



ISTITUTO DI STUDI E ANALISI ECONOMICA

**Consumers Sentiment and  
Cognitive Macroeconometrics  
Paradoxes and Explanations**

by

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## **ABSTRACT**

Using data from the Business Surveys Unit of the European Commission as a long-running-continental-scale experiment, this paper examines how, and how accurately, people assess economic systems. Data show both commonsense (e.g. people know the past better than the future) and puzzling results (e.g. there is a systematic bias in forecasts). The former support the reliability of the surveys, the latter are in sharp contrast with the standard maintained hypothesis of a world populated by calculating and unemotional maximizers. The dualism of behavior may be fruitfully explored via cognitive psychology, according to which both logic and emotions systematically drive people's choices.

Key Words: Beliefs, survey research, consumer sentiment, cognitive economics.

JEL Classification: C42, C82, D12, D84.

## NON-TECHNICAL SUMMARY

Everyday practice presents survey data on consumer sentiment by means of aggregate measures. Alike, usually, mainstream literature analyzes summary information from the surveys in the form of confidence indexes. While it is easy to understand the factual need to report easily accessible indicators, aggregation/quantification procedures necessarily imply loss of information (not mentioning the issues/assumptions they involve). But, clearly, every clue on consumers' perceptions may be important for policy makers and economists in order to understand their behavior.

Using data from the Business Surveys Unit of the European Commission as a long-running-continental-scale experiment, this paper presents brand new empirical evidence on how, and how accurately, people assess economic systems. Results from individual response options suggest that survey respondents reply, on average, as expected. Agents think to know their own situation better than the system wide one, and the past better than the future. Also, perceptions accumulate towards the "stationarity" of the economic stance. Altogether these commonsense outcomes support the hypothesis that survey data give a faithful representation of people's opinions. But this is not the only story told by the data. Paradoxical outcomes emerge too – people tend to judge over-pessimistically and to forecast over-optimistically and, hence, there is a persistent non-zero "forecast" error. Also, individuals seem to believe that their own situation may consistently drift apart from the general one. Even more strikingly, the experiments highlight the emergence of biased forecast errors even when responses deal with familiar conditions.

These puzzling results are in sharp contrast with the standard maintained hypothesis of a world populated by calculating and unemotional maximizers. Following an unusual approach, I argue that it does not necessarily hamper the reliability of the information content of surveys of people in households. In fact, another contribution of this paper is the analysis of traditional qualitative survey data via cognitive psychology. In economics, rationality means that decision-makers use available information in a coherent and systematic way. In cognitive psychology, a human being is commonly regarded as a system, which codes and interprets available information in a conscious and rational way. But other, less conscious, factors are also assumed to govern human behavior in an equally consistent way. Furthermore, unlike textbook economics, cognitive science addresses the rationality not as an axiom, but as an element of the analysis. This new approach allows explaining the above mentioned macroeconometric paradoxes. Just to mention, the well-known psychophenomenon called "illusion of control" suggests that agents' responses on future economic developments are likely to be illusions, not rational forecasts.

# **CLIMA DI FIDUCIA DELLE FAMIGLIE E MACROECONOMIA COGNITIVA. PARADOSSI E SPIEGAZIONI**

## **SINTESI**

Come reso noto dal recente e intenso dibattito sull'inflazione effettiva e percepita, elementi psicologici possono condizionare la formazione dell'opinione pubblica sulle questioni economiche. D'altronde, da vari decenni una parte della teoria economica suggerisce di arricchire l'analisi aprendo a visioni alternative degli elementi alla base delle decisioni dell'homo economicus. In particolare - negli anni cinquanta - vari autori (Katona, Tobin, Juster, ecc.) proposero di sondare le percezioni dei consumatori tramite interviste. Da allora, il clima di fiducia degli operatori è stato sempre più al centro dei dibattiti e non solo nell'ambito della teoria economica.

Le indagini effettuate nell'ambito del Joint Harmonised European Union Programme of Business and Consumer Surveys della Commissione Europea, costituiscono da oltre vent'anni un appuntamento stabile e molto atteso nel panorama economico comunitario. Mentre le survey sono solitamente impiegate per analisi sulla congiuntura economica, esse appaiono particolarmente appropriate anche per una verifica empirica delle questioni sopra citate. Vale la pena di rimarcare che si tratta di una messe di informazioni veramente impressionante sia per qualità che per quantità: da oltre vent'anni vengono mensilmente interpellate 33.000 persone accuratamente selezionate in modo da incarnare l'europeo rappresentativo.

Un'analisi basata su semplici, ma molto robuste, statistiche descrittive delle relative risposte fa emergere i caratteri più profondi, meno contingenti, dell'atteggiamento dei consumatori europei nei confronti della situazione economica. Essa informa che la gente non risponde casualmente, ovvero, che le indicazioni fornite presentano un certo grado di coerenza interna. Ad esempio, come logico, i rispondenti mostrano di conoscere la propria situazione meglio di quella generale e il passato meglio del futuro. Accanto a queste evidenze prevedibili che, stabilendo l'ovvio, sostengono in un certo modo l'affidabilità del sondaggio, emergono - con altrettanta nitore - caratteristiche singolari dal punto di vista dell'economia standard. In altri termini, il processo informazione-elaborazione-azione non sempre risulta così lineare e prevedibile come ipotizzato dagli economisti. Anzitutto, le persone si illudono che la propria situazione possa essere costantemente migliore di quella generale. Inoltre, c'è la tendenza a commettere sempre lo stesso errore, ovvero a giudicare in modo

troppo pessimistico e a prevedere in modo troppo ottimistico. E' importante osservare che l'errore permane anche quando le domande riguardano la situazione personale. Il problema, dunque, non sembra unicamente associabile alla disponibilità/interpretazione di informazioni vaghe e indirette. Dato che approcci ortodossi difficilmente possono offrire suggerimenti eterodossi, appare più fruttuoso cercare altrove spiegazioni plausibili alle evidenze più sbalorditive.

La proposta di questo lavoro è di rivolgersi alla psicologia cognitiva. Psicologi ed economisti concordano nel ritenere che l'essere umano si comporta in modo coerente e sistematico. Tuttavia, per gli psicologi, ci sono altri componenti che a livello inconscio, ma altrettanto sistematicamente, possono giocare un ruolo nelle scelte individuali. Inoltre, mentre (troppo spesso) in economia la razionalità assurge a postulato, in psicologia essa è parte integrante dell'analisi. Nel presente lavoro si mostra che questa complessa visione del *modus operandi* dell'individuo pare accomodare, in modo convincente, anche i risultati più sconcertanti. Il messaggio contenuto nelle surveys presso i consumatori può dunque validamente e fruttuosamente essere decodificato: se l'econometria ci ha insegnato a non confondere le semplici correlazioni dalle relazioni causali, la psicologia può insegnarci a discriminare le previsioni razionali dalle semplici, umanissime, illusioni.

Parole chiave: consumatori, clima di fiducia, economia cognitiva

Classificazione JEL: C42, C82, D12, D84.

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| <p><i>Did you hear about the politician who promised that, if he was elected, he'd make certain that everybody would get an above average income?<br/>And nobody laughed...</i></p> <p>Statistical Joke</p> | <p><i>Illusory control is an expectancy of a personal success probability inappropriately higher than the objective probability would warrant.</i></p> <p>Undisputed Psychological Finding</p> |
|---|--|

## 1 INTRODUCTION

In many countries consumer sentiment indexes (CSI) play a relevant role in public discussions of the economy (for a seminal contribution see Katona, 1951). CSI are so commonly diffused and commented at their “face value”, that it seems that what is behind them be considered as known as not to require explanation. As refer to economic literature, by and large, three main strands of research have been addressing CSI. The first clusters around the evaluation of its predictive power in forecasting aggregate consumption and/or other macroeconomic variables (see Ludvigson, 2004 for a review). This is not surprisingly since consumer surveys are intended for short-term economic analyses (European Commission, 2004), as mirrored in their high (usually monthly) frequency. The second makes use of survey data to appraise the rationality of consumers' expectations (Souleles, 2004; Forsells and Kenny, 2004; Carrol, 2001, 2003; Stephens, 2003). Apart from inflation, the research on consumer expectations about the economy is quite limited and attempts to explain puzzling results are even rarer. This literature is often based directly on CSI, which are indexes stemming from the aggregation of survey responses to a set of questions about current and expected economic conditions (exemptions are Souleles, 2004; Dominitz and Manski, 2004). The third strand focuses on converting qualitative data obtained in surveys into quantitative indexes for a number of economic variables. Needless to say, the quantification of categorical survey responses is to some extent intrinsically arbitrary, since survey responses are a subjective assessment of the expected or actual behavior of a variable<sup>1</sup>. Converting qualitative messages into quantitative statistics is an intensive area of research (Mitchell and Weale, 2005; Mitchell, Smith and Weale, 2005; European Commission, 2004). Driver and Urga (2004) survey several statistical ways of inferring quantitative signals from qualitative data,

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<sup>1</sup> A recent and promising practice elicits from survey respondents probabilistic expectations of significant personal events (Manski, 2004). However, my paper deals with long-running traditional qualitative surveys only. Moreover, while Manski deals with “how to measure expectations”, I deal with the one-step-back question: “what expectations are?”

concluding that no method has imposed itself as being clearly superior to the others. Dominitz and Manski (2004) conclude that indexes based on disparate and non-commensurate elements are not the best way to decipher information on consumer beliefs. An indirect confirmation of the issues surrounding this topic comes from everyday practice, where virtually identically targeted CSI are based on different approaches. In the US, each of the single questions pertaining to the (University of Michigan) overall CSI has three possible answers which are "good times", "no change" and "bad times". The weights of the answers are respectively 1, 0 and -1. In Japan, there are five possible responses to questions: "improve", "somewhat improve", "no change", "somewhat deteriorate" and "deteriorate". For each question, the answers are respectively assigned the following weights: 1, 3/4, 2/4, 1/4 and 0. In Europe, five similar response options (see below) are weighted, respectively, 1, 1/2, 0, -1/2, -1. In all cases, the overall index is calculated as a simple average of individual indicators. Thus, somewhat curiously, while in Japan pessimists are left out by CSI, elsewhere the zero weight is assigned to "no change" persons. In the US, on the other hand, extreme positions are not allowed. To further confuse the matter, Canada follows another approach. While its weights are centered as in Europe/US, the questions relate to consumer's financial situation over the past/next six months. Elsewhere, the time window is one year.

Due to their importance in political and economic circles, the relevance of getting a better understanding of survey response behavior seems simply obvious. Even if modern research have been following other directions, as far back as fifty years ago, the Federal Reserve Consultant Committee on Consumer Survey Statistics (the so called Smithies Committee, 1955), as well as Tobin (1959) and Juster (1964), recommended that predictive power be evaluated by the ability of individual survey responses to predict subsequent individual outcomes reported later in re-interviews<sup>2</sup>. Then, the attitudinal research (Dominitz and Manski, 2003, 1999; Das, Dominitz, and van Soest; 1999; Manski, 2004) has made clear why the analysis of the micro foundations of consumer confidence indexes may be important. One obvious problem is that some of the events about which respondents are queried are remarkably vague, e.g. "general economic conditions", and it may be that different respondents do not interpret the same question in the same way. Thus, responses could be not comparable across individuals. Other, actually sparse, works (Oppenlander and Poser, 1986; European Commission 1997; Dominitz, 1998) have addressed the

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<sup>2</sup> As mentioned in the main text, this turned out to be the minority view. Mainstream literature proceeded according to Katona (1957) and Mueller (1957), which suggested that aggregate predictive tests may also be useful.

potential criticism that there may be little incentive for respondents to reply truthfully<sup>3</sup>.

