or hypothetical situations.

Methodology: The data for the analysis will be the one collected throughout the research, primarily from a survey. The targeted sample will comprise Moldovan workers (aged 18-60) of one of the four economic sectors: agriculture, services, industry, and construction. The survey will be conducted in English, Romanian, and Russian; the anticipated number of subjects is 200.

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Supervisor

Chapter 1

1. Introduction

Behavioural economics has developed in nature and depth throughout the last years capturing the attention of both economist and non-economists interested in analysing the human behaviour and decision making at individual and aggregate levels. The findings in this field bring in explanations and solutions that standard economic models fail to provide. Money illusion is an important chapter of behavioural economics, numerous economists concentrate on research related to this subject, and important findings and contributions are by Shafir, Diamond, and Tversky in their famous article "Money Illusion" published in 1997; where they argue and provide explanations that economic decisions and behaviour of individuals are not always a result of pure rationality as prescribed by classical economics.

The thesis replicates and verifies some of the findings of Shafir, Diamond, and Tversky, particularly the present paper puts forward an attempt to prove that individuals tend to behave differently when the situation is presented in nominal and real terms, they misinterpret and fall victims to money illusion, and that all this leads to a bias when nominal evaluation occurs. The current author conducts a survey on Moldovan workers of the four economic sectors (services, construction, industry, and agriculture) in order to determine and analyse the variables that influence people to fall victims to money illusion; and to find and verify the relationship between earning profiles and money illusion, as well as the role of money illusion in migration from one sector of the economy to another. The data used in the analysis are collected by the author, 200 respondents participated at the survey.

Introduction

The thesis is made up of four chapters. Chapter2 is structured as follows: a short introduction and literature review with reference to behavioural economics and its maturity in time; and standard economics versus behavioural economics (the first sub-chapter); earning profiles and money illusion, the second sub-chapter, where the author makes references to several papers on the subject and presents the results of several researchers relevant for the current study; the third sub-chapter provides insights of the article by Shafir, Diamond and Tversky "Money Illusion", and the second chapter of the thesis ends with presenting the outcomes and conclusions of the same article. Chapter3 is made up of five sub-chapters, it embodies the presentation of the research hypothesis, and the second sub-chapter provides the country description and particular economic features of the working population. The third sub-chapter illustrates the survey design used to test the research hypotheses validity; followed by the study of the sample; and the chapter concludes with the analysis of the results. The last chapter of the thesis summarizes the findings of the research and provides conclusions.

Chapter 2

2. Earning profiles and money illusion

2.1. Behavioural economics

Economics is a social science that among other is concerned with the study of people and their activities, the way they behave, in relation to their environment. Behavioural economics searches for the use of psychology to inform Economics, while maintaining the emphases on mathematical structure and explanation of field data that distinguish Economics from any other social sciences. Behavioural economics brings psychological insights to relate to economic phenomena, in other words behavioural economics increases the explanatory power of Economics by providing it with more realistic psychological foundations. The accuracy of analytical predictions and causal analysis are significantly depended on how realistic are the variety of psychological, social, or institutional assumptions. Behavioural economists build models to give explanatory power to what is happening in different areas of the economic activity, and their work is based on observations of real behaviour; moreover they define themselves based on their appliance of psychological insight to economic phenomena.

Nowadays there is an escalating understanding of importance of behavioural economics in public policy decision making and implementation. Most of the studies related to behavioural economics analyse how people's emotions and thoughts can affect the way they make money related decisions. There are three main ideas that refer to behavioural economics, the first idea is that people

generally act on “the rules of thumb” – although broadly applied, it is not a principle that is precise or consistent with every situation; it is considered a tool or a homemade technique for making a guess – as opposed to rational thought: “you get what you pay for”.

The second idea is that the way people think of a problem is affected by how the problem is presented, i.e. framing. For example, when a situation is presented in terms of gains and losses, individuals will choose the current state of affairs opposed to the risky alternative (this is in accordance with risk aversion principle), but when the same situation is presented in terms of final benefits, without mentioning changes in wealth, individuals are more likely to choose the risky alternative with higher expected worth/return. The third idea, circulating among behavioural economists, is concerning to market inefficiencies, applied to the stock market, which explains certain outcomes in specific situations when something other than the expected happens.

It is by and large recognized that generality and congruency with reality is central to any scientific theory, as well as the applicability to various situations and ability to make testable predictions. Hart (1980) argues that limitations of many behavioural studies are the lack of any universal methodological approach. Also, researchers criticize behavioural economics emphasising that economic agents and individuals in general are rational. Standard neoclassical economic theory assumes that people are rational and make choices to maximize their welfare, and every rational, well-informed, utility-maximising agent reaches the optimal outcome in the same way. What is more, according to standard economic theory, agents have time-consistent preferences, and are considered to be driven by selfish concerns and are the least interested in other persons’ utility when maximizing their own utility; and all the revenue and assets are freely exchangeable or replaceable.

Deviations from the conventional norm imply errors and biases – the absence of rationality and even intelligence – in choice behaviour. Given that the notion of individuals as fundamentally irrational is thought to be incompatible with general economic modelling (Altman, 2006, p.128). More than that, opponents argue that decision making models are applicable to once-off decision problems presented to survey respondents; plus experimentally observed behaviour is inapplicable to market situations, because competition, learning opportunities, and experience ensure an approximation of rational behaviour; and since variations from rationality are random, they will cancel each other at aggregate level; or, if it may be the case, that agents do act irrational, they will learn from their wrong judgment and will not mistake again; rational agents make higher profits and will make irrational agents leave markets, as a result the number and force of rational agents will increase in time; to bear in mind that the this assumption is not characteristic for the labour market.

What makes individuals happy (‘true utility’) differs from what they choose. Economic welfare analysis should use true utility rather than the utilities governing choice (‘choice utility’) (Gul, Pesendorfer, 2005, p.1). The end of the last century has also proven that, despite all the attention concentrated on behavioural economics, major issue related to it becoming wildly recognized as an approach to economics did not have the necessary magnitude versus just being considered a restraint or command rarely called upon to handle abnormal economic situations or cases. The case of behavioural economics is meant only to be illustrative; suggesting the sorts of direction pure economics will have to take if it is to pursue the goal of greater pertinence (Baumol 1991, p.6).

While the rationality assumption yields a great instrument for analysis, it has many deficits that can result in unrealistic economic analysis and policy-

making. Nonetheless, instead of rejecting neoclassical concepts (equilibrium, maximization, self-interest) behavioural economists are in point of fact bringing in expansion and generalization, consequently the relationship between behavioural and neoclassical economics appears to be that of subset and superset. Additionally behavioural economics began to grow stronger as a subfield of Economics in the last quarter of the 20th century, and gained larger acceptance among disciplines of economics: publications in mainstream economic journals, reputation at meetings and conferences... It is the behavioural economists that so far managed to lunch some of the most novel and provocative hypothesis about individual decision-making and behaviour. At that time certain circumstance lead to this step forward: econometrics became a tool, a sub-discipline as a means for testing hypothesis; and psychology gain territory among economists. Behavioural economists "stole" several methods and approaches from psychologists (experiments – unlike observations, experimental studies imply a higher degree of control) and from traditional economists (observational studies); nevertheless behavioural economics, standard economics and psychology can complement each other.

Behavioural economics is best characterized not as a single specific theory but as a commitment to empirical testing of the neoclassical assumptions of human behaviour and to modify economic theory on the basis of what is found in the testing process (Simon 1987, p.221). behavioural economics relies on cognitive-psychology research, affirming that humans have "bounded rationality"— a term first employed in 1957 by Nobel winner economist Herbert A. Simon — and so make biased decisions, sometimes perceived as irrational that sometimes run counter to the best economic interests of the agent.

People's behaviour is influenced by their self-expectations: they want their actions to be according to their values and their commitments. Humans are poor at

computation when making a decision: they rely a lot on recent events and too little on far-off ones; people overweigh their frequent small gains vis-à-vis occasional large losses, and vice versa, they are unable to calculate probabilities correctly and worry excessively about unlikely events; as well as they are highly influenced by how the problem is presented to them. John Maynard Keynes employed behavioural economics to avoid Great Britain going through a slump: people started spending more because their nominal salaries were increased, but taking inflation into consideration there was no raise and the real salary remained the same, but people did not do any calculations (or simply ignored the truth), they just looked at their current amount of money and started to spend more. Therefore an economic crash was avoided.

Behavioural economics contributes to a broader understanding of people's motivation while making their mind up and performing in markets and the implications for policy and regulatory approaches. It also has particular relevance to consumer policy, some theoreticians doubted the assumption that providing information to consumers necessarily leads them to make better choices, and have argued that consumers can be confused and mislead rather than informed by long-lasting revelation statements. Others have suggested that the findings of behavioural economics could and must be used to assess the expected effectiveness of proposed regulations. It is worth considering to shelter people from systematically-misguided or ill-informed decisions, but some might be worried about interventions with people freedoms and rights. Economists also think that disproportionate regulation may lead to a lack of learning, or sophistication, care or responsibility in a population that will grow gradually more self-righteous.

The literature related to studying behavioural economics describes circumstances where people's behaviour is steadily biased and inconsistent with

rationality in one way or another: people have inconsistent attitudes towards risk, uncertainty, and discounting that lead them to make decisions that they may regret later in life. Both experiments and the real world results have presented that people's sensitivity to losses relative to gains is greater than implied by the expected-utility approach. Behavioural economics has highlighted the importance of framing effects in decision making; plus some decisions are influenced by altruism and fairness — not guided just by self interest or other rationality principles.