Against this framework, I address household surveys to extract usually neglected facts via an unusual analysis solely based on individual data. My goal, and novelty, is threefold. First, making use of standard consumer surveys as a long-running-large-scale experiment, I examine whether there emerge any robust stylized facts on agents' cognitive macroeconometrics. Otherwise stated, I canvass opinions on economy as a whole and on how people think the system-wide economic situation interacts with their own economic sphere. This aim is relatively complementary<sup>4</sup> to the question posed by Blinder and Krueger (2004) – “What does the public know about economic policy, and how does it know it?”. Second, I verify if survey responses are internally consistent. For instance, I check if agents know their own situation better than the system wide one, or the past better than the future. I interpret commonsense results as supporting the reliability of survey data in the sense that they faithfully express people's point of view. Third, seeking explanations for puzzling outcomes, I resort to cognitive economics. This latter emerged in the last decades<sup>5</sup> as the study of economic systems based on the cognitive capacities and processes of the participating social agents, their knowledge, beliefs, desires and intentions. In one of the milestone book for the cognitive approach, Hayek (1952) emphasized that the most relevant problem for economics is to explain how people produce subjective (internal) knowledge via objective (external) information. This process is fundamental, because agents act by using knowledge and not information. Thus, examining pervasive surveys of people in households in the light of cognitive economics appears only natural and paramount. However, I am aware of no work with this scope. Illusion of control, depressive realism, and the law of small numbers are among well known cognitive phenomena, pointed out by psycho-economists in laboratory/field tests, which can be usefully applied even in the present long-run macro context. And, the other way round, European surveys constitute an extraordinary experiment for psycho-economists to shed some lights on the black box transforming information into action.

Somewhat confirming previous findings on consumers inflation expectations (Souleles 2004; Forsells and Kenny, 2004; Carrol, 2001, 2003), the empirical analysis leads to conclude that people sometimes behave

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<sup>3</sup> According to Smith (1976), monetary incentives for respondents are essential in behavioral economics.

<sup>4</sup> Their paper is based on a *ad hoc* telephone survey and it is more politically targeted than mine.

<sup>5</sup> Psychology professor D. Kahneman was awarded the 2002 Nobel Prize in economic sciences.

according to Homo Economicus, sometimes not. Even more strikingly this dual outcome can be scientifically interpreted via cognitive psychology, according to which a human being consistently codes and interprets available information both rationally and emotionally. Kahneman and Tversky (1973, 1974, 1982) show that sophisticated as well as naïve respondents appear to follow certain principles that sometimes lead to reasonable answers and sometimes to severe and systematic errors. Cyert et al. (1956) found a similar dualism of behavior in analyzing managerial decisions.

Predictable results show that agents know i) their own situation better than the system wide one, and ii) the past better than the future. Also, iii) the sentiment accumulates towards the “long-term stationarity” of the economic stance. These commonsense behaviors support previous results on the inner coherence and reliability of survey data (Oppenlander and Poser, 1986; European Commission, 1997; Dominitz, 1998; Manski, 2004). The paradoxical outcomes refer to i) the presence of a long run bias in the “forecast” error, which is due to ii) people’s tendency to judge over-pessimistically and to iii) forecast over-optimistically. Lastly, closely mimicking the situation described by the aforementioned joke, iv) agents seem to believe that their own situation may systematically drift apart from the general one. Anticipating one of the proposed interpretations, illusion of control may help to explain why individuals show systematically dissociate expectations when referring to personal vs general economic conditions. Indeed, according to psychologists, illusory control is “an expectancy of a personal success probability inappropriately higher than the objective probability would warrant” (Langer 1975, p. 313). Thus, referring to the quotations at the beginning of the text, the same situation may be seen both as a statistical joke and as a serious psychological result. Occasionally, I will match statistics and psychology throughout this work, which is organized as follow. The next section deals with the data, section 3 focuses on the statistical analysis and the results. Section 4 offers some tentative interpretations of the most puzzling findings. Concluding remarks close the paper.

## 2 DATA

The data are drawn from the Business Surveys Unit of the European Commission<sup>6</sup>. They are based on monthly surveys carried out at a national level by public and private institutes in the framework of the Joint Harmonised European Union (EU) Programme of Business and Consumer Surveys<sup>7</sup> (European Commission, 1997). Logically, in order to achieve representativeness, the bigger member countries use a larger sample. The starting date is January 1985 for nine out of fifteen EU countries. Exemptions are Austria (starting date 1995:10), Finland (1987:11), Luxembourg (2002:01), Portugal (1986:06), Spain (1986:06), and Sweden (1995:10). The sample stops in July 2005 for all countries. Currently, almost 33,000 consumers are surveyed every month across the EU. Persons are usually selected by a random stratified sampling procedure or by simple random sampling. At the moment, the most widespread method is the telephone interview. Participants in the survey are asked the following questions, which are harmonized in all countries according to the EU guidelines:

Ex post questions:

Q1 How has the financial situation of your household changed over the last 12 months? It has ...

Q3 How do you think the general economic situation in the country has changed over the past 12 months? It has ...

- PP) got a lot better
- P) got a little better
- E) stayed the same
- M) got a little worse
- MM) got a lot worse
- N) don't know.

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<sup>6</sup> Available on demand at [http://europa.eu.int/comm/economy\\_finance/index\\_en.htm](http://europa.eu.int/comm/economy_finance/index_en.htm)

<sup>7</sup> Detailed information on the Joint Harmonised EU Programme of Business and Consumer Surveys can be found in European Commission (1997, 2004).

Ex ante questions:

Q2 How do you expect the financial position of your household to change over the next 12 months? It will ...

Q4 How do you expect the general economic situation in the country to develop over the next 12 months? It will ...

- PP) get a lot better
- P) get a little better
- E) stay the same
- M) get a little worse
- MM) get a lot worse
- N) don't know.

In fact, national surveys contain other ex ante and ex post questions about the labor market, spending intentions on major purchases (furniture, electrical/electronic devices, etc.), savings, etc. While each question has a potential information content, I focus only on the mentioned four queries. Hopefully, they should constitute a sufficient information set in the present context. The most common way of presenting consumers survey data is the balance, that is the difference between positive and negative percentages. Let PP, P, E, etc. denote the percentages respondents having chosen the corresponding option, so that  $PP+P+E+M+MM+N=100$ . Balances are calculated as

$$B = (PP + \frac{1}{2}P) - (\frac{1}{2}M + MM).$$

The index is then calculated as a simple average of individual indicators. Other countries follow other rules. In Japan, the aggregate index does not take into account pessimists (in that they have a zero weight); in the US, citizens can not take extreme positions (their response options are good, same, bad); in Canada, people are thought to be short-sighted (they are asked to judge/forecast over a semester only). While this calls for more research efforts and attention in comparing CSI across countries, I do not address aggregation/quantification issues, analyzing the single response options without

further manipulations<sup>8</sup>. The data set suffer from some modifications throughout the sample. Since 1995, for instance, Italy substituted on-the-spot interviews with the telephone method. In Germany, apart from the issues stemming from the re-unification of 1991, there have been some modifications in the order as well as in the wording of some questions. I was not been able to find data issues for other countries, but a first impression of them can be drawn by the graphs reported in Appendix 2 (e.g., for Portugal data from February 1997 to August 1997 are not available). Altogether it means that there are difficulties in the comparability of the data. Then, it is easily understood that the queries are remarkably vague<sup>9</sup> and, unlike usual behavioral experiments (because, obviously, the target is different), there are not incentives/disincentives related to a particular answer. Finally, persons are usually selected randomly, in that somewhat preventing the Smithies recommendation to perform analyses via re-interviews. On the positive side, the dataset constitutes a unique continuous long-running continental-scale harmonized “experiment”. Also, I analyze full-sample descriptive statistics with no attempt to aggregate/quantify survey data. All in all it should allow establishing the basic, structural, facts I am looking for in a very robust way.

### 3 STATISTICAL ANALYSIS AND RESULTS

The data described in the previous section can be examined and assessed along a number of dimensions. In the present setting, some quick and simple experiments based on reply options allow verifying some commonsense-predictable scores. For instance, do consumers know their own situation better than the system wide one? If this is the case, the average share of individuals answering “don’t know” to questions about the general environment should be greater than the average share of individuals which do not know how their own situation is going on. A similar trial can be performed by comparing corresponding ex ante vs ex post replies in order to see whether consumers feel, as expected, more uncertain about the future. Thus, the simple comparison

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<sup>8</sup> Usually CSI are subject to seasonal adjustments, as well. Needless to say, this increases the number of assumptions on which the overall index is based. The proposed framework allows sidestepping even this potential problem.

<sup>9</sup> An anecdote may help to clarify this issue. In answering to journalists’ questions on Italian economic slowdown, Mr. Berlusconi (Italian Prime Minister) stated the following: “I have never met the GDP”.

between usually neglected information can confirm/negate interesting behavioral conjectures.

**Tab. 1. Consumers' uncertainty on Personal vs General and Past vs Future economic conditions**

| Countries   | Personal  |             | General   |             |
|-------------|-----------|-------------|-----------|-------------|
|             | (Q1) Past | (Q2) Future | (Q3) Past | (Q4) Future |
| AUSTRIA     | 0.98      | 2.97        | 2.43      | 4.04        |
| BELGIUM     | 2.96      | 6.69        | 6.05      | 10.8        |
| GERMANY     | 1.36      | 4.73        | 2.32      | 5.58        |
| DENMARK     | 0.66      | 3.70        | 7.11      | 8.85        |
| GREECE      | 0.16      | 4.46        | 1.95      | 7.68        |
| SPAIN       | 1.09      | 9.68        | 5.37      | 14.8        |
| FINLAND     | 0.60      | 3.59        | 3.34      | 4.89        |
| FRANCE      | 0.48      | 4.23        | 1.66      | 8.76        |
| IRELAND     | 0.94      | 4.88        | 1.97      | 6.97        |
| ITALY       | 0.50      | 4.68        | 1.95      | 6.32        |
| LUXEMBOURG  | 1.16      | 3.46        | 4.67      | 5.59        |
| NETHERLANDS | 1.08      | 4.50        | 7.00      | 11.0        |
| SWEDEN      | 0.77      | 2.21        | 5.49      | 4.77        |
| PORTUGAL    | 1.33      | 11.2        | 5.47      | 15.7        |
| UK          | 1.57      | 5.93        | 4.62      | 9.84        |
| EU11        | 1.02      | 5.08        | 3.93      | 8.58        |

EU11=Belgium, Germany, Denmark, Greece, Spain, Finland, France, Ireland, Italy, Netherlands, UK (sample 87:11-05:07)

Full sample average of responses "don't know" (in % of total) to the questions:

Q1=How has the financial situation of your household changed over the last 12 months?

Q2=How do you expect the financial position of your household to change over the next 12 months?

Q3=How do you think the general economic situation in the country has changed over the past 12 months?

Q4=How do you expect the general economic situation in the country to develop over the next 12 months?

The picture emerging from table 1 is plain. Europeans do report a greater uncertainty in addressing both system wide conditions, as opposed to familiar ones, and future developments as opposed to past situations. Another intriguing experiment deals with the "E" answer. Since the queries are about "developments/changes", individuals should respond, on average, "the same" the most part of times (Theil, 1961), because it is hard to think to ever improving/worsening economic conditions (whatever it means for common people<sup>10</sup>) over many years. In addition, the preference of being "E" may be partly due to the fact that this "neutral" option may be chosen by uninformed and/or uninterested respondents. In appendix 1, I report the empirical

<sup>10</sup> To the extent i) GDP growth coincides with people's view of "development in economic condition", and ii) GDP growth follows a stationary process agents should, on average, accumulate towards the "stationary" item of the questionnaire. It is worth noticing that the average GDP (Consumption) growth has been positive for each and every country during the years under scrutiny (the same holds in per capita terms), whereas Europeans seem to be more pessimists than optimists.

distributions of the full sample means of the six response options. The visual impact of the histograms is self-evident - individuals reply, on average, “the same” the most part of times. It is worth recalling that in the European weighting scheme, both “N” and “E” respondents do not affect the overall CSI.

All the tests performed so far may be thought of as supporting the reliability of the survey “overall experiment”, at least in order to point out some non contingent attributes of human behavior. In fact, the proposed distributions shed some lights on other interesting long run features of consumers’ replies. The number of agents responding “the same” when elicited about personal as opposed to general economic developments is much higher. Perceptions about the personal context show a unimodal distribution in E, with a very high percentage of E. On the contrary, beliefs on the general environment display ten (out of thirty) M-peaks with an almost halved E. This calls for ad hoc experiments to contrast general vs personal and ex-ante vs ex-post response options. One simple way to address the former issue is computing mean values of (Q1+Q2)-(Q3+Q4) for each single item (leaving aside the already studied E and N). The term (Q1+Q2) refers to the two personal queries, the second to the pair of general questions (see section 2). Thus, negative (positive) values in columns “MM” and “M” (“PP” and “P”) of table 2 imply that the personal

**Tab. 2 Comparing Personal vs General Sentiment in fifteen European Countries**

| Countries   | PP          | P            | M     | MM    |
|-------------|-------------|--------------|-------|-------|
| AUSTRIA     | 1.0         | <b>-19.0</b> | -25.0 | -8.1  |
| BELGIUM     | 1.0         | <b>-8.9</b>  | -26.0 | -19.0 |
| GERMANY     | 0.6         | <b>-5.6</b>  | -23.0 | -12.0 |
| DENMARK     | 10.0        | <b>-1.0</b>  | -17.0 | -3.4  |
| GREECE      | <b>-0.7</b> | <b>-6.2</b>  | -5.3  | -5.5  |
| SPAIN       | <b>-0.3</b> | <b>-9.6</b>  | -16.0 | -9.3  |
| FINLAND     | 3.8         | <b>-19.0</b> | -14.0 | -3.9  |
| FRANCE      | 2.2         | 1.5          | -31.0 | -23.0 |
| IRELAND     | <b>-3.8</b> | <b>-16.0</b> | -10.0 | -13.0 |
| ITALY       | <b>-1.8</b> | <b>-15.0</b> | -22.0 | -26.0 |
| LUXEMBOURG  | 2.8         | 1.7          | -50.0 | -8.0  |
| NETHERLANDS | 5.1         | <b>-12.0</b> | -15.0 | -9.9  |
| SWEDEN      | -0.4        | <b>-4.6</b>  | -22.0 | -8.0  |
| PORTUGAL    | 6.6         | <b>-11.0</b> | -21.0 | -2.9  |
| UK          | 5.3         | <b>-2.7</b>  | -14.0 | -14.0 |
| EU11        | 2.1         | <b>-8.1</b>  | -18.6 | -12.7 |

EU11=Belgium, Germany, Denmark, Greece, Spain, Finland, France, Ireland, Italy, Netherlands, UK (sample 87:11-05:07).

Country-rows report mean values of (iQ1+iQ2)-(iQ3+iQ4) where i=PP,P,M,MM. PP=a lot better; P=a little better; M=a little worse; MM=a lot worse. Q1-Q4 see under table 1. *E.g.*, when i=MM, iQ1= % of agents responding “my financial situation changed a lot worse over the last 12 months”. Clearly, negative (positive) values in columns “MM” and “M” (“PP” and “P”) mean that the personal condition (Q1,Q2) is perceived to be systematically better than the general one (Q3,Q4). Bold values show the opposite.

condition is perceived to be systematically better than the general one. Table 2 collects the results, where bold values highlight a personal condition perceived to be worse than the general one. Since such values amount to a low 28% (seventeen out of sixty experiments), there is a strong clue that agents' sentiment about their own economic condition is consistently better than the general one. Moreover, as already noticed, the response option "the same" shows a much lower share in queries eliciting general economic conditions. As a consequence, in passing from Q1,Q2 to Q3,Q4 questions, some "E" individual responds differently. Table 2 leads to conclude that most part of them becomes pessimist. By the comparison between the figures in column M and in column P it results that pessimists are more numerous than optimists in twelve out of fifteen experiments. All in all, bold values are a small minority and have smaller values than the others. It turns out that the personal condition is considered to be systematically better than the general one.

Alike, table 3 gathers mean values of  $(Q1+Q3)-(Q2+Q4)$  for each single response option (again excluding E and N). The first term,  $(Q1+Q3)$ , refers to the ex-post queries, the second to the ex-ante questions. In this case, positive (negative) values in columns "MM" and "M" ("PP" and "P") imply that judgments  $(Q1,Q3)$  are systematically worse than forecasts  $(Q2,Q4)$ .

**Tab. 3 Comparing Judgments vs Forecasts in fifteen European Countries**

| Countries   | PP         | P          | M           | MM   |
|-------------|------------|------------|-------------|------|
| AUSTRIA     | -0.8       | -13.0      | 14.0        | 12.0 |
| BELGIUM     | <b>0.1</b> | -7.4       | 14.0        | 11.0 |
| GERMANY     | <b>1.2</b> | <b>1.0</b> | 12.0        | 9.4  |
| DENMARK     | <b>1.3</b> | -3.0       | 3.8         | 3.6  |
| GREECE      | -0.9       | -12.0      | 27.0        | 5.8  |
| SPAIN       | <b>0.8</b> | -7.9       | 16.0        | 8.6  |
| FINLAND     | <b>0.8</b> | -8.1       | 6.1         | 7.3  |
| FRANCE      | -0.8       | -11.0      | 12.0        | 15.0 |
| IRELAND     | <b>3.7</b> | -2.3       | 13.0        | 14.0 |
| ITALY       | -0.9       | -15.0      | 23.0        | 17.0 |
| LUXEMBOURG  | -0.3       | -15.0      | 18.0        | 4.2  |
| NETHERLANDS | <b>5.6</b> | -1.5       | <b>-0.6</b> | 10.0 |
| SWEDEN      | <b>0.3</b> | -5.0       | 12.0        | 4.9  |
| PORTUGAL    | <b>0.7</b> | -9.0       | 5.9         | 5.2  |
| UK          | <b>0.6</b> | -9.9       | 12.0        | 15.0 |
| EU11        | <b>1.0</b> | -7.2       | 12.7        | 10.2 |

EU11=Belgium, Germany, Denmark, Greece, Spain, Finland, France, Ireland, Italy, Netherlands, UK (sample 87:11-05:07).

Country-rows report mean values of  $(iQ1+iQ3)-(iQ2+iQ4)$ . PP, P, M, MM and Q1-Q4 see under table 1. When  $i=MM$ ,  $iQ1=$  % of agents responding "my financial situation changed a lot worse over the last 12 months". Clearly, positive (negative) values in the columns "MM" and "M" ("PP" and "P") mean that judgments  $(Q1,Q3)$  are systematically worse than forecasts  $(Q2,Q4)$ . Bold values show the opposite.

The picture arising from table 3 suggests that, when consulted about the economy, people's judgments are worse than people's forecasts even considering hundreds of tests performed across several countries. The detected difference between ex ante and ex post perceptions recommends refining the experiment. As a matter of fact, according to one of the basic axiom of the standard neoclassical models, agents should not consistently repeat the same mistakes. In the present framework, it may be addressed by looking at the gap between "contemporaneous" ex ante and ex post responses, to which I refer as the "forecast error". An example may help to clear the matter. Let the share of individuals forecasting that the system wide economic situation will be "a little worse" in the next year be, according to the survey performed in January 2000, 35%. After a year, interviewed are asked to say how the general economic situation in the country has changed over the past 12 months. If people's forecasts in January 2000 were corrected, then the share of individuals judging that the economic situation has got "a little worse" should be 35%. It is noteworthy that, in this setting, there is no need for agents to correctly address what a "general economic situation" really is. In fact, I just compare answers given to the same question. With the potential exemption of "don't know", which is a "non" response<sup>11</sup> (i.e. it is not the outcome of an explicit elaboration but, rather, a declaration of no information), the equivalence should hold for each and every possible ex ante vs ex post same-period-referring pairs. Needless to say the bias should be zero only on average, allowing for short-living forecast errors (this is why it is usually called the "long-run bias"), perhaps partly due to the different individuals interviewed, too. In appendix 2, I plot the forecast errors and I report some descriptive statistics. Forecast errors sustain the previous conclusion. People show an evident asymmetry towards the future, keeping on thinking that things, as compared to what they themselves think it is happened, will improve. E-agents turn out to be the most "rational" (or, better, the less emotional) – the values of their forecast errors are the lowest. Anyway, as mentioned, this ex-ante-ex-post coherence could be partly due to the appealing of keeping neutral. Clearly, psychological neutrality is different from analytical rationality. Then, reflecting agents' difficulties in addressing more complex tasks (Thaler, 1999), opinions about the system wide situation should show a greater volatility. In order to save space I do not report single item standard errors<sup>12</sup>, although an indirect clue may be found by looking at the standard errors of personal vs general forecasts errors (Appendix 2).

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<sup>11</sup> On that, European Commission Users' Manual (1997, p. 18) claims that: "(...) there are six reply options: five "real" ones and a "do not know" option."

<sup>12</sup> Available on request from author. They support agents' difficulties in addressing complex tasks.

Somewhat confirming earlier findings on consumers inflation expectations (Souleles 2004; Forsells and Kenny, 2004; Carrol, 2001, 2003), the picture emerging from the proposed empirical analysis leads to conclude that people behave sometimes as expected, sometimes not. Among predictable behaviors it results that, over time, across countries, and for the most part of the response options:

1. agents think to know their own situation better than the system wide one, and the past better than the future;
2. opinions about the system wide situation show a greater volatility as compared to personal situation replies;
3. responses accumulate towards a “long-run stationarity” of the economic stance.

Side by side with these conventional scores, somewhat supporting the reliability of survey experiments, some paradoxical outcomes emerge as well. They refer to:

1. people’s tendency to judge over-pessimistically and/or to forecast over-optimistically.

The ambiguity arises because of the lack of a “hard” benchmark (e.g., GDP, Consumption, etc.). However, as suggested in the next section, there are strong reasons to believe that people systematically both judge over-pessimistically and forecast over-optimistically. Anyway, it implies that:

1. people’s forecasts show a long run bias. Last, but not least:
2. people think that their own situation can be systematically different from the general one.

To sum up the puzzling results, it seems that there is a mantra echoing across Europe. It sounds like the following:

**AS USUAL, IT HAS GOT WORSE THAN I EXPECTED. ESPECIALLY FOR THE OTHERS.**

**NEVERTHELESS, I THINK THAT IT WILL GET BETTER. ESPECIALLY FOR ME.**

## 4 EXPLAINING THE PARADOXES

Human beings deviate in one way or another from the standard assumptions of the rationalistic paradigm in economics (among others, see Hayek, 1952; Simon, 1991). If such deviations from rationality were small and purely idiosyncratic, they would on average cancel out, and standard economic theory would not be too wide off the mark when predicting outcomes for large aggregates of agents. In economics, rationality means that decision-makers use available information in a coherent and systematic way. In cognitive psychology, a human being is commonly regarded as a system, which codes and interprets available information in a conscious and rational way. But other, less conscious, factors are also assumed to govern human behavior in an equally consistent way. Furthermore, unlike textbook economics, cognitive science addresses the rationality not as an axiom, but as an element of the analysis. Analyzing beliefs involves some description of how people learn, update, and model the world in which they live in (North, 2000). Just to mention another long-running macro “experiment” it is hard to explain, within the mainstream neoclassical framework, why millions of people keep on gambling at manifestly unfair lotteries, suffering systematic losses. A leading statistician, Bruno De Finetti, nearly one century ago referred to Lotto as “a tax on fools”. While it is analytically true, especially as for “expert” gamblers, a psychological approach could assess the case. We may think of Lotto as a dream factory just like the Cinema is. Excluding pathological behaviors, in both cases people pay to buy a dream, a temporary escape from the reality (if I win I could...). In both cases there is no need, and/or is misleading, to compute impersonal mathematical expectations<sup>13</sup>. It is this more complex view that can fruitfully support an interpretation of the basic facts pointed out in the previous section. On that, it is paramount to recall that the European surveys suggest that people are not able to compute non-zero-mean forecast errors even when dealing with personal conditions. Thus, it is not only a problem of the amount and quality of available information and/or the difficulty of the exercise - there is something else preventing “rational” results. The key importance of taking advantage of the deeper and wider concept of rationality held by psychologists, can be drawn from the outcomes showing that the information-elaboration-action process is sometimes rationally predictable, sometimes not (on the dualism of behavior, see Cyert et al., 1956; Kahneman and Tversky, 1973, 1974, 1982). To sum up,

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<sup>13</sup> Working with consumer survey data, Bovi (2005) tests the emotional content of different kind of goods.

while it is hard to find heterodox suggestions from an orthodox point of view, it seems more productive to resort to alternative views.