Behavioural characteristics of agents deliver information which, in combination with standard economic principles, is able to offer more comprehensive rationalizations. The effectiveness of policy interventions is determined by the need to devise contexts in ways that not only provide all the options and convey the correct information, but that are also able to trigger the explanation most likely to generate the appropriate interpretation and response. Human behaviour is the complex outcome of a system — the human information processing system; it makes it both interesting and difficult to deliver viable assumptions.

There are several behavioural facts that are pertinent to the study of behavioural economics. People's discount rates tend to be unstable and influenced by factors, such as the size of the good, its importance, and its temporal distance, that do not fall under the standard economics normative assumptions (Frederick, Loewenstein and Donoghue, 2002). For example, there is excessive present discounting, generally people choose 1 unit of good today over 2 units of good tomorrow, but they tend to choose 2 units of good in 10 days over 1 unit of good in 9 days.

Other facts are that: sentiment and reason are in a tension; and emotional reactions can influence decision making; people derive their identity in large part from social groups to which they belong (Turner, 1987); a classical assumption is that consumers are knowledgeable and capable of taking advantage of important information, but there is great unawareness among both poor educated people and people who have the possibility to be informed about opportunities, options, and rules, but refuse to, or just ignore them; as for example, there is a considerable number of investors that are not financially educated, but really on their intuition and experience.

Behavioural economics models are applied in several situations: loss aversion, money illusion, altruism, and inequality aversion. Implication of behavioural economics models in tackling money illusion will be presented in the next sub-chapter. Regarding altruism, they say that economic behaviour assumes not just monetary but also altruistic acts, sometimes driven by irrational motives at first sight (helping a mother (nanny) with a baby in a stroller to get on or off a bus). Inequality aversion is closely related to fairness and morale, another aspect studied by Shafir et al. (1997) in “Money Illusion”.

2.2. Earning profiles and money illusion

Although sceptic about the subject at the begging; nowadays economists acknowledge the presence of money illusion and its importance. Money illusion means that people behave differently when the same objective situation is represented in nominal terms rather than in real terms (Fehr and Tyran, 2000). Branson and Klevorick propose an explanation of their own: "people whose demands for commodities would be altered by an equiproportionate change in all prices, money income, and money wealth are said to suffer from money illusion" (Branson and Klevorick, 1969, p.832). Money illusion is a fallacy as modern currencies have no natural value, but their real value is derived from their capacity to be exchanged for goods; therefore money illusion arises whenever the presence of inflation, changes in relative prices, and nominal accounting affects decision making.

The term was coined by Keynes in the early 20th century and Irving Fisher wrote a book about the subject, "The Money Illusion", in 1928. The following is a historical definition of money illusion that Florian Zinsmeister proposed in his presentation "Money Illusion", in 2006: "the failure to perceive that the dollar, or any other unit of money, expands or shrinks in value". During the 70s of the 20th century, as money illusion was in no accordance with the existing theory of the utility maximizing decision making based on real terms, not on nominal quantities; it was not up-to-the-minute to build theoretical or empirical models around money illusion.

In their paper "Charity Donations and the Euro Introduction: Some Quai-Experimental Evidence on Money Illusion", Kooreman et al. (2004) mention several approaches to find empirical evidence on money illusion: empirical

consumer demand analysis; data analysis from a quasi-natural experiment (used by Kooreman et al., 2004); survey based research on hypothetical choices made by respondents (utilized by Shafir et al., 1997); laboratory experiments (presented by Fehr and Tyran, 2000). The last two approaches, surves and experiments, bear an important disadvantage that respondents/participants may or may not act the same in real life situations as they answered the questions or behaved during the experiments.

Presence of money illusion may determine different earning profiles and surveys that are meant to test for the presence of money illusion are based on "the rule of thumb" or on framing. It is most important to choose the correct economic phenomenon to investigate and determine the mechanism of propagation, the sample to conduct the survey, and the instruments when conducting the questionnaire. While, the fact that people are prone to money illusion doesn't explain entirely diverse earning profiles, it could explain why people choose one job for another, or perceive changes in wages in ways not prescribed by the rational assumptions about individuals.

Experiments show that money illusion has permanent real effect over time, i.e. people rely more on nominal than real value of money when making economic decisions. But there exists this aspect of rationality: those people or agents that do not suffer from money illusion care more about the real extent versus the nominal one; along with the fact that money illusion could be overcome through learning and organization among people; although Bakshi in his paper "Rational Agents and Economics Training: the Case of Money Illusion in Experimental Study" proved experimentally that money illusion has permanent real effect over time, furthermore that people with strong economic background have better foresight to pierce the veil of money (Bakchi 2009, p.32).

It is also somewhat surprising that people most often think in real terms when inflation is relatively high, but they fail to do so when inflation drops off; but this is complicated to observe in large populations and over long periods of time; thus making it more difficult to test these peculiarities in real life or quasi-experiments, moreover their effect on earning profiles.

The existence of money illusion phenomenon has been repeatedly called upon, and just as many times it has been refused to be accepted, by theoreticians, researchers, and regulators. One indirect explanation for that is that people's perception does not match the nominal nor the real evaluation, but the mixture of the two. Most of the cases people are conscious of the difference between real and nominal values, but because money is a significant and natural unit, they think of transactions for the most part in nominal terms, be it just once, for a certain period of time, or for a lifetime. But sometimes this way of thinking is voluntarily, conscious, or sometimes premeditated: a variety of empirical evidence suggests that investors who know that assets are overpriced retain or even purchase the overpriced assets and thus ride the bubble (Fehr and Tyran, 2005, p.66).

It is important to illustrate that people show preferences not entirely consistent with rationality; therefore it might be helpful for example, for companies to adequately motivate their workers in other terms rather than wages, and to emphasize, for example, the importance of fairness and morale among workers. Earning profiles and money illusion could represent an interesting torn point for economic policies implication, for instance the importance of delivering correctly the message about the real and nominal terms of the changes that are to come along with the implementation of new regulations. money illusion could have a say on people's perceptions of outcomes, as for example there are experiments that provided the findings: people usually recognize a 2% cut in nominal income as unfair, but considering a 4% inflation, a 2% rise in nominal income is perceived as

fair, although the two situations are rationally equivalent. As a result nominal representation of an economic situation is almost certainly the natural representation for most persons.

Economists debate money illusion as a psychological matter; some consider that people think of their money in real terms, based on the prices on the market. But money illusion does exist and among the reasons for that are: the price stickiness seen in many goods and services, or a general lack of financial education. Every so often money illusion is cited a reason why small levels of inflation (1-2% per year) are advantageous for an economy; as this allows employers to raise nominal wages without paying more in real terms, while many employees believe that their wealth is increasing, and do not take into consideration the actual rate of inflation.

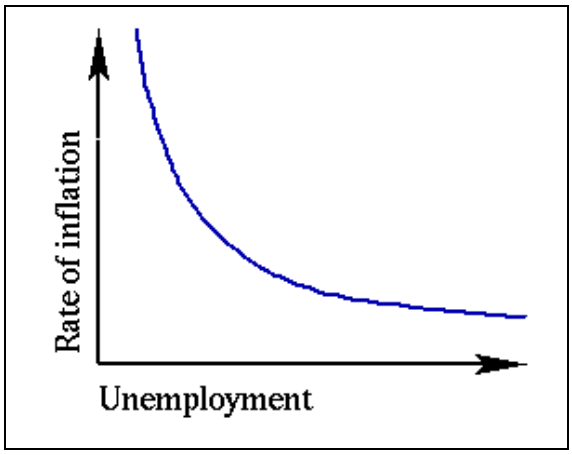
Money illusion can be observed at individual and aggregate level: a person solves a problem more accurate in real terms than in nominal terms; and the situations when several individuals' decision not to adjust to a nominal shock will determine a larger number of agents to do the same. If a person exhibit relatively insignificant deviations from optimality, this may lead to greater domino effect thus affecting economic equilibrium. Alternatively, with a raise in money income, money expenditure changes independent of price modifications (when money income increases than marginal propensity to consume or spend of individuals is entirely unaffected by the associated change in prices); and an increase in prices leads to a reduction of single agents' expenditures in real terms.

Mellenbergh et al. (2003) tackle the subject of causality, which is important for behavioural economics in general and money illusion in particular: "researchers are frequently interested in causal relations between variables, but relations may be of a spurious nature. Most researchers are perfectly aware of this problem, and

research methodology is frequently confronted with questions on possible spuriousness of relations" (Mellenbergh et al., 2003, p.213). So, yes, empirical evidence is important, on the other hand, not least important is the ability to judge the validity of assumptions, and the reliability and accuracy of preliminary results.

Although there is little empirical evidence, money illusion is yet considered to be an explanation basis for involuntary unemployment and cyclical developments of the economy. Despite recent macroeconomic theories, a number of economists suggest that money illusion implies that the negative relationship between inflation and unemployment could hold as described by the Phillips curve; which in turn could be seen as a way to implement Keynes' original money illusion idea in the supply of labour.