Some general findings in cognitive psychology are validly exploitable to address the over-pessimism in judgments and the over-optimism in people's forecasts (Kahneman and Tversky, 1973, 1974, 1982). Psychologists suggest that, compared to unfamiliar information, familiar information is more easily accessible from memory and is believed to be more real or relevant. Therefore, mere repetition of certain information in the media, regardless of its accuracy, makes it more easily available and therefore falsely perceived as more accurate. The explanation is completed by noticing that, according to Doms and Morin (2004), the media tend to overweight bad economic news<sup>14</sup>. In fact, that is just the very basic nature of the news media. So, there are reasons inducing individuals toward dispositional pessimism. Can psychology accomplish people's tendency to forecast over-optimistically, as well? Again, my answer is yes. According to the psychological law of small numbers, as opposed to the statistical law of large numbers, people believe that the mean value from a small sample also has a distribution concentrated at the expected value of the random variable. This leads to a bias due to "overinference" from (too) short sequences of observations. In an overview of behavioral finance, Shleifer (2000) argues that the law of small numbers may explain the excess sensitivity of stock prices (Shiller, 1981) as a result of investors' overreacting to short strings of good news. Likewise, as suggested by Shiller (2000), another aspect of overconfidence (irrational exuberance, in the famous Mr. Greenspan's 1996 speech) is that people tend to make forecasts in uncertain situations by looking for familiar patterns and assuming that future favorable patterns will resemble past ones, often without sufficient consideration of the reasons for the pattern or the probability of the pattern repeating itself. When forecasting national lottery numbers, individuals seem to follow the opposite approach. They tend to bet on "hot" numbers (i.e. numbers that have been coming up a lot lately), in that assuming that future patterns will not resemble past ones. Human beings are really bizarre from an econometric point of view. Finally, we may resort to the so called hindsight bias (Shiller, 2000). Suppose there is an unexpected event. People tend to concoct explanations for it after the fact, which makes them appear more predictable, and less random, than it is. Our minds are designed to retain, for efficient storage, past information that fits into a compressed narrative. This distortion prevents agents from adequately learning from the past. The point I want to stress is that these departures from

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<sup>14</sup> Doms and Morin (2004) find that news affect consumers' sentiment about general situations more deeply than that on personal conditions. The approach of this paper may help in explaining their result.

mathematical/rational expectations may help in understanding the presence of the long run bias.

Let us now turn the attention to the other stylized fact emphasized in the previous section. Why people believe that their own situation can be consistently better than the general one? To answer, the phenomenon of the illusion of control is validly exploitable (DeBondt and Thaler, 1995). It belongs to the more general class of egocentric biases, among overconfidence and unrealistic optimism (Msetfi *et al.*, 2006 for a survey). It is magnified by skill-related factors, in the present case the greater familiarity with the personal situation, and it is defined as “an expectancy of a personal success probability inappropriately higher than the objective probability would warrant” (Langer 1975, p. 313). Closely related to the illusion to control, there is the theory of depressive realism. In a seminal paper, Alloy and Abramson (1979) found that non-depressed people are more likely than depressed people to think that outcomes are contingent on their actions when they are not. They concluded that as opposed to depressed people, whose perceptions are apparently accurate, common people distort reality in an optimistic fashion. One interpretation of depressive realism is that non-depressed people possess a positive bias, which allows them to feel in control of their environment. Since, hopefully, the representative European is non-depressed, evidence supports agents’ tendency to think that it is systematically less likely that they themselves will suffer an adverse event than the average agent.

## 5 CONCLUSION

Everyday practice presents survey data on consumer sentiment by means of a single measure. Alike, mainstream literature analyzes summary information from the surveys, usually in the form of confidence indexes. While it is easy to understand the factual need to report easily accessible indicators, aggregation/quantification procedures necessarily imply loss of information (not mentioning the issues/assumptions they involve). On the other hand, every clue on consumers' perceptions may be important for policy makers and economists in order to understand their behavior. Since long-running-large-scale disaggregated data on people's sentiment are available, it is hard to rationalize why so few works take advantage of them. While agents may act differently from what they say, the message contained in surveys of people in households can be validly and usefully decoded to infer intriguing aspects of consumers' way of thinking.

Using data from the above mentioned kind of surveys, this paper has presented brand new empirical evidence on how, and how accurately, people assess economic systems. Another contribution is the analysis of traditional qualitative survey data via cognitive economics. Results from individual response options suggest that survey respondents reply, on average, as expected. Agents think to know their own situation better than the system wide one, and the past better than the future. Also, perceptions accumulate towards the "stationarity" of the economic stance. Confirming Manski (2004), these commonsense outcomes support the hypothesis that survey data give a faithful representation of people's opinions. This is not the only story told by the surveys. Paradoxical outcomes emerge too. Data show people's tendency to judge over-pessimistically and/or to forecast over-optimistically and, hence, a persistent non-zero "forecast" error. Finally, individuals seem to believe that their own situation may consistently drift apart from the general one. These puzzling results are in sharp contrast with the standard maintained hypothesis of a world populated by calculating and unemotional maximizers. This paper argued that this does not necessarily hamper the reliability of the information content of surveys of people in households. Whether psychologists are right in thinking that the information-elaboration-action process may be systematically different from what economists assume, then economically astonishing but psychologically explainable outcomes may enforce rather than weaken the coherence of the picture. As a matter of fact, there are well-known cognitive phenomena explaining the macroeconometric paradoxes. Just to mention, illusion of control suggests that agents' responses on future economic

developments should be seen as illusions and not as forecasts. Moreover, data suggest that these illusions prevent the emergence of unbiased forecast errors even in the long-run or when dealing with familiar conditions. Thus, everyday practice could find useful to address the CSI weighting scheme even from a psychological point of view. As for the theory, the last word must be spent for statistics and psychology. Whereas the former teaches us that we must not infer causes from correlations, the latter may help us not to infer (rational) forecasts from illusions.



## APPENDIX 1

### **The Distribution of Europeans' Responses On Economic Conditions**

Sample 1985:01–2005:07 for all countries but for Austria (starting date 1995:10), Finland (1987:11), Luxembourg (2002:01), Portugal (1986:06), Spain (1986:06), and Sweden (1995:10).

Q1=How has the financial situation of your household changed over the last 12 months? It has ...

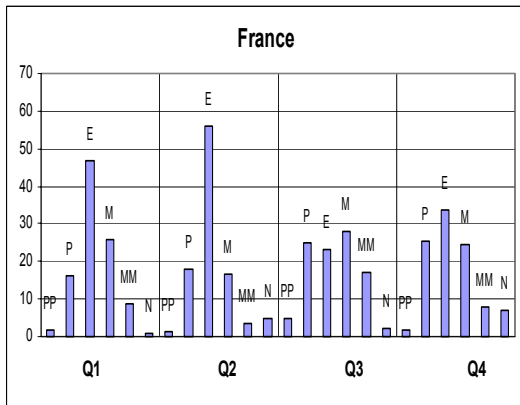
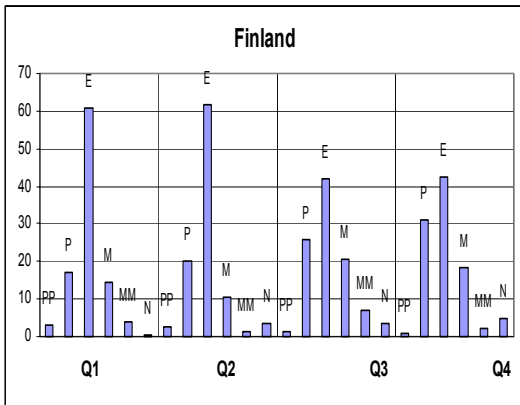
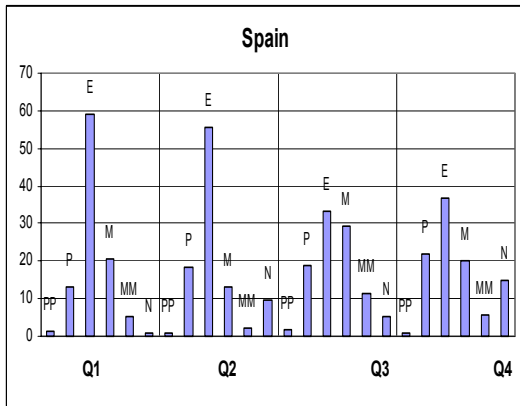
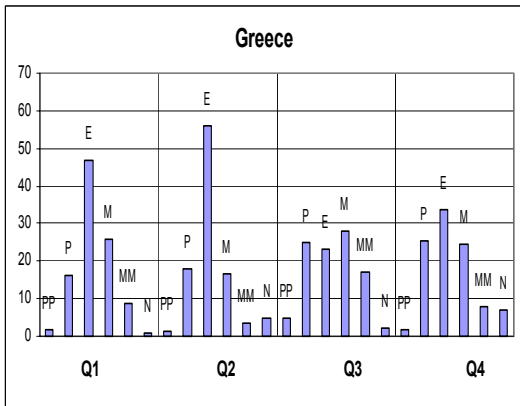
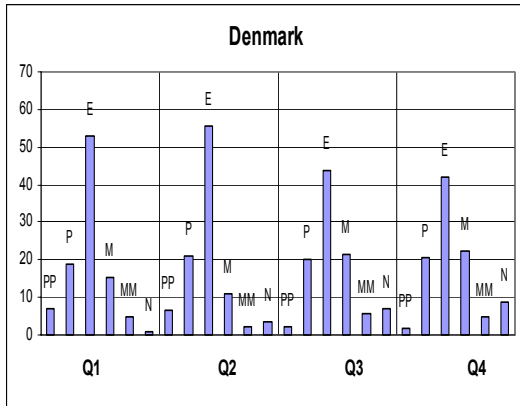
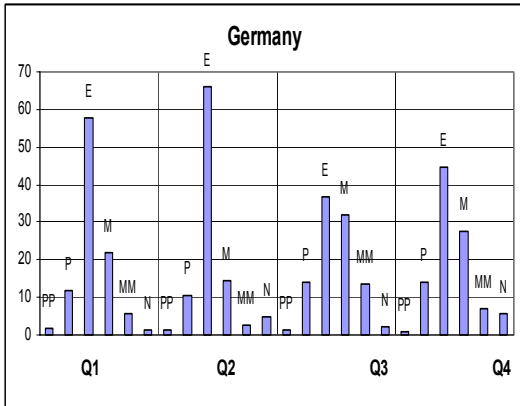
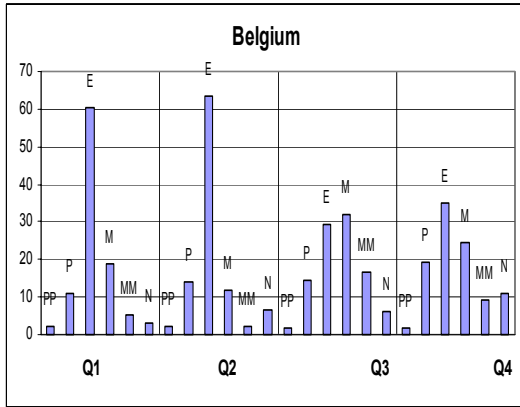
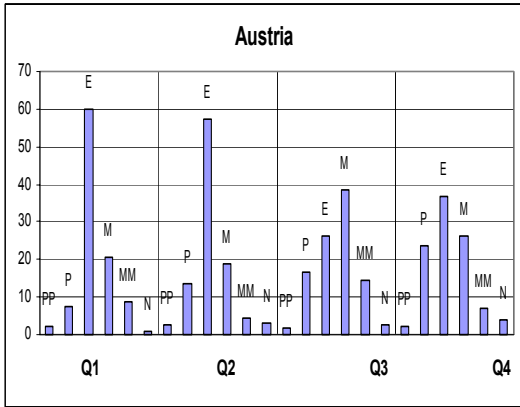
Q2 How do you expect the financial position of your household to change over the next 12 months? It will ...