Figure 1 Phillips Curve



Source: Thomas and Freiberger, 2006

For example, firms would keep real wages relatively low during high inflation periods and therefore hire more people; and this in the case workers use nominal wages as a reference point to evaluate wage offers and consequently

accept apparently high nominal wages (Figure1). Bearing that in mind, Trevithick (1975) pointed out that "inflation is not the consequence of persistent income-expenditure disequilibrium: it is the means by which national income equilibrium is restored" (Trevithick, 1975, p.112). Additionally, Agell and Bennmarker, 2002, conclude that employers are conscious that their workers suffer from money illusion, and that work morale influences performance; otherwise productivity may reduce in case the workers are not satisfied with their wages. Therefore, managers have strong motivations (example: fairness and morale) to offer higher payments than the minimum necessary to attract workers (clearing wage). As a continuation of this idea, Akerlof (2002) also provides several considerations: reciprocity ('gift exchange' theory), fairness (tackled in Shafir et al. (1997)), adherence to group norms ('reference group' theory), attempt to reduce workers to shirk, insider-outsider model (insider workers' conspiracy against outsiders).

2.3. Shafir, Diamond, and Tversky: "Money Illusion"

In times of great confusion related to proper explanation and definition of money illusion Shafir, Diamond, and Tversky (1997) provided clear interpretations and usefully ideas. They provided forceful empirical evidence for the existence of money illusion that affect behaviour and decision making both in experimental and real world situations. Money illusion is generally described in terms of heuristics, while economic literature provides with methods to assess the real value of transactions, in day by day situations people tend to deal with nominal representations, as they face nominal prices of goods and services. Such interpretations should not be limited only to effects of inflation, as can be noted in the Shafir et al. (1997) study. The main findings of Shafir et al. (1997) are related to earnings and contracts, but they asked people questions related to a number of issues concerning transactions, contracts, investments, mental accounting, and fairness and morale; to determine the psychological reasons and explanations why people suffer from money illusion, agents' characteristic that is incompatible with standard economic models. The effects of changes in nominal values on people's assessment of monetary transactions and on their economic decisions, was the central idea explored by the researches.

Shafir et al. (1997) proposed to prove that money illusion is a general problem characteristic for the United States of America, which could have a great impact on the economy as whole. The authors mention three classes of observations inconsistent with theoretical assumptions: the existence sticky prices and wages, there is no indexing or incomplete indexing of contracts and laws, and people behaviour that seems to reflect confusion between real and nominal money value. They affirm that even courts do not treat severe changes in inflation as a force major that affects the value of a contract; additionally there are papers that deliver untrue information influenced by money illusion "syndrome": "there are

newspaper accounts of debt-financed projects that add together the initial costs and the interest costs coming from debt financing and report a single sum” (Shafir et al., 1997, p.344).

There are economists that disapprove of the Shafir et al. (1997)’s findings: they say there might be a problem with the questionnaire method as people tend to answer differently to a hypothetical situation in comparison to their actual behaviour in real world, or respondents can be free from money illusion, but think that others suffer from it; secondly they say that it is not enough to prove the presence of money illusion at individual level, because proving that money illusion is present at aggregate level has a higher economic significance, additionally this implies the examination of strategic interactions among individuals in the economy.

The study of strategic interactions is most relevant for stock markets, where for example: “if some economic agents act irrationally, for example by raising prices without any inflationary cause, then it may be optimal for other agents who are rational to react in the same way and “follow the crowd’’”(Wilkinson, 2008, p.35). Furthermore, among other results, Shafir et al. noted that people could generally distinguish between economic welfare and happiness, but this does not necessarily indicate rationality or better yet there is no pattern.

The Shafir et al. (1997) paper is presented in three sections: numerous representations of money illusion, the experimental study, and, summary and conclusions. The experimental study encompasses reaction to salary raises under inflation; evaluation of monetary transactions; the effect of framing transactions; study of investment employing means of experiment; intuitive accounting (involving the theory of multiple representations); and comprehension of fairness and morale.

Reaction to salary raises under inflation was investigated by offering respondents the possibility to choose between two outcomes of the three situations. The present paper replicates this problem, found in section two of Shafir et al. (1997), where three groups of respondents were presented an earning related situation where two persons got raises in salary, and the respondents were asked to react to one of the three question corresponding to each group: whom of the two persons in the situation was doing better in economic terms, who was happier, and who would choose another job for the current.

Assessment of monetary transactions was done by representing specific transactions in nominal or in real terms. In Shafir et al. (1997), in order to evaluate the effect of framing transactions the authors proposed a contracts related situation to test respondents’ preferences regarding indexing contracts for future payment, also under inflation. Mental accounting was investigated under nominal and real price changes. And the last part of the second section, illustrates the relation between money illusion and the understanding of fairness and morale. The paper ends with section 3, Discussion, where authors discuss results and make preceding conclusions.

2.4. Outcome and conclusions of Shafir et al. (1997)

The general outcome of the research conducted by Shafir et al. is that indeed people's economic reactions and decisions are far from complying with standard economic theory. In order to accomplish that, the researches highlighted the role of money illusion in decision making process in the context of framing, mental accounting, loss aversion, and anchoring. In Shafir et al. (1997) they found plenty of evidence for money illusion and the importance of framing from the surveys where respondents evaluated different (hypothetical) income and price scenarios.

An example from Shafir et al. (1997) where they analyse whether people understand differently happiness and economic well being: "The majority of respondents attribute happiness to people based on greater nominal raises, despite lower real raises. Thus, the attribution of happiness incorporates money illusion, even when an analysis in terms of real value is easily accessible" (Shafir et al., 1997, p.352). Further on, the authors present the effect of framing on transactions. Optional framings of a contracting decision, make people think of a problem in either real or nominal terms, by this means influencing their choices between contracts. People unsurprisingly tend to estimate the contracts in mostly nominal terms and avoid nominal rather than real risk, plus show evidence of frame dependent risk aversion.

They proved that money illusion is present in mental accounting in conditions of no inflation, but with changes in relative prices; as well as under changes in real prices. They concluded that this facet of money illusion has an effect on ordinary inventory valuation decisions, which in turn may damage a small business. Opinions on fairness are based chiefly on nominal rather than on real changes. Money illusion enters into the perception of fairness and worker morale.

"...money illusion may result in a larger contribution of inflation to poverty among the elderly as a result of the choice of nominal interest rates. In addition, money illusion may affect multinational trade and tourism." (Shafir et al., 1997, p.367)

Although Shafir et al. (1997) presented credible evidence; the authors, as real economists, were careful enough to say that their results do not indicate the extent to which respondents and people in general, will react in real life the same way the results of the surveys suggested. Nevertheless the paper still represents one of the most important evidence in the field at the moment.

Chapter 3

3. The survey

3.1. The research hypothesis

This paper will provide evidence on whether adult workers (aged 18-60) from the Republic of Moldova are more or less prone to money illusion depending on which sector of the Moldovan economy they activate, and if this determines different earning profiles among them. A series of data were collected (field work) to determine other variables rather than just the sector of economy that could influence people's judgment in terms of money illusion. More than that there is an attempt to identify whether there is any relationship between money illusion and migration among the economic sectors.

Based on the information presented by the National Bureau of Statistics of the Republic of Moldova, I tested the following hypothesis: under the presence of relatively high inflation, and a higher increase in nominal wage relative to real wage, Moldovan workers are prone to money illusion, this influences their earning profiles over time and across economic sectors, more than that this finding is important in explaining why workers change the economic sector, or why some sectors of the economy are characterized by grater fluctuations than other.

In order to test the hypothesis, the present author will replicate the questionnaire method used by Shafir et al. (1997), but will make use only of the question related to earnings. Certainly taking into consideration that the survey will be conducted in another country approaching a different research hypothesis, the question is adjusted so that it answers the research question. Therefore the currency

used to denote the monthly wage is MDL[1] (1Euro = 16.8713lei, official exchange rate on 22.04.2010, National Bank of Moldova). The monthly wage is set at 2000lei, and the names of the subjects in money illusion question are changed to Ann and Cristina. Additionally, the question about the level of education in the questionnaire (appendix A) proposes 6 answers: school (11years of schooling), high school (12years), professional school (12years), bachelor, master, and PhD.

[1] Moldovan leu

3.2. Country profile

Moldova is a country in Eastern Europe, member of the Commonwealth of Independent States; it declared independence from the Soviet Union in 1991. It is a relatively young and small state, with Chisinau its capital city, and it is there were all the major businesses are concentrated. Chisinau is the largest municipality and the most flourishing city of Moldova, its population reaches 1 million people. The population of the country reaches four million people, and the Republic of Moldova is considered to be the most densely populated of all former Soviet Republics.

Figure 2 Map of Eastern Europe

Source: UKNetGuide

Figure 3 Republic of Moldova Symbols

Coat of arms of the Republic of Moldova

State flag of the Republic of Moldova

Source: discover-moldova.com

Moldova aspires to join the European Union and is implementing its first three-year Action Plan within the framework of the European Neighbourhood Policy (ENP) of the EU. The economy depends heavily on agriculture, with a third of the working population engaged in this sector. Moldova is famous for its wines. Viticulture and winemaking in Moldova were the general occupation of the population for a longer period of time. One more important characteristic of this country is that a lot of people work abroad especially in the EU countries (Italy, Spain, and Portugal), their unofficial number reaches almost 1 million people that left the country for a better paid job. Due to the political instability there is no a favourable investment climate, still, the Government makes it best to attract investments and build an encouraging investment climate. Nonetheless, the business activity provides numerous job positions, as well as state institutions, and non-profit institutions.

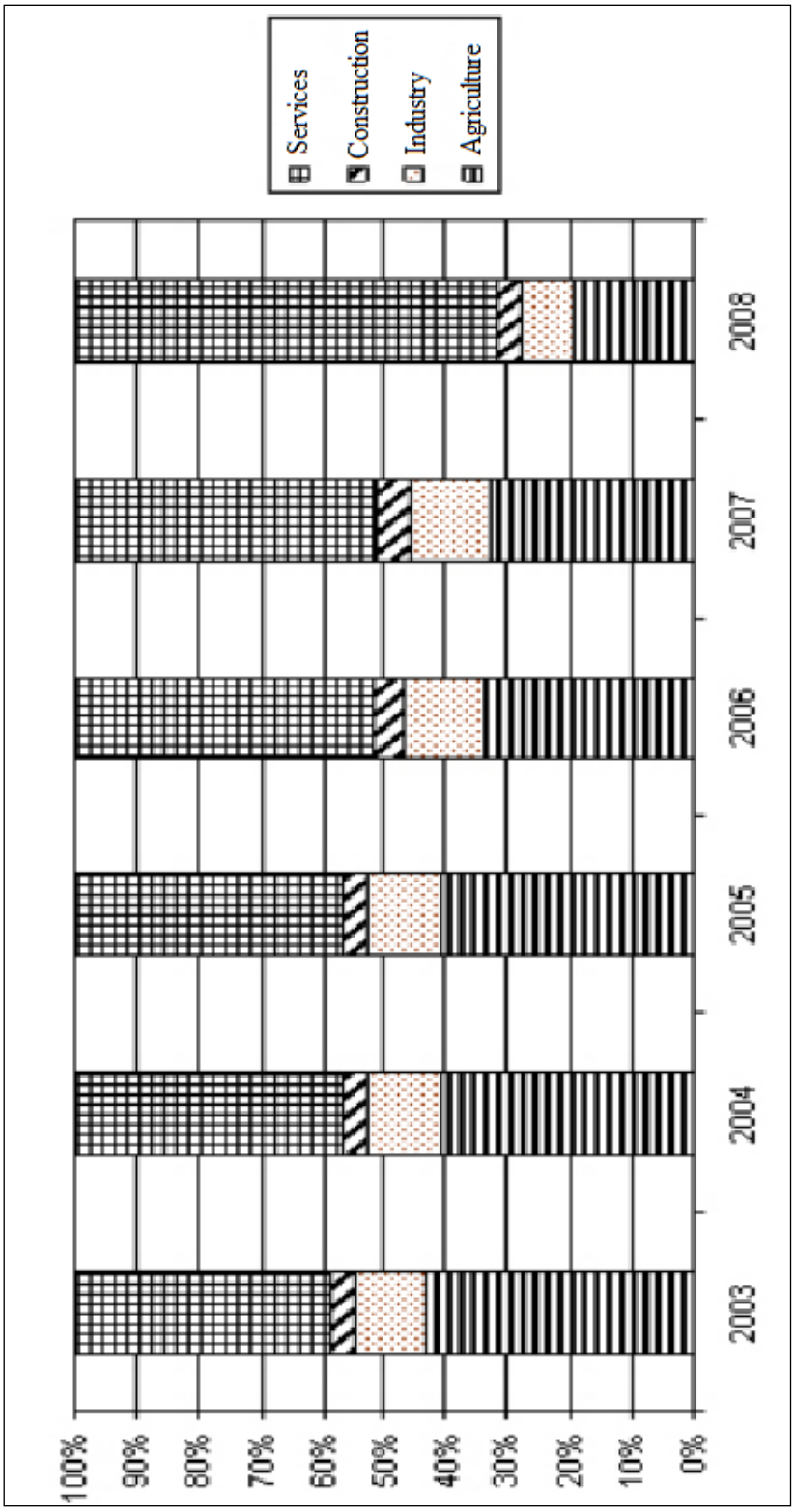
3.3. Wages in the Republic of Moldova

According to the statistical data presented by the National Bureau of Statistics of the Republic of Moldova regarding monthly wages and the percentage of the population engaged in different sectors of the economy, the last 6 years there is a tendency to leave one economic sector for another, and there is different growth rate of salaries for different sectors. Figure4 presents the evolution characteristic for the period 2003-2008 of the distribution of the working population according to sectors of economy. For the analysed period the number of people working in services increased from 40% to 70%, the number of people working in construction and industry remained mostly the same (approximately 5% and respectively 10%), while in agriculture in 2003 there were engaged 45% of the working population, and in 2008 – 20% of the working population.

Table1 presents the annual evolution of the average nominal monthly salary (in lei[2]) per employee in economy, by economic activities. Along the analyzed period in agriculture nominal salaries vary from 498lei to 1484lei; in industry it varies from 1190lei to 3739lei; in constructions at the begging of the analyzed period a worker had a salary of 1194lei a month to 3468lei at the end of the period; in services in 2003 health workers had monthly salaries of 578lei, and in 2008 the wage reached 2265lei. From this, a person currently working in the industrial sector of the economy is more likely to have a higher monthly salary compared to a worker engaged in agriculture.

[2] Leu/lei – national currency of the Republic of Moldova

Figure 4 Distribution of the working population according to sectors of economy



Source: author's translation from the NBSRM (National Bureau of Statistics of the Republic of Moldova)

Table 1 Average nominal monthly salary per employee (by economic activity)

Year	2003	2004	2005	2006	2007	2008
Total (lei)	890.8	1103.1	1318.7	1697.1	2065	2529.7
Agriculture, hunting and forestry	498.6	642.6	744	914.5	1098.6	1484.4
Fishing	585.7	860.2	1043.1	1191	1281	1367.7
Industry	1270.6	1501.9	1764.5	2084.5	2540.7	3041.7
Mining and quarrying	1190	1598.9	2037.3	2623.8	3098.3	3739.7
Manufacturing industry	1216.1	1417.8	1651.6	1914.5	2314.1	2762.8
Electricity and heat, gas and water supply	1534.7	1946.6	2323.6	2872.3	3595.8	4316.4
Construction	1194	1639.1	1972.8	2429.1	2967.6	3468.9
Wholesale and retail trade	794.9	1051	1228.1	1555.2	2088.7	2530.7
Hotels and restaurants	827.4	975	1150.5	1384.6	1759.5	2111.9
Transport and communications	1453.5	1786.3	2142.9	2549.1	3039.5	3533.1
Financial intermediation	2926.4	3254.8	3450.6	3863.3	4648.3	5446.3
Real estate, renting and business services	1133.4	1382	1671.4	2051.7	2583.6	3215.6
Public administration	1049.9	1204.6	1363.6	2164.3	2389	2802.4
Education	610.2	710.7	881.8	1209.3	1351.2	1670.5
Health and social work	578.8	844.7	1016.7	1333.5	1703.2	2265.5
Other communal service activities	671.4	801.9	1010.9	1302.2	1600.3	2013.9

Source: NBSRM

Table 2 Annual rate of inflation in the Republic of Moldova

Year	2003	2004	2005	2006	2007	2008
Inflation	11.10%	15.70%	12.50%	14.10%	13.10%	7.30%

Source: NBSRM

Table2 illustrates the evolution of the annual rate of inflation in the Republic of Moldova. We notice no pattern-like evolution; the values oscillate from 11.10% to 15.70% with a dramatic fall in 2008 when inflation reached 7.30%. These data are utilized to determine the changes in real salaries over the analyzed period, presented in Table3. Here we see that although in 2008 the real monthly salary of an industrial worker is 2834lei, persons working in agriculture still receive a considerably lower real wage of 1383lei per month. Plus, in 2008 for those working in construction the difference between nominal and real wage is around 236lei.

The last table in this sub-chapter, table4, presents calculations of the annual increases in both nominal and real salaries; it is an evolution over time where real wages increase at a higher rate in comparison with nominal wage in 2008, and this is characteristic for all the Moldovan economic sectors. For previous years under analysis, the opposite happened, i.e. real wages increase by a lower annual amount relative to the annual amount the nominal wages increase year by year.

Table 3 Average real monthly salary per employee in economy, by economic activities

Year	2003	2004	2005	2006	2007	2008
Total (lei)	801.8	953.4	1172.2	1487.4	1825.8	2357.6
Agriculture, hunting and forestry	448.8	555.4	661.3	801.5	971.4	1383.4
Fishing	527.2	743.5	927.2	1043.8	1132.6	1274.7
Industry	1143.7	1298.1	1568.4	1826.9	2246.4	2834.8
Mining and quarrying	1071.1	1381.9	1810.9	2299.6	2739.4	3485.3
Manufacturing industry	1094.6	1225.4	1468.1	1677.9	2046.1	2574.8
Electricity and heat, gas and water supply	1381.4	1682.5	2065.4	2517.4	3179.3	4022.7
Construction	1074.7	1416.7	1753.6	2128.9	2623.9	3232.9
Wholesale and retail trade	715.5	908.4	1091.6	1363.0	1846.8	2358.5
Hotels and restaurants	744.7	842.7	1022.7	1213.5	1555.7	1968.2
Transport and communications	1308.3	1543.9	1904.8	2234.1	2687.4	3292.7
Financial intermediation	2634.0	2813.1	3067.2	3385.9	4109.9	5075.8
Real estate, renting and business services	1020.2	1194.5	1485.7	1798.2	2284.4	2996.8
Public administration	945.0	1041.1	1212.1	1896.8	2112.3	2611.7
Education	549.2	614.3	783.8	1059.9	1194.7	1556.8
Health and social work	521.0	730.1	903.7	1168.7	1505.9	2111.4
Other communal service activities	604.3	693.1	898.6	1141.3	1414.9	1876.9