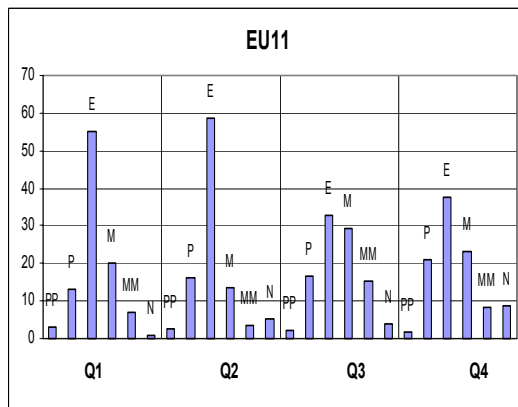
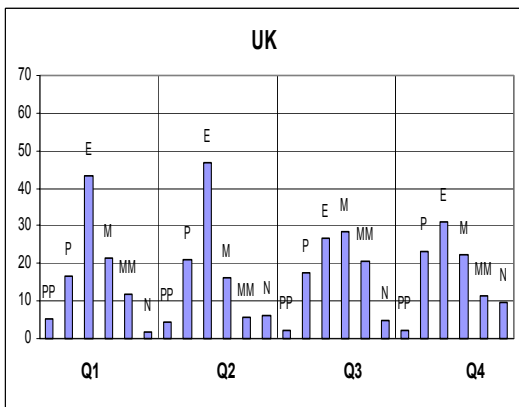
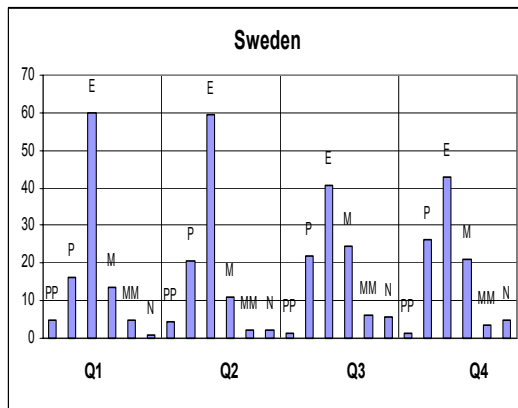
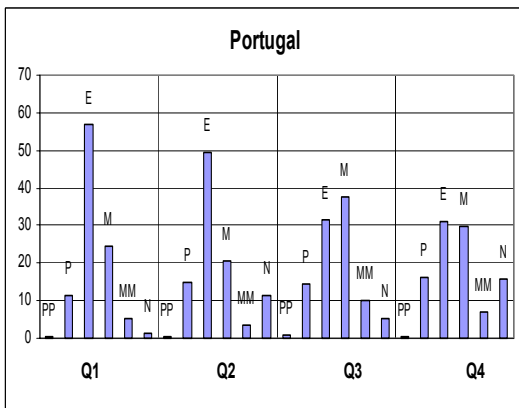
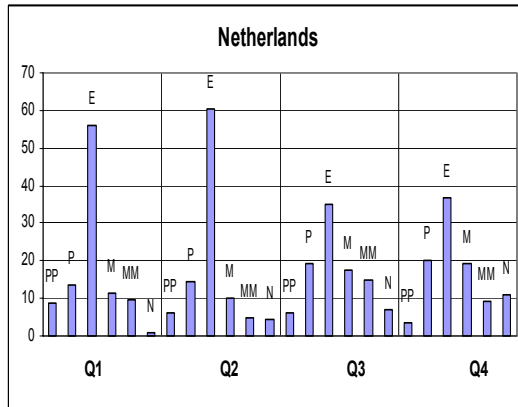
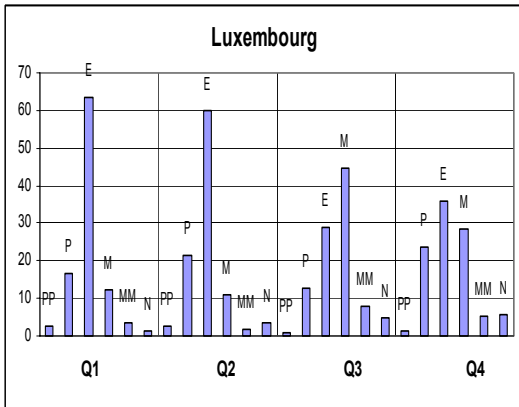
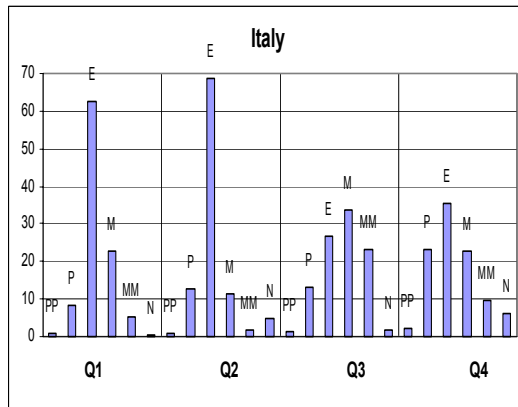
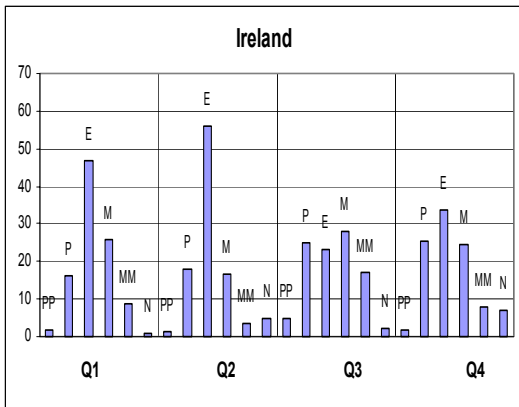
Q3=How do you think the general economic situation in the country has changed over the past 12 months? It has ...

Q4 How do you expect the general economic situation in the country to develop over the next 12 months? It will ...

PP=got/get a lot better; P=got/get a little better; E=stayed/stay the same; M=got/get a little worse; MM=got/get a lot worse; N=don't know.

Histograms report full (individual) sample means of each item.







## APPENDIX 2

### Europeans' Forecasts Errors

Graphs plot the “forecast error” computed as

$$100*[Q1\_i-Q2\_i(-12)]/[Q1\_i+Q2\_i(-12)]$$

and

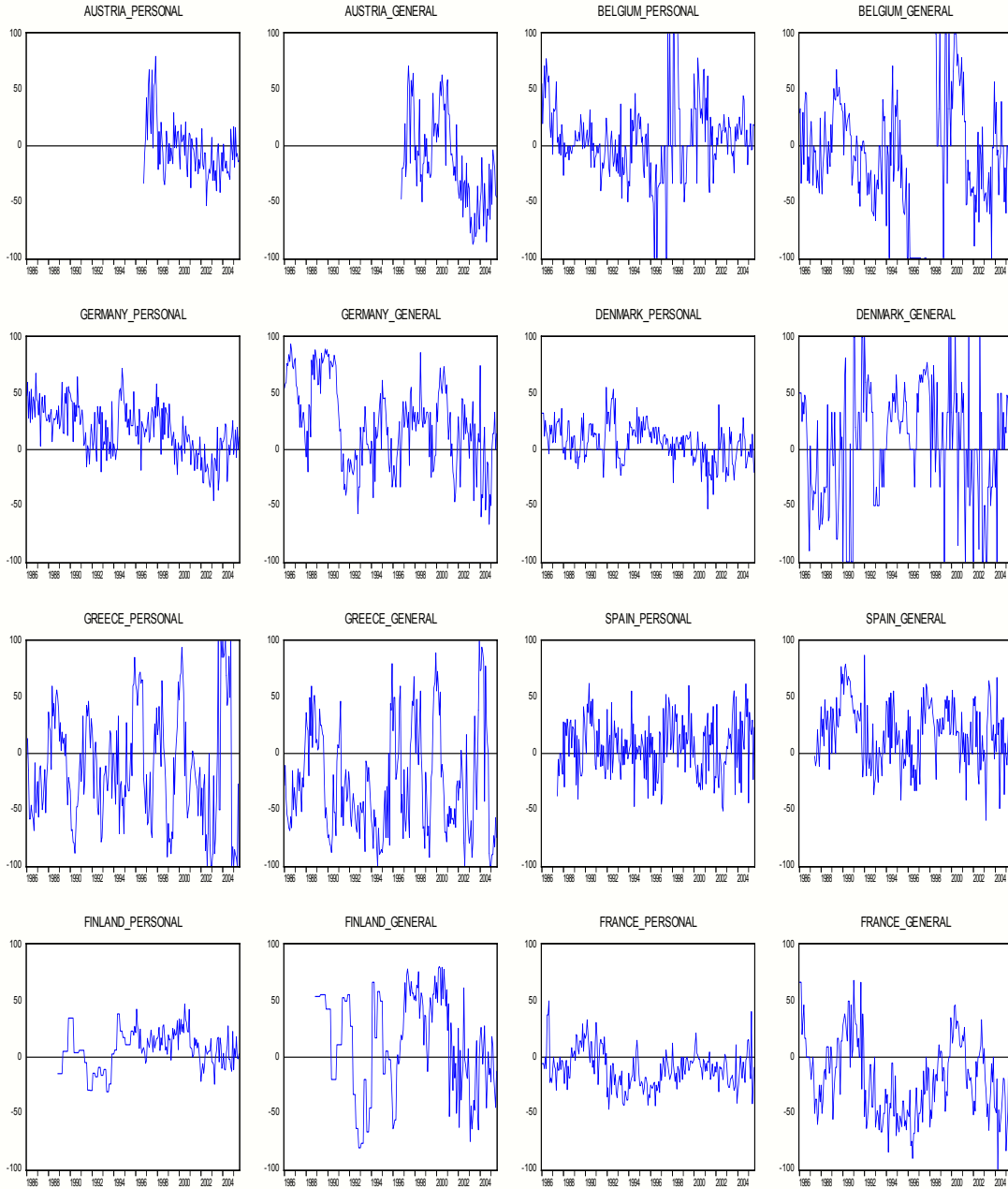
$$100*[Q3\_i-Q4\_i(-12)]/[Q3\_i+Q4\_i(-12)]$$

where

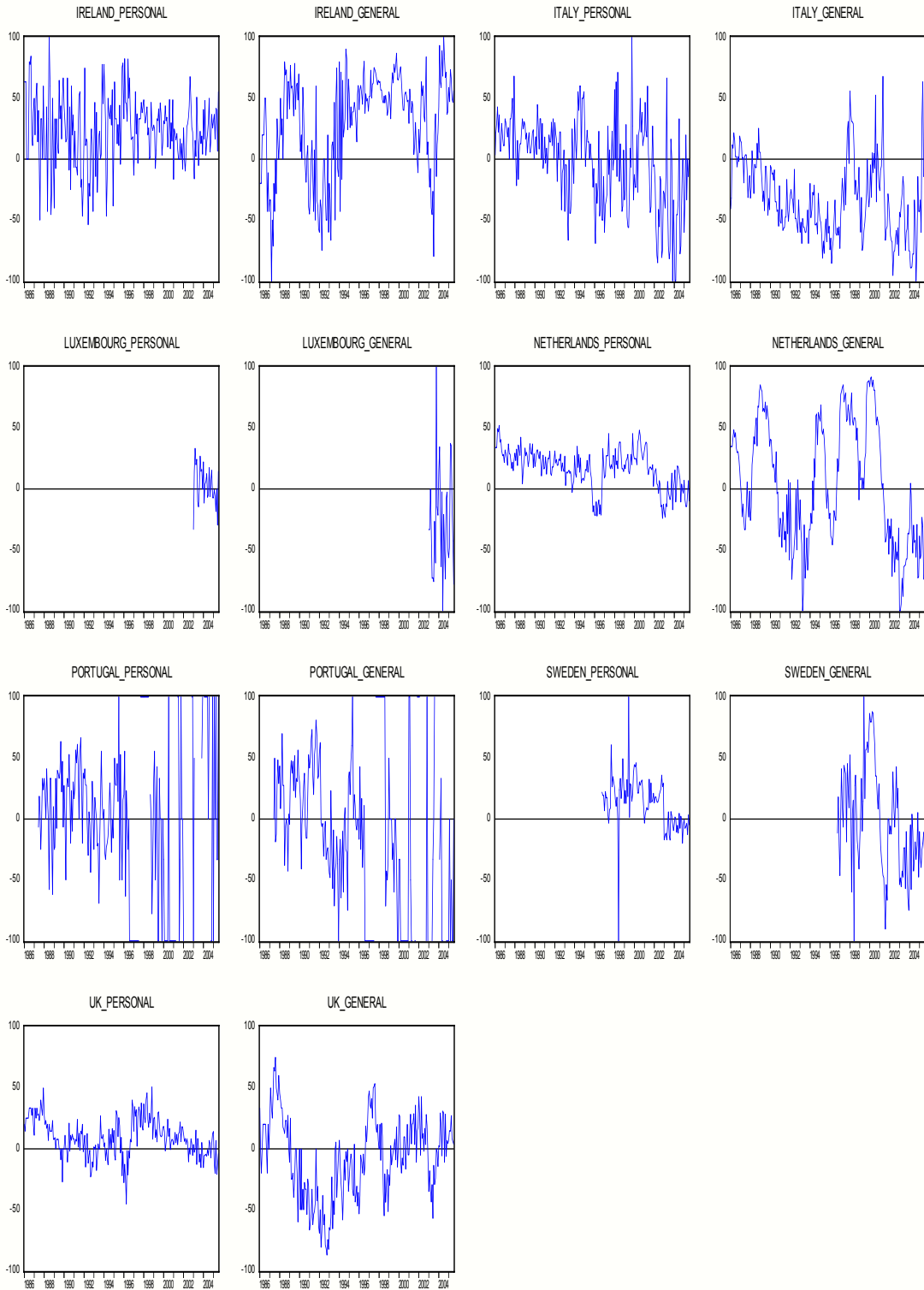
$$i=PP, P, E, M, MM$$

The headers (PP, P, etc.) refer to the six possible responses. Other details in Appendix 1. The statistics reported at the end of each page follow the order of graphs. Thus, e.g., the second column refer to Austria\_Personal, the last to France\_General. The last row (% in  $\pm 5\%$  band) report the number of values (as % of total) within the  $\pm 5$  band, i.e. the share of months with (quasi) no bias. The forecast error of a perfectly rational agent is mean=0;  $\pm 5$  band=100.

# PP

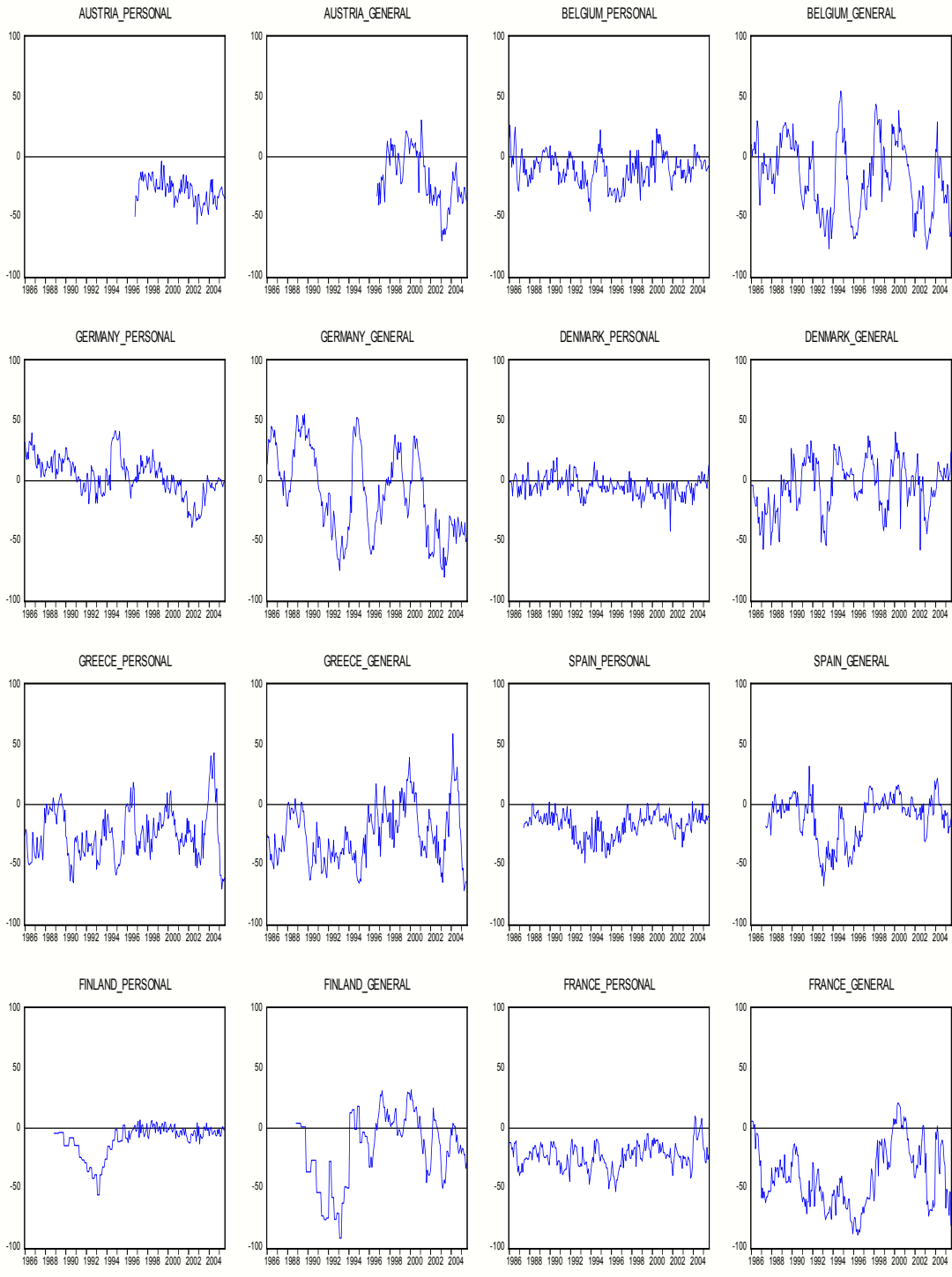


|                     |      |       |      |       |      |      |      |      |       |       |      |      |      |      |      |       |
|---------------------|------|-------|------|-------|------|------|------|------|-------|-------|------|------|------|------|------|-------|
| Mean                | -3.1 | -15.1 | 4.5  | -10.1 | 17.0 | 22.1 | 6.1  | 4.2  | -12.3 | -25.2 | 6.2  | 17.4 | 6.4  | 11.9 | -9.8 | -19.3 |
| Std. Dev.           | 24.1 | 39.8  | 32.1 | 49.0  | 22.3 | 37.5 | 16.8 | 50.3 | 49.8  | 47.8  | 24.7 | 28.2 | 17.0 | 43.8 | 16.9 | 34.7  |
| J-B Prob.           | 0.00 | 0.17  | 0.00 | 0.73  | 0.42 | 0.06 | 0.26 | 0.05 | 0.02  | 0.00  | 0.24 | 0.47 | 0.41 | 0.00 | 0.00 | 0.06  |
| % in $\pm 5\%$ band | 14.2 | 4.0   | 25.1 | 16.6  | 14.0 | 6.8  | 17.9 | 21.3 | 7.7   | 6.4   | 15.1 | 12.8 | 17.9 | 4.5  | 20.0 | 8.9   |

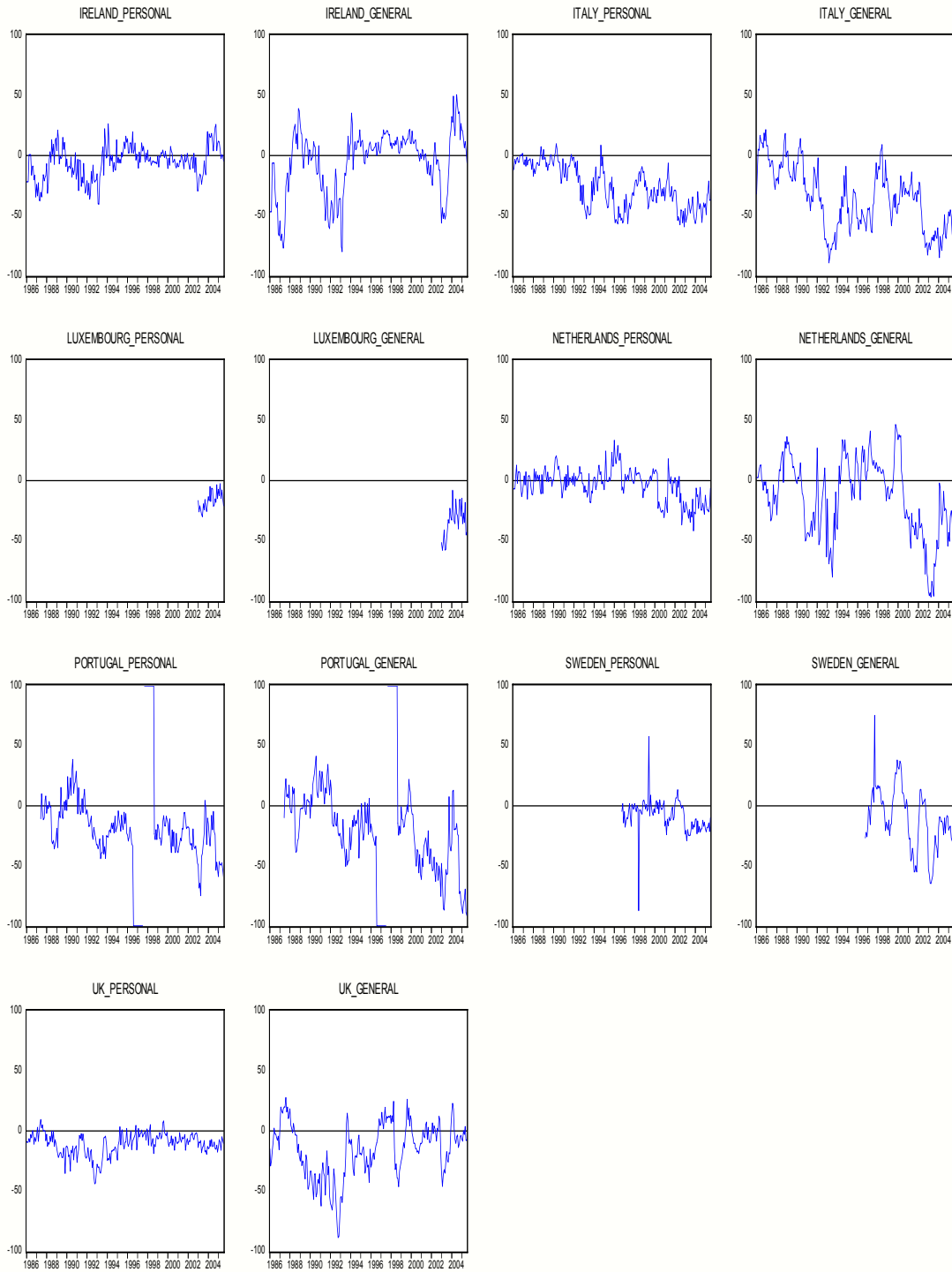


|                     |      |      |      |       |      |       |      |      |      |      |      |      |      |      |
|---------------------|------|------|------|-------|------|-------|------|------|------|------|------|------|------|------|
| Mean                | 23.6 | 28.3 | -1.7 | -32.2 | 2.9  | -27.5 | 16.8 | 4.0  | 2.1  | 9.2  | 12.8 | -1.4 | 9.0  | -7.3 |
| Std. Dev.           | 28.1 | 40.9 | 35.5 | 31.2  | 16.1 | 42.6  | 16.0 | 49.6 | 63.6 | 9.3  | 21.6 | 42.6 | 15.5 | 33.2 |
| J-B Prob.           | 0.31 | 0.00 | 0.02 | 0.00  | 0.77 | 0.10  | 0.00 | 0.00 | 0.03 | 0.67 | 0.00 | 0.40 | 0.76 | 0.18 |
| % in $\pm 5\%$ band | 11.1 | 5.5  | 13.6 | 7.7   | 19.4 | 9.7   | 8.5  | 6.4  | 18.3 | 17.9 | 17.9 | 5.7  | 23.4 | 14.9 |