Source: author based on the information from NBSRM

Table 4 Annual increase in nominal and real salaries

Year	2004		2005		2006		2007		2008	
Salary	nom.	real	nom.	real	nom.	real	nom.	real	nom.	real
Tota(lei)l	212.3	151.6	215.6	218.8	378.4	315.2	367.9	338.4	464.7	531.8
Agriculture, hunting and forestry	144	106.6	101.4	105.9	170.5	140.2	184.1	169.9	385.8	412.1
Fishing	274.5	216.3	182.9	183.7	147.9	116.6	90	88.8	86.7	142.0
Industry	231.3	154.4	262.6	270.3	320	258.5	456.2	419.5	501	588.3
Mining and quarrying	408.9	310.8	438.4	429.0	586.5	488.6	474.5	439.9	641.4	745.8
Manufacturing industry	201.7	130.8	233.8	242.7	262.9	209.8	399.6	368.2	448.7	528.8
Electricity and heat, gas and water supply	411.9	301.1	377	383.0	548.7	451.9	723.5	662.0	720.6	843.4
Construction	445.1	342.0	333.7	336.9	456.3	375.3	538.5	495.0	501.3	609.0
Wholesale and retail trade	256.1	192.9	177.1	183.3	327.1	271.4	533.5	483.8	442	511.8
Hotels and restaurants	147.6	98.0	175.5	180.0	234.1	190.8	374.9	342.2	352.4	412.5
Transport and communications	332.8	235.6	356.6	360.9	406.2	329.3	490.4	453.4	493.6	605.3
Financial intermediation	328.4	179.1	195.8	254.1	412.7	318.7	785	724.0	798	965.9
Real estate, renting and business services	248.6	174.3	289.4	291.2	380.3	312.5	531.9	486.2	632	712.5
Public administration	154.7	96.1	159	170.9	800.7	684.8	224.7	215.4	413.4	499.5
Education	100.5	65.0	171.1	169.6	327.5	276.0	141.9	134.8	319.3	362.2
Health and social work	265.9	209.1	172	173.7	316.8	265.0	369.7	337.2	562.3	605.4
Other communal service activities	130.5	88.8	209	205.5	291.3	242.7	298.1	273.7	413.6	461.9

Source: author based on the information from NBSRM

Table 5 Annual increase in nominal and real salaries (%)

Year	2004		2005		2006		2007		2008	
Salary	**nom**	**real**	**nom**	**real**	**nom**	**real**	**nom**	**real**	**nom**	**real**
Total	24%	19%	20%	23%	29%	27%	22%	23%	23%	29%
Agriculture, hunting and forestry	29%	24%	16%	19%	23%	21%	20%	21%	35%	42%
Fishing	47%	41%	21%	25%	14%	13%	8%	9%	7%	13%
Industry	18%	14%	17%	21%	18%	16%	22%	23%	20%	26%
Mining and quarrying	34%	29%	27%	31%	29%	27%	18%	19%	21%	27%
Manufacturing industry	17%	12%	16%	20%	16%	14%	21%	22%	19%	26%
Electricity and heat, gas and water supply	27%	22%	19%	23%	24%	22%	25%	26%	20%	27%
Construction	37%	32%	20%	24%	23%	21%	22%	23%	17%	23%
Wholesale and retail trade	32%	27%	17%	20%	27%	25%	34%	35%	21%	28%
Hotels and restaurants	18%	13%	18%	21%	20%	19%	27%	28%	20%	27%
Transport and communications	23%	18%	20%	23%	19%	17%	19%	20%	16%	23%
Financial intermediation	11%	7%	6%	9%	12%	10%	20%	21%	17%	24%
Real estate, renting and business services	22%	17%	21%	24%	23%	21%	26%	27%	24%	31%
Public administration	15%	10%	13%	16%	59%	56%	10%	11%	17%	24%
Education	16%	12%	24%	28%	37%	35%	12%	13%	24%	30%
Health and social work	46%	40%	20%	24%	31%	29%	28%	29%	33%	40%
Other communal service activities	19%	15%	26%	30%	29%	27%	23%	24%	26%	33%

Source: author based on the information from NBSRM

3.4. Survey design

The survey is a non-experimental, descriptive research technique, and a systematic method for gathering information from a sample of individuals for the purposes of describing the attributes of the larger population of which the individuals are members. Surveys can be useful when a researcher wants to collect data on phenomena that cannot be directly observed, as is the case of testing for the presence of money illusion. Nevertheless, surveys have some limitations related to the fact that people may answer in one way to a hypothetical question, but act different in real-life situations; and whether respondents understand the situation the exact same way the experimenter built it and presented it in the questionnaire, and not take into consideration other unspecified assumptions that could affect their answers. Taking these limitations into consideration, they can be overcome by carefully constructing the questions and properly instructing the respondents before they start to complete the questionnaire.

Surveys collect information from a segment of the population of interest and this is different from a census where every member of the population is studied. The sample represents a fraction of the population that is under study, its size depends on the purpose of the study. Surveys are conducted to obtain a complex profile of the population, and in no case tend to describe the individuals who, by chance, are part of the determined sample. A variety of data collection methods are available for survey research, basic distribution techniques differ in cost, administrative ease, and characteristics of returns. Data are usually collected through the use of questionnaires.

Questionnaires provide a convenient way of gathering information from a target population. These are familiar to most people: nearly everyone has had some experience completing questionnaires and they generally do not make people

apprehensive (Walonick, 1993). Questionnaires are recommended to make use of simple and direct language, the questions should be easily understood by the respondent, and most important, questions must have the meaning that the researcher intended. The phrasing should be simple, to the point, and recognizable for the target population. Questionnaires usually begin with several non-threatening enquiries; else there is less probability that the person will complete the questionnaire.

At the beginning of March 2010 I started the survey on Moldovan employees, which lasted for an overall of 10 working days. The selection focused on the capital city Chisinau, where most businesses are concentrated; there was a door-to-door approach. The city is divided into five divisions (Centru, Ciocana, Botanica, Buiucani, and Riscani), so the respondents were selected from each of these divisions. The paper based questionnaire was designed in English, Romanian, and Russian languages (most of the population is bilingual, they speak Romanian and/or Russian). The number of participants is 200; participation was one-time and anonymous.

The selection was not completely random due to several circumstances: it was necessary to follow the profile of the respondents according to economic sector, sex and age; another situation is related to the different concentration of businesses in each division (for example, a large number of respondents working in agriculture were interviewed on the territories of the division Centru); during the survey there were people that refused to participate due to lack of time or interest, approximately one from every twenty approached persons refused to complete the questionnaire. Selection was unordered, but most of the offices where people participated at the survey were situated on main streets; additionally: during the last part of the survey potential participants were declined because it was necessary to fulfil the structure of respondents.

Workers in Moldova aged 18 to 60 within the four sectors of the national economy (services, construction, industry, agriculture) were eligible to participate, and they completed the questionnaires during 10-20 minutes. The responses are kept completely confidential, and participation was voluntary. Respondents could choose to remain anonymous, because, although they were told that there are no right or wrong answers, if respondents gave their names there is a great chance they would still be concerned about consequences of answering a question in a particular manner, and a good possibility that the answer would have not been truthful or honest (they could think their professional reputation is at stake); more than that, they could have not provided real feelings about the situation, but think what is correct; therefore questionnaires do not contain any identifying information, and therefore were more likely to generate honest responses than those identifying the respondent.

The participants at the survey were given the questionnaires at their work place; the responsible person picked up the answers after 2 hours. In each office there was chosen only one person: half of the times the person with the earliest date of birth, the other half of the times – the person with the latest date of birth; most important: only the number of day of the month counts, neither the month, nor the year are taken into consideration. For example: there are 3 workers in an office with the following birth dates: March16 1976, August1 1985, December22 1973. If we choose the earliest date it is: 1, so the 2nd person will fill in the questionnaire; if we choose the latest date it is 22, so the 3rd person to fill in the questionnaire.

In the questionnaire the set of seven demographic questions are followed by a question concerning attitude towards salary raises in times of inflation. For the last question, the respondents were divided in three more or less proportional groups (65respondets – 70respondents – 65respondents) such that each group

received a different set of questions to the same situation. Control variables such as gender, age, the level of education, economic sector of activity, period of activity in the current sector, previous economic sector of activity, and who earns the most in the family were also collected in the questionnaire.

At the begging of the survey 70 copies of each of the 3 variants of the questionnaire were printed; everyday quest for respondents started by taking the exact same number of questionnaires of all types, so that at the end of the day I had to use all 3 variants proportionally; although there was no control for who had to complete a certain variant, the paper was offered from the pile no order whatsoever. All respondents were asked one of the versions A, B, or C of the question presented bellow, adapted from Shafir et al. (1997):

Consider 2 individuals, Ann and Cristina, who graduated from the same college a year apart. Upon graduation, both took similar jobs with tourism agencies. Ann started with a monthly salary of 2000lei. During her first year on the job there was no inflation, and in her second year Ann received a 2% (40lei) raise in salary. Cristina also started with a salary of 2000lei. During her first year on the job there was 4% inflation, and in her second year Cristina received a 5% (100lei) raise in salary.

a. As they entered their second year on the job, which was doing better in economic terms?

    i. Ann
    ii. Cristina

b. As they entered their second year on the job, who do you think was happier?
    i. Ann
    ii. Cristina
c. As they entered their second year on the job, each received a job offer from another firm. Who do you think was more likely to leave her present position for another job?
    i. Ann
    ii. Cristina

The question is not replicated 100%, as I had to take into consideration specific aspects of the country and people, so some minor modifications were made (currency, names...), but did not affect the final result, thus making it possible to make outcome comparable to that of Shafir et al..