P

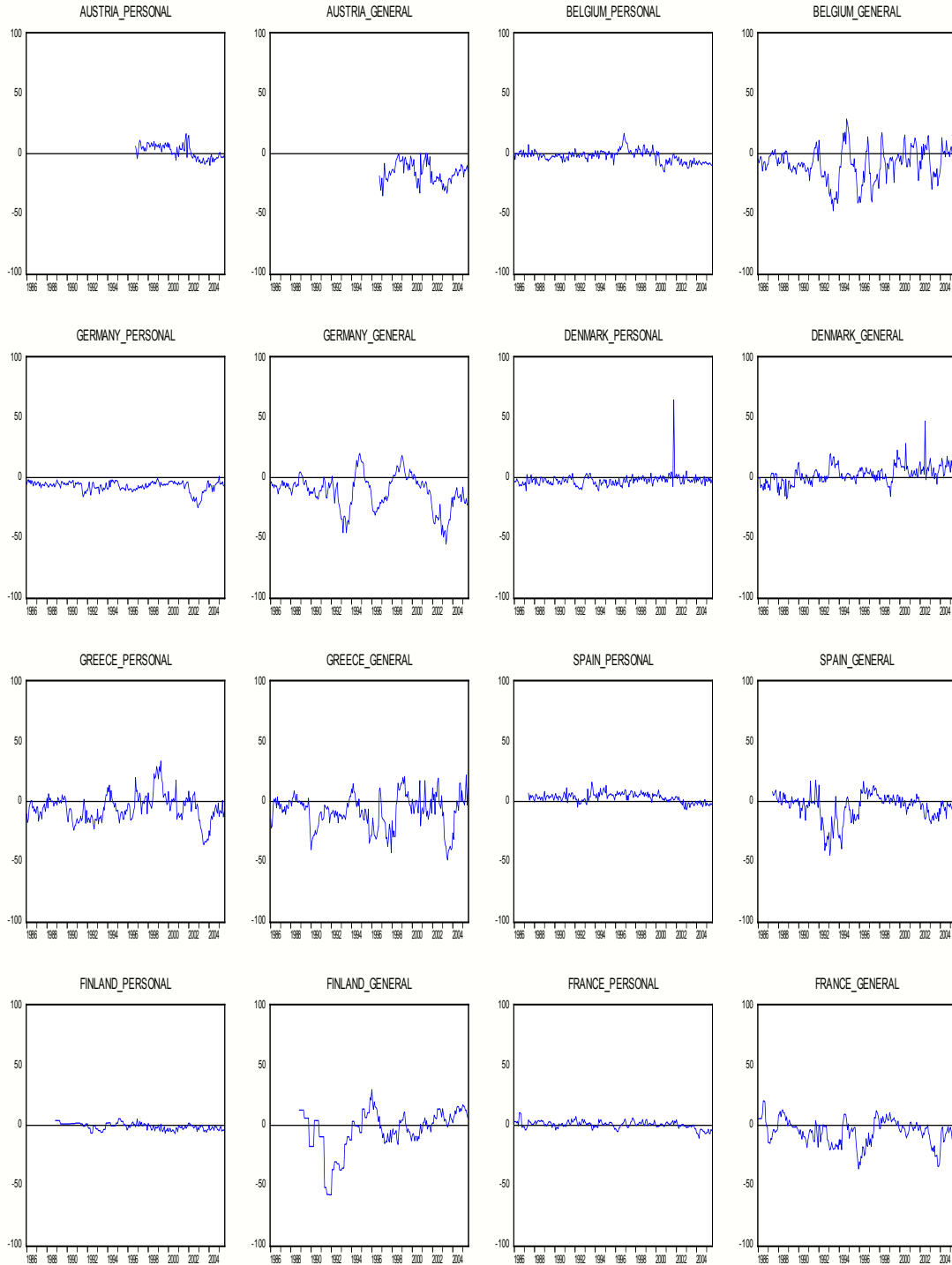


|                   |       |       |       |       |      |       |      |      |       |       |       |       |      |       |       |       |
|-------------------|-------|-------|-------|-------|------|-------|------|------|-------|-------|-------|-------|------|-------|-------|-------|
| Mean              | -28.4 | -17.9 | -10.0 | -16.4 | 3.8  | -10.4 | -4.6 | -4.4 | -24.7 | -24.6 | -17.3 | -10.9 | -9.7 | -16.7 | -23.1 | -39.9 |
| Std. Dev.         | 9.9   | 23.0  | 13.2  | 30.4  | 16.1 | 36.0  | 8.1  | 21.4 | 20.9  | 24.1  | 10.5  | 19.2  | 12.9 | 29.6  | 10.5  | 26.1  |
| J-B Prob.         | 0.74  | 0.29  | 0.88  | 0.02  | 0.75 | 0.00  | 0.00 | 0.02 | 0.01  | 0.02  | 0.00  | 0.00  | 0.00 | 0.00  | 0.42  | 0.01  |
| in $\pm 5\%$ band | 0.9   | 12.3  | 23.8  | 8.9   | 26.8 | 10.6  | 44.7 | 17.0 | 10.6  | 8.1   | 11.0  | 28.0  | 44.3 | 20.9  | 2.1   | 6.8   |

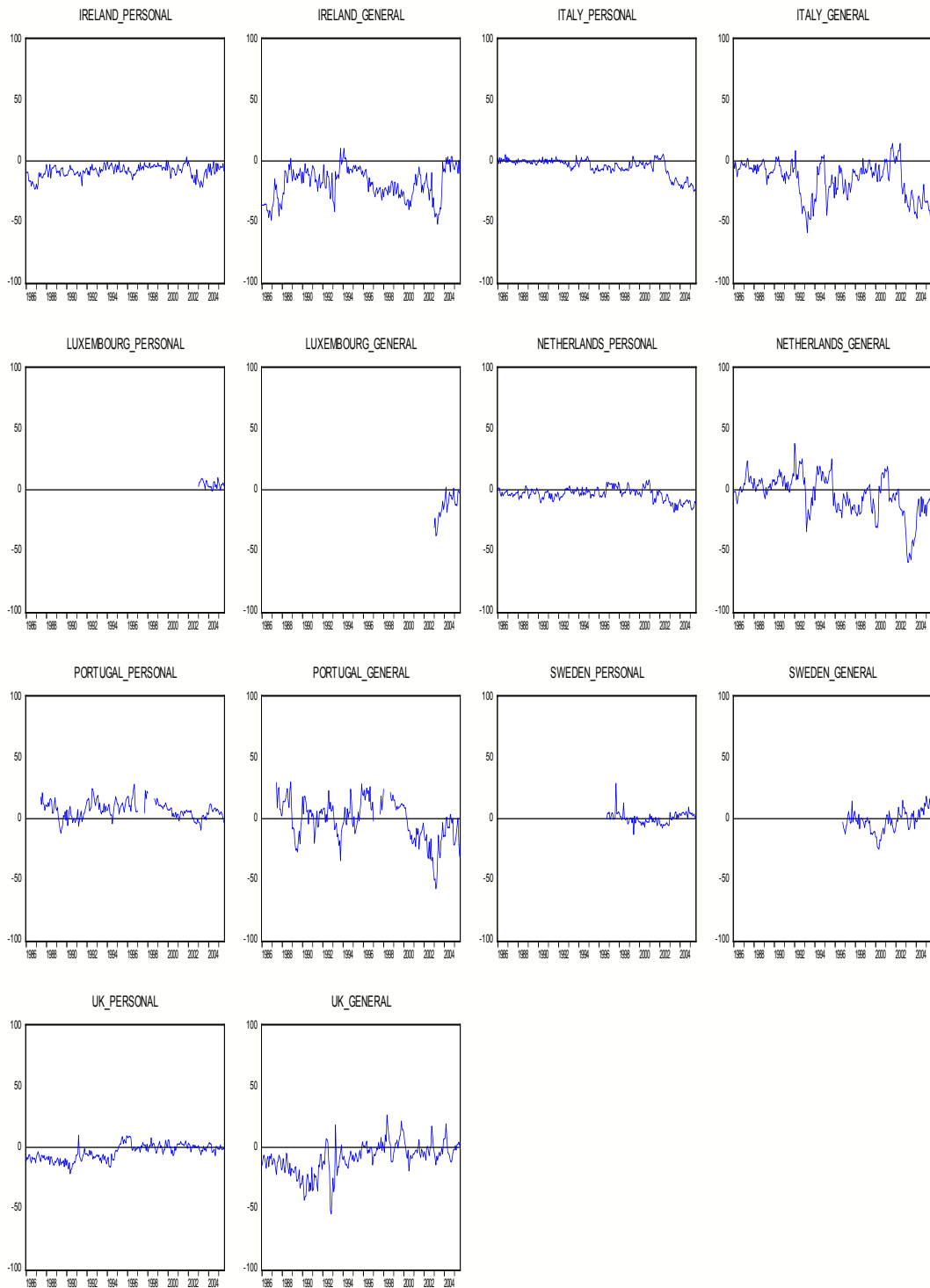


|                     |      |      |       |       |       |       |      |       |       |       |      |       |       |       |
|---------------------|------|------|-------|-------|-------|-------|------|-------|-------|-------|------|-------|-------|-------|
| Mean                | -5.5 | -5.3 | -25.5 | -35.6 | -16.5 | -34.0 | -3.2 | -13.7 | -16.9 | -18.2 | -8.1 | -10.7 | -10.8 | -15.5 |
| Std. Dev.           | 13.4 | 26.6 | 18.0  | 26.3  | 7.4   | 13.5  | 13.1 | 31.9  | 38.3  | 43.4  | 13.7 | 25.8  | 9.2   | 22.8  |
| J-B Prob.           | 0.21 | 0.00 | 0.00  | 0.02  | 0.60  | 0.71  | 0.08 | 0.01  | 0.00  | 0.00  | 0.00 | 0.77  | 0.00  | 0.00  |
| % in $\pm 5\%$ band | 35.7 | 17.4 | 14.0  | 6.8   | 9.7   | 0.0   | 37.0 | 12.8  | 9.6   | 9.2   | 41.5 | 14.2  | 24.3  | 16.2  |

# E

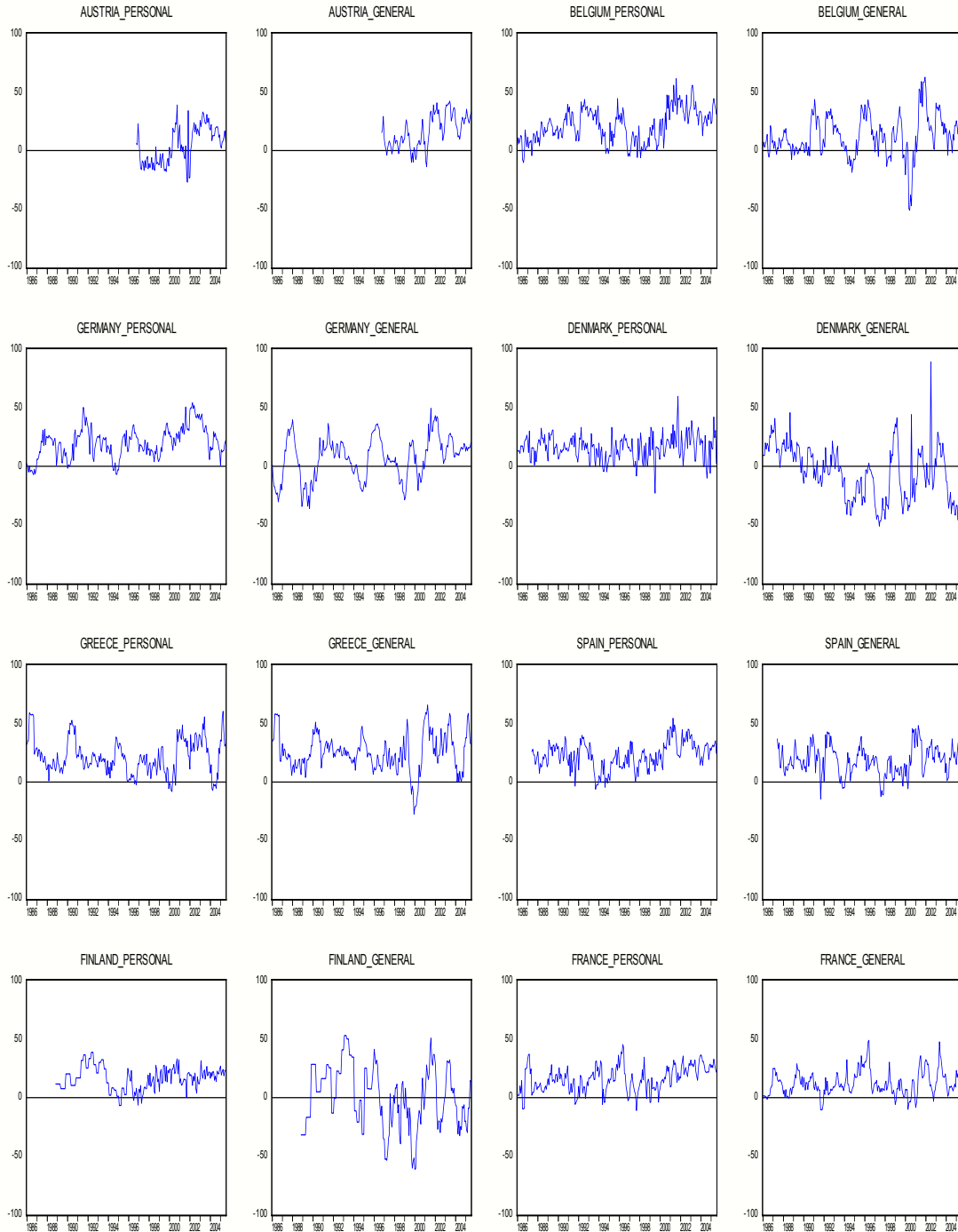


|                     |      |       |      |      |      |       |      |      |      |      |      |      |      |      |      |      |
|---------------------|------|-------|------|------|------|-------|------|------|------|------|------|------|------|------|------|------|
| Mean                | 1.7  | -15.7 | -2.1 | -8.5 | -7.2 | -12.0 | -2.3 | 2.8  | -5.4 | -8.4 | 3.3  | -4.4 | -0.9 | -4.0 | 0.6  | -5.5 |
| Std. Dev.           | 5.9  | 8.5   | 4.9  | 13.7 | 4.2  | 14.5  | 5.5  | 7.8  | 11.6 | 14.2 | 3.9  | 11.2 | 2.8  | 17.6 | 3.1  | 10.5 |
| J-B Prob.           | 0.2  | 0.4   | 0.0  | 0.1  | 0.0  | 0.0   | 0.0  | 0.0  | 0.0  | 0.0  | 0.8  | 0.0  | 0.2  | 0.0  | 0.0  | 0.0  |
| % in $\pm 5\%$ band | 50.9 | 13.2  | 67.2 | 26.0 | 34.5 | 23.0  | 75.3 | 50.6 | 34.9 | 31.5 | 66.5 | 47.7 | 90.0 | 26.4 | 89.8 | 40.4 |

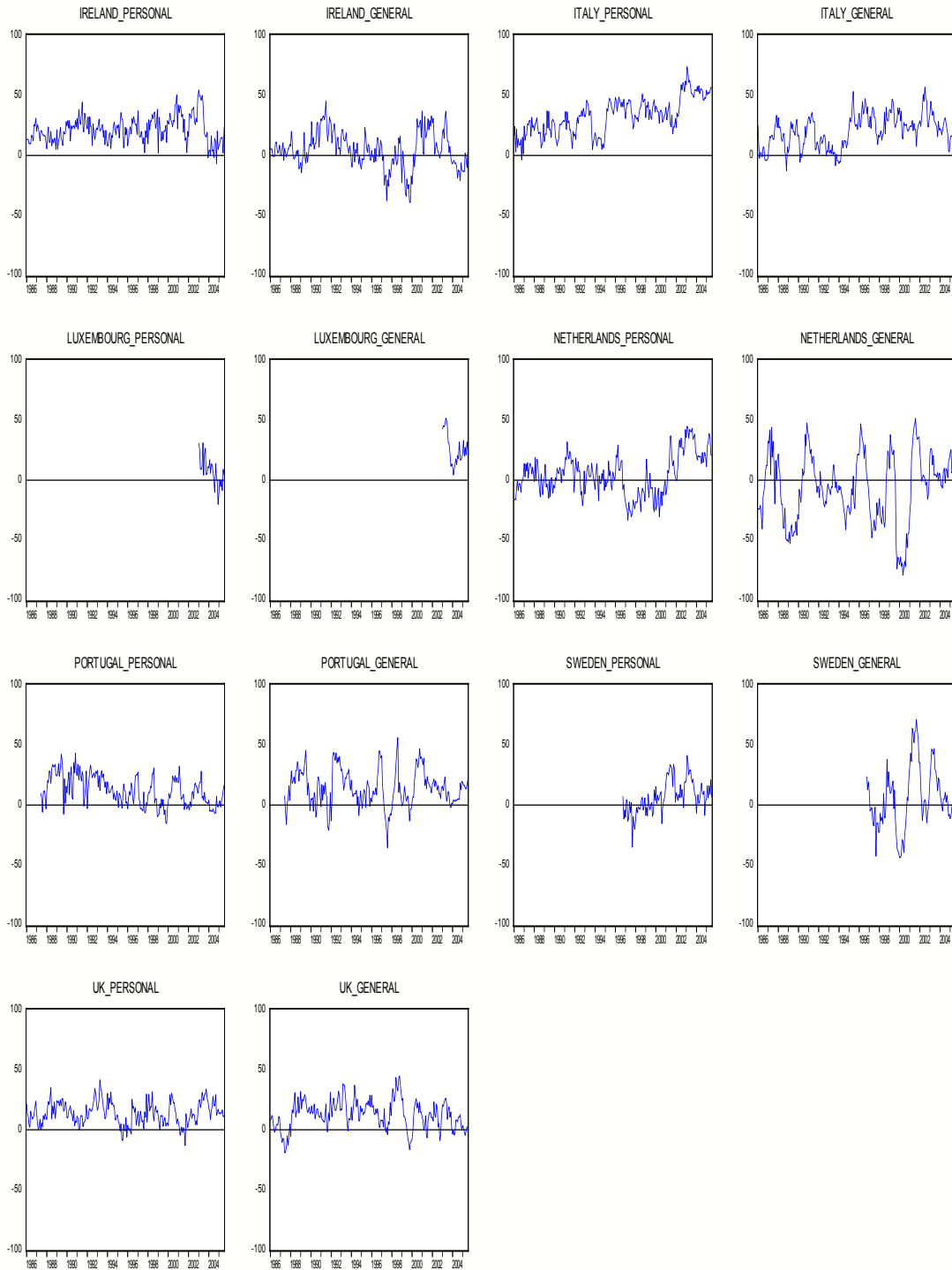


|                     |      |       |      |       |      |       |      |      |      |      |      |      |      |      |
|---------------------|------|-------|------|-------|------|-------|------|------|------|------|------|------|------|------|
| Mean                | -8.3 | -18.6 | -4.5 | -15.1 | 4.5  | -13.4 | -3.5 | -4.0 | 7.2  | -1.7 | 0.4  | -1.7 | -3.9 | -8.6 |
| Std. Dev.           | 5.0  | 12.9  | 6.7  | 14.8  | 3.0  | 10.7  | 5.1  | 16.6 | 7.0  | 16.9 | 4.9  | 8.7  | 6.3  | 12.8 |
| J-B Prob.           | 0.00 | 0.03  | 0.00 | 0.00  | 0.66 | 0.30  | 0.05 | 0.00 | 0.61 | 0.00 | 0.00 | 0.59 | 0.15 | 0.00 |
| % in $\pm 5\%$ band | 26.4 | 12.3  | 64.7 | 23.0  | 58.1 | 25.8  | 64.3 | 24.3 | 36.2 | 23.9 | 80.2 | 46.2 | 47.7 | 29.8 |

# M

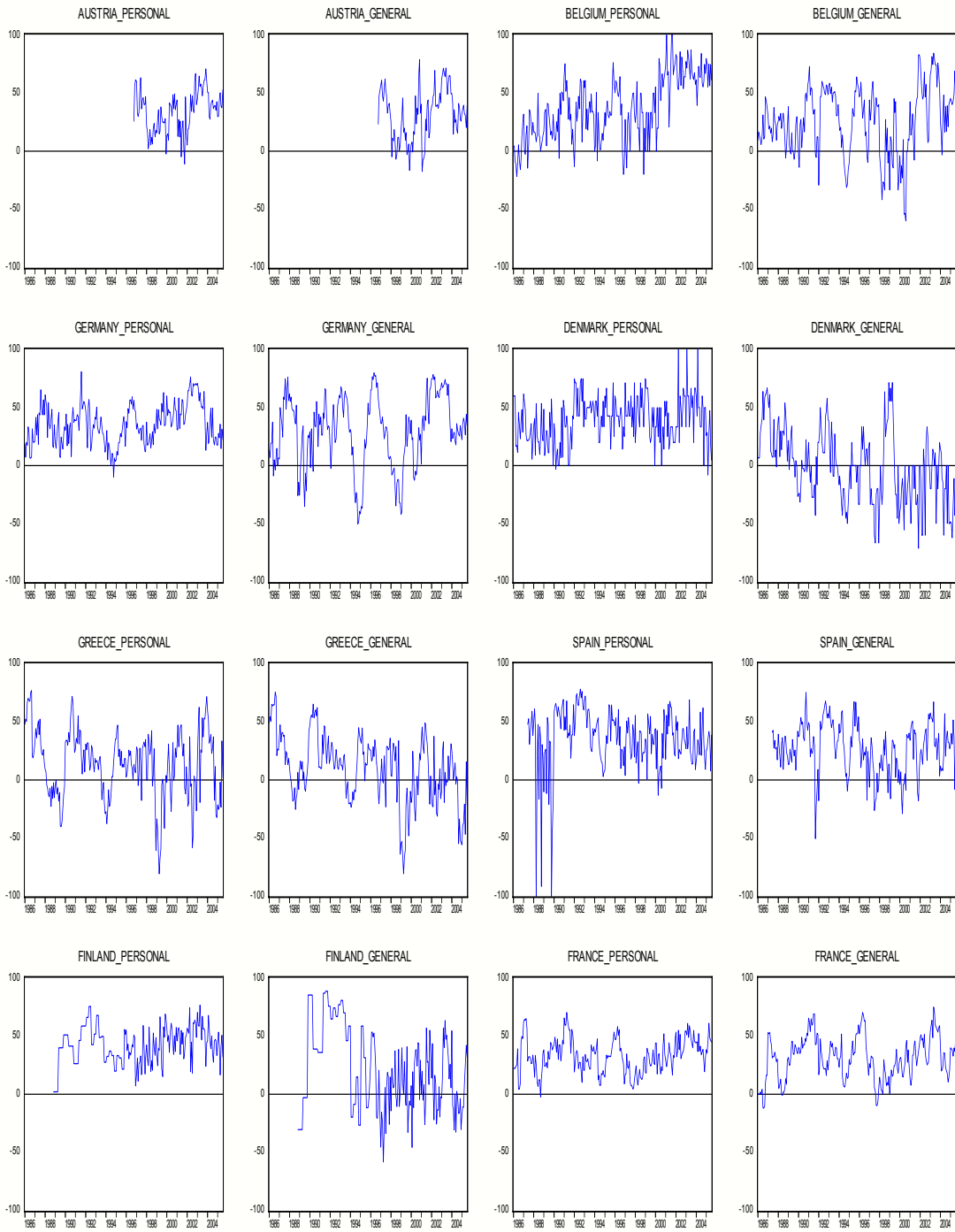


|                     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|---------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Mean                | 4.6  | 16.6 | 21.5 | 12.7 | 20.2 | 7.1  | 15.9 | -5.3 | 21.8 | 25.3 | 22.9 | 18.7 | 16.7 | 0.6  | 16.4 | 12.6 |
| Std. Dev.           | 15.8 | 14.0 | 14.2 | 17.8 | 13.4 | 18.1 | 10.6 | 22.8 | 14.9 | 16.0 | 11.4 | 12.6 | 9.9  | 26.3 | 10.9 | 10.6 |
| J-B Prob.           | 0.1  | 0.1  | 0.2  | 0.0  | 0.5  | 0.1  | 0.0  | 0.3  | 0.0  | 0.1  | 0.7  | 0.7  | 0.5  | 0.1  | 0.6  | 0.0  |
| % in $\pm 5\%$ band | 25.5 | 26.4 | 12.8 | 21.7 | 11.1 | 15.7 | 15.7 | 13.6 | 