3.5. The sample

In order for the sample to be representative, I built the profile of the respondents according to the information provided by the NBSRM. Table6 presents the number and percentage of working people according to the economic sector, based on it is easier to determine the exact number of respondents from each economic sector that ought to be interviewed.

Table 6 Distribution of employment by economic sector

Period	Total	Agriculture	Industry	Construction	Services
2008					
thousands	*1251*	*388.6*	*163.4*	*82.8*	*616.3*
percentage	*100%*	*30.06%*	*13.06%*	*6.62%*	*50.26%*

Source: author based on the information from NBSRM

Table7 illustrates the number of workers that have to be interviewed taking into consideration that there should be 200 respondents per total: 99 persons from the economic sector: services (doctors, teachers, lawyers, bank employees, restaurant workers, hotel workers, advertising firm employees...); 14 workers in construction (construction firms' employees); 25 persons engaged in industry (textile industry workers, energy production, plants workers...); and 62 respondents from agriculture economic sector (farmers).

Table 7 Number of respondents from each economic sector

	Total	Agriculture	Industry	Construction	Services
percentage	*100%*	*30.06%*	*13.06%*	*6.62%*	*50.26%*
respondents	*200*	*61*	*25*	*14*	*100*

Source: author

Table 8 Distribution of employment by economic sectors and sex

2008	Total	Total		Agriculture		Industry		Construction		Services	
SEX	-	male	female	male	female	male	female	male	female	male	female
thousands	*1251.1*	628.8	622.3	211.9	176.8	88.5	74.9	73.3	9.5	255.1	361.2
percentage	*100%*	50%	50%	17%	14%	7%	6%	6%	1%	20%	29%
number of respondents	200	101	99	34	28	14	11	12	2	42	58

Source: author based on the information from NBSRM

Additionally Table8 represents the distribution of employees by economic sectors and sex, so the number of male and female respondents should be proportional to the corresponding percentage. For example: from those 100 interviewed persons working in services 58 were women. After having planned, prepared, quantified and reviewed the sample, the survey conducted.

3.6. Results

Table 9 Control variables

Variable	Definition
RESPONDENT	the number of the respondent
SEX	0 if male, 1 if female
AGE	From 18 to 60
EDUCATION	
school	1 if highest degree is school, 0 otherwise
high school	1 if highest degree is high school, 0 otherwise
professional school	1 if highest degree is professional school, 0 otherwise
Bachelor	1 if highest degree is Bachelor, 0 otherwise
Master	1 if highest degree is Master, 0 otherwise
PhD	1 if highest degree is PhD, 0 otherwise
CURRENT ECONOMIC SECTOR	
services	1 if current economic sector is services, 0 otherwise
construction	1 if current economic sector is construction, 0 otherwise
industry	1 if current economic sector is industry, 0 otherwise
agriculture	1 if current economic sector is agriculture, 0 otherwise
DURATION	duration in years of working in the present economic sector
PREVIOUS ECONOMIC SECTOR	
pservices	1 if previous economic sector is services, 0 otherwise
pconstruction	1 if previous economic sector is construction, 0 otherwise
pindustry	1 if previous economic sector is industry, 0 otherwise
pagriculture	1 if previous economic sector is agriculture, 0 otherwise
PERSON WITH THE HIGHEST INCOME IN THE FAMILY	
respondent	1 if the respondent has the highest income, 0 otherwise
spouse	1 if the spouse has the highest income, 0 otherwise
parents	1 if the parents has the highest income, 0 otherwise
another	1 if somebody else has the highest income, 0 otherwise
MI	0 if Ann; 1 if Cristina – for type A and B 0 if Cristina; 1 if Ann – for type C
MONEY ILLUSION QUESTION TYPE	
A	1 if money illusion question type is A, 0 otherwise
B	1 if money illusion question type is B, 0 otherwise
C	1 if money illusion question type is C, 0 otherwise

Source: author

Table9 presents the control variables collected in the questionnaire, and the descriptive statistics on control variables can be found in the Table10.

Table 10 Descriptive statistics

variable		average	st. dev.	population of Moldova (18-60 years)	
age		37.75	12.48	37.31	12.55
sex		0.49	0.5	0.51	0.35
duration		6.50	3.91	n/a	n/a
MI		0.60	0.49	n/a	n/a
		%		%	
educ	school	11%		not available	
	high school	8.5%			
	prof. school	17.5%			
	Bachelor	51%			
	Master	7.5%			
	PhD	4.5%			
EcSect	services	50%		not available	
	construction	7%			
	industry	12.5%			
	agriculture	30.5%			
past EcSect	services	60%		not available	
	construction	7%			
	industry	15%			
	agriculture	18%			
high Income	respondent	52.5%		not available	
	spouse	26.5%			
	parents	16.5%			
	another	4.5%			

Source: author and NBSRM

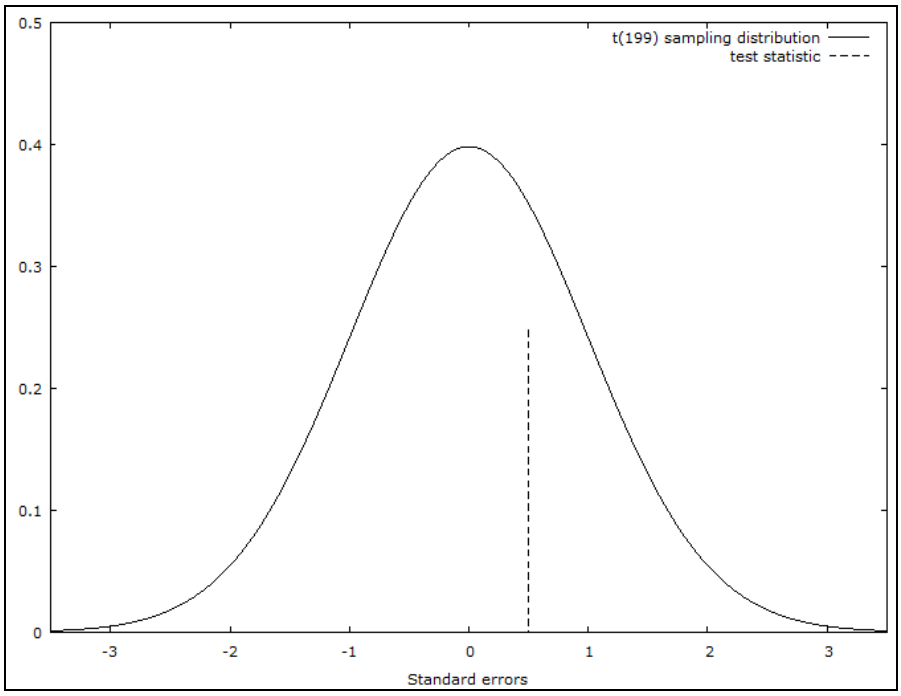
Unfortunately there is a lot of information missing so we cannot compare the data from the sample with the data characteristic for the Moldovan population aged 18-60. Nevertheless, following is a t-test to compare the simple averages for age of the respondents in the survey and the age of population in Moldova: if they

are significantly different and at what level. We test the null hypothesis that the mean of age in the sample is not significantly different from the mean of age in the population of Moldova.

H_0: mean=37.31
H_1: mean≠37.31

Sample size: n = 200
Sample mean = 37.755, std. deviation = 12.4858
Test statistic: t(199) = (37.755 - 37.31)/0.882877 = 0.504034
Two-tailed p-value = 0.6148
(one-tailed = 0.3074)

Figure 5 Graph of sampling distribution



Source: author

The null hypothesis cannot be rejected so the age in the sample is not different from the mean of age in the population at a 10% significance level.

Preliminary results are presented in Table11. Under the hypothesis of no framing effect, the proportions of respondents answering (i) or (ii) should be similar under the three different versions of the questions. As presented in Table10 these proportions are similar for questions A (when economic terms are emphasized) and C, but there is a 9% difference between these two and question B. This could suggest that more than one third of the respondents were mislead when answering the last question about money illusion, and what is more impressing is that their proportion increases to 66% when the respondents were asked question B, that is "*As they entered their second year on the job, who do you think was happier?*". It is not unlikely that this result denotes the importance of framing, therefore when asked who is happier between Ann and Cristina; people tend to be more prone to money illusion, rather when asked who is doing better in economic terms, or who is more likely to leave their current job for another one. Nevertheless, framing effect is to a certain extent insignificant judging from the outcome of the survey.

Table 11 Preliminary results

MI	A	B	C
	(n=65)	(n=70)	(n=65)
0	43%	34%	43%
1	57%	66%	57%

Source: author

Table 12 Preliminary results

MI	A	B	C
	(n=65)	(n=70)	(n=65)
ANN	43%	34%	57%
Cristina	57%	66%	43%

Source: author

The 57% of the persons that answered type A questions do not understand the sense of inflation (and these results are different from what Shafir et al. (1997) presented – 29%); additionally, under non-economic emphasis of question B, a not much higher percentage (66% - somewhat similar to Shafir et al. (1997)'s 64%) is prone to money illusion. Table11 and table12 present the same results under different settings, this is because for type A and B questions, answer "Cristina" represents money illusion, while for type C question, answer "Ann" represents

money illusion. Basically, the results illustrate the situation where there is no dominance between economic and nominal representation, the way respondents thought and answered indicates money illusion in more or less same proportions. As a result, the present author checked for variables, other than money illusion question type, that influence the presence of money illusion among the respondents.

Table 13 Sex

MI	male	female
0	41%	39%
1	59%	61%

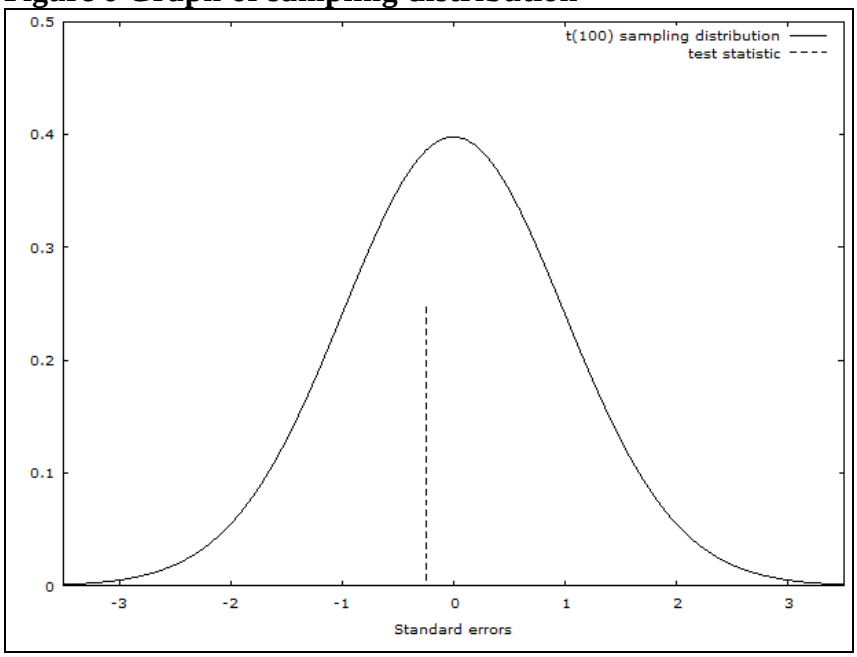
Source: author

Table13 illustrates how respondents reacted to money illusion question depending on gender: no strong difference in proportions, but worth to be mentioned is the fact that women are slightly more prone to money illusion (it could be because women are more sentimental or naive). Next a t-test is conducted to compare the simple averages of responses to money illusion question: we have mean (MI_{female})=0.606 and mean(MI_{male})=0.594. We test the null hypothesis that the simple average for males is not significantly different from the mean of simple averages for females.

H_0: mean=0.606
H_1: mean≠0.606

Sample size: n = 101
Sample mean = 0.594, std. deviation = 0.493
Test statistic: t(100) = (0.594059 - 0.60606)/0.0491073 = -0.244375
Two-tailed p-value = 0.8074
(one-tailed = 0.4037)

Figure 6 Graph of sampling distribution



Source: author

The null hypothesis cannot be rejected so the mean of MI_{male} is not different from the mean of MI_{female} at a 10% significance level. In conclusion both women and men reacted the same way to money illusion question, and the difference is not significant.

Table 14 Age

MI	18-30	31-40	41-50	51-60
0	36%	45%	45%	36%
1	64%	55%	55%	64%

Source: author

Table14 offers information regarding the proportion of people that suffer from money illusion according to their age; 64% for the following age groups: (18-30) and (51-60); and only 55% for people aged 31 to 50 exhibit money illusion.

Table 15 Education

money illusion	school	high school	prof. school	bachelor	master	PhD
0	23%	29%	37%	48%	27%	44%
1	77%	71%	63%	52%	73%	56%

Source: author

Table15 illustrates a somewhat surprising situation where over 70% of respondents that graduated schools and high-schools, and those that have a Master degree exhibit money illusion. Else, graduates of professional schools, and those holding a Bachelor or a PhD degree, are less, but still significantly prone to money illusion (52%-63%). As a result, there exists a tendency to be less prone to money illusion with the increase of education; nevertheless, Moldovans that hold a master degree do not follow the rule.

Table 16 Economic Sector

MI	services	construction	industry	agriculture
0	46%	50%	36%	30%
1	54%	50%	64%	70%

Source: author

Table 17 Duration

MI	1-3	4-7	>7
0	30%	50%	42%
1	70%	50%	58%

Source: author

The data presented in table16 indicate that people that activate in agriculture are relatively more prone to money illusion: seven out of ten suffer from money illusion; while the percentage of people that exhibit money illusion varies from 54% to 64% from those working in services, and industry. It appears that those people working in construction and that suffer from money illusion, judge this way from other reasons rather the sector they work in. Additionally, as illustrated in Figure4 there seems to be no fluctuation in the percentage of people working in this sector for several last years.

In contrast with data in table18, the proportions of people that do not suffer from money illusion is more or less uniform, from 33% to 43%, indicating that the economic sectors respondents used to work in the past do not influence their general judgment vis-à-vis income and inflation.

Table 18 Past Economic Sector

MI	services	construction	industry	agriculture
0	42%	36%	43%	33%
1	58%	64%	57%	67%

Source: author

It appears that duration, i.e. the period of time the respondent has been working in the present sector of the economy is playing an important role in people's sensitivity to money illusion, as in table17 the data show that 70% of people that were working from 1 to 3 years suffer from money illusion, conversely, if they are working for a longer period (4-7 years) it seems not to affect the shares of respondents prone to money illusion. And finally, 58% of people working for more than 7 years exhibit money illusion.

Last but not least, table19 indicates that who has the highest income in the family influences the proportions of people that suffer from money illusion: if it is the respondent, the spouse, or one of the parents that earns the most in the family; than around 60% of this people suffer from money illusion, but it is interesting to observe that if it is someone else that earns the most in the family there is 100% probability to suffer from money illusion.

Table 19 Highest Income

MI	respondent	spouse	parents	someone else
0	42%	45%	36%	0%
1	58%	55%	64%	100%

Source: author

Further on, a Probit model will be considered where the binary dependent variable will be MI presented in table9 (0 or 1). The logistic model regression is used to estimate the factors that influence presence of money illusion. The independent variables are: age, high_school, prof__school, Bachelor, Master, PhD, services, construction, industry, duration, pservices, pconstruction, pindustry, spouse, parents, B, C, sq_age (represents the square of variable age). Table20 presents the results of the regression.

When we control for education, the result of the regression (Table20, right hand side) shows that the variable *Bachelor* has a significant coefficient -0.65 (significant at 1% level), as a result people that have a bachelor degree are 65% less likely to suffer from money illusion in comparison with people that graduated a school. Additionally we can conclude that people who are currently working in services are 51% less likely to exhibit money illusion relative to people working in agriculture – the coefficient of the variable *services* is (-0.51) at a 1% significance level. The coefficients of variables *age* and *sq_age* are the most significant in the regression at 10% level, this means that the probability of suffering from money illusion falls by 23% for each year of age, but this decrease is accelerated by 0.003 for each year. The model predicts 66% of the responses correctly. The McFadden's R^2 is 0.09.

On the other hand, in Table20, when we do not control for education we see that the coefficient of variable *services* is significant at a higher level (5%), and people engaged in services are 63% less likely to suffer from money illusion in comparison to those working in agriculture. Therefore we can conclude that the difference between the two sectors of the economy could also be influenced by the level of education of people. We cannot exclude the fact that people working in services are less prone to money illusion because they are more educated.

Table 20 Probit regression

Variables	Coef.	std. error	p-value	Coef.	std. error	p-value
sex	0.318	0.217	0.143	0.295	0.221	0.183
age	-0.217	0.075	0.004***	-0.236	0.081	0.004***
high_school				-0.643	0.524	0.220
prof__school				-0.380	0.404	0.347
Bachelor				-0.659	0.382	0.084*
Master				-0.038	0.547	0.944
PhD				-0.639	0.580	0.271
services	-0.631	0.273	0.021**	-0.517	0.297	0.082*
construction	-0.595	0.430	0.166	-0.455	0.447	0.309
industry	-0.299	0.403	0.457	-0.120	0.415	0.773
duration	0.012	0.031	0.680	0.009	0.032	0.770
pservices	0.229	0.317	0.470	0.239	0.322	0.458
pconstruction	0.268	0.470	0.567	0.159	0.482	0.742
pindustry	0.068	0.419	0.870	-0.043	0.428	0.921
spouse	-0.270	0.232	0.244	-0.228	0.242	0.345
parents	-0.564	0.354	0.111	-0.498	0.367	0.175
B	0.361	0.234	0.123	0.351	0.240	0.143
C	0.084	0.231	0.714	0.046	0.237	0.848
sq_age	0.002	0.0008	0.004***	0.003	0.001	0.004***
Mean dependent var			0.600000			0.600000
McFadden R-squared			0.069220			0.090899
Log-likelihood			-125.2852			-122.3671
Schwarz criterion			330.0451			350.7006
S.D. dependent var			0.384297			0.383367
Adjusted R-squared			-0.042219			-0.057687
Akaike criterion			280.5703			284.7343
Hannan-Quinn			300.5920			311.4298
Number of observations			200			200
Dependent variable			MI			MI
Number of cases 'correctly predicted'			135 (67.5%)			132 (66.0%)
f(beta'x) at mean of independent vars			0.384			0.383
Likelihood ratio test: Chi-square			(14) 18.6343 [0.1794]			(19) 24.4704 [0.1787]

Source: author

The next two tables represent the results of the Probit model run on men and women separately. This is done to determine what factors influence the presence of money illusion among men and women individually. The outcome suggests that there is a relatively high success rate of the regressions (63.5% for men, 65.7% for women) - computed as a percentage prediction on the total number of observations in the sample.

We see that age and age_sq are the only most significant variables in the Male model, and this means that among the male population the probability of suffering from money illusion falls by 35% for each year of age, and the decrease is accelerated by 0.004 for each year. On the other hand, when analyzing the outcome of Female model, age is not more a significant variable. However, among the female population, at 5% significance level: women that graduated from professional schools are 154% less likely to suffer from money illusion than women that graduated from schools. Similarly women holding a bachelor degree are 166% less probable to exhibit money illusion than women that graduated from schools.

Table 21 Probit regression male

Variables	Coef.	std. error	p-value
age	-0.354	0.125	0.004***
high_school	-0.545	0.697	0.433
prof__school	0.694	0.573	0.226
Bachelor	-0.072	0.518	0.888
Master	0.376	0.804	0.639
PhD	-0.531	0.938	0.571
services	-0.206	0.440	0.638
construction	-0.189	0.561	0.735
industry	0.387	0.624	0.534
duration	0.040	0.046	0.386
pservices	0.283	0.451	0.530
pconstruction	0.359	0.613	0.557
pindustry	-0.361	0.627	0.564
spouse	-0.175	0.475	0.712
parents	-0.121	0.486	0.803
B	0.114	0.363	0.753
C	-0.145	0.354	0.681
sq_age	0.004	0.001	0.004***

Mean dependent var	0.594059
McFadden R-squared	0.115393
Log-likelihood	-60.33908
Schwarz criterion	208.3654
S.D. dependent var	0.383324
Adjusted R-squared	-0.163158
Akaike criterion	158.6782
Hannan-Quinn	178.7930
Number of observations	101
Dependent variable	MI
Number of cases 'correctly predicted’	64 (63.4%)
f(beta'x) at mean of independent vars	0.383
Likelihood ratio test: Chi-square(18)	15.7419 [0.6106]

Source: author

Table 22 Probit regression female

Variables	Coef.	std. error	p-value
age	-0.161	0.122	0.186
prof__school	-1.540	0.693	0.026**
Bachelor	-1.668	0.683	0.014**
Master	-0.781	0.854	0.360
PhD	-1.195	0.872	0.170
services	-0.756	0.444	0.088*
industry	-0.686	0.625	0.272
duration	0.006	0.054	0.906
pservices	0.325	0.519	0.531
pindustry	0.0496	0.733	0.945
spouse	-0.431	0.319	0.176
parents	-0.596	0.637	0.349
B	0.435	0.360	0.226
C	0.029	0.356	0.934
sq_age	0.001	0.001	0.217
Mean dependent var			0.606061
McFadden R-squared			0.167322
Log-likelihood			-5.27088
Schwarz criterion			184.0637
S.D. dependent var			0.369984
Adjusted R-squared			-.073724
Akaike criterion			142.5418
Hannan-Quinn			159.3416
Number of observations			99
Dependent variable			MI
Number of cases 'correctly predicted’			65 (65.7%)
f(beta'x) at mean of independent vars			0.370
Likelihood ratio test: Chi-square(15)			22.2128 [0.1023]

Source: author

Also from table22 we can say that women employed in services are 75% less possible to suffer from money illusion compared to women working in agriculture. Consequently, the conclusion is that the presence of money illusion

among men looks to be influenced by age, while a larger variety of factors influence the presence of money illusion among women: certain levels of education and the sector of the economy they work in.

Certainly there are many factors that could count for migration from one sector of the economy to another, first of all the fact that Moldova is a developing country which is naturally characterized by evolutionary changes in the economy and in the labour force. Nevertheless we cannot neglect the importance of money illusion in the current earning profiles, and its possible implication in influencing the migration of workers among sectors. Bakshi (2009) proposed the results of their experiments concluding money illusion has permanent real effect over time, and non-neutrality of money has strong real and permanent effect in the short run. Based on this we can analyze the period 2003-2008 presented in Figure4 as a part of the short-run period where people suffered from money illusion the same as they suffer according to the results from this survey. Therefore when migrating from one sector of an economy to another, workers were actually looking for better and higher wages, also something usual for a developing country where people will leave agriculture and start working in services; but this period is characterized by high inflation and rises in salary across sectors of the economy; now, not all increases were in accordance with inflation, so actual raises differed from the perceived nominal value. According to the results of this survey workers engaged in services are 51% less likely to exhibit money illusion relative to people working in agriculture, on the other hand, in Figure4 we see that from all four sectors most people “left” agriculture, and apparently migrated to services. Also we notice people earn differently across sectors, some of the highest salaries are in services – here are people that suffer the less from money illusion.

Bearing in mind all the analysis and the results presented in this sub-chapter it is possible to state that the working population of Moldova, indeed suffers from

money illusion. During the survey respondents made decisions that are consistent with money illusion behaviour, while it was proved that the framing effect in this situation is comparatively not essential, it has been proven that among others, education influences the most the probability of falling victim to money illusion; and that people engaged in services are less likely to be prone to money illusion in comparison to people working in agriculture. The outcome of the investigation could suggest that money illusion influence earning profiles, and contribute to their "migration" from one sector of the economy to another.

Chapter 4

4. Conclusion

In this thesis we focus on the factors that influence the presence of money illusion among the Moldovan working population. After having conducted a survey we present and analyze the results, and draw attention to the most significant causes that influence some persons to exhibit a smaller predisposition for a rational evaluation of actions and are more probable to suffer from money illusion than others.

The thesis starts with a presentation of the main ideas and a description of behavioural economics including literature review on the subject; followed by a sub-chapter about money illusion and earning profile; in continuation we offer a short presentation of the paper "Money Illusion" written by Shafir et al. (1997). The question about reaction to salary raises under inflation from the experimental study by Shafir et al. (1997) is adapted in the questionnaire used in the survey for the present thesis.

The survey was conducted for around two weeks in Chisinau, Republic of Moldova, 200 respondents participated at the survey; workers aged 18 to 60 within the four sectors of the national economy (services, construction, industry, agriculture) were eligible to participate, and they completed the questionnaires during 10-20 minutes. The selection was not completely random due to several circumstances: it was necessary to follow the profile of the respondents according to economic sector, sex and age. In the questionnaire the set of seven demographic questions are followed by a question concerning attitude towards salary raises in times of inflation. For the last question, the respondents were divided in three more

or less proportional groups (65respondets – 70respondents – 65respondents) such that each group received a different set of questions to the same situation. Control variables such as gender, age, the level of education, economic sector of activity, period of activity in the current sector, previous economic sector of activity, and who earns the most in the family were also collected in the questionnaire.

The results of the survey suggest that people that have a bachelor degree are 65% less likely to suffer from money illusion in comparison with people that graduated a school. Additionally people who are currently working in services are 51% less likely to exhibit money illusion relative to people working in agriculture. Having analyzed the population by gender: the presence of money illusion among men looks to be influenced by age, while a larger variety of factors influence the presence of money illusion among women: certain levels of education and the sector of the economy they work in. Although we cannot ignore the hypothesis that money illusion determines the migration from one sector of the economy to another, the magnitude is not that significant; and within the scope of this thesis, we cannot hope to cover all the possible implications of the question about migration among sectors of the economy. Nevertheless, the results indicate that the working population in Republic of Moldova seems less capable of untangling nominal and real effects and they appear to suffer from money illusion. Furthermore, this study brought new suggestions and somewhat successfully added new ideas and insights to the subject.

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A The Questionnaire

This study is being conducted by Doina Todica, a graduate student at the Institute of Economic Studies at Charles University in Prague, for the purpose of a Master Thesis. The results of the study will be used for scholarly purposes only. The results from the study might be presented in educational settings and at professional/academic conferences and the results might be published in an academic journal in the field of behavioural economics.

The purpose of this study is to determine Moldovan workers attitude towards changes in salaries. Workers in Moldova aged 18 to 60 within the four sectors of the national economy (services, construction, industry, agriculture) are eligible to participate. You will be able to complete the questionnaire during 10-20 minutes. The responses are kept completely confidential, participation is voluntary. The person responsible for the questionnaires will be back in 2 hours to pick up your answers.

2. *Are you Male or Female?*
    a. *M*
    b. *F*
3. *What is your age?*
4. *What town do you live in?*
5. *What is your highest completed level of education?*
    a. School
    b. High school
    c. Professional school
    d. Bachelor
    e. Master
    f. PhD
6. *What is the sector of the national economy you activate?*
    a. Services
    b. Construction
    c. Industry

d. Agriculture

7. *For how many years have you been working in this sector?*
    a. 1-3 years
    b. 4-7 years
    c. 8 and more years
8. *Who has the highest income in your family?*
    a. You
    b. Your husband/wife
    c. One of your parents
    d. Somebody else
9. *Consider 2 individuals, Ann and Cristina, who graduated from the same college a year apart. Upon graduation, both took similar jobs with tourism agencies. Ann started with a monthly salary of 2000lei. During her first year on the job there was no inflation, and in her second year Ann received a 2% (40lei) raise in salary. Cristina also started with a salary of 2000lei. During her first year on the job there was 4% inflation, and in her second year Cristina received a 5% (100lei) raise in salary.*
    a. First group (for 33.33% of respondents): As they entered their second year on the job, which was doing better in economic terms?
        i. Ann
        ii. Cristina
    b. Second group (for 33.33% of respondents): As they entered their second year on the job, who do you think was happier?
        i. Ann
        ii. Cristina
    c. Third group (for 33.33% of respondents): As they entered their second year on the job, each received a job offer from another firm. Who do you think was more likely to leave her present position for another job?
        i. Ann
        ii. Cristina

Thank You for the participation!

A Content of Enclosed DVD

There is a DVD enclosed to this thesis which contains empirical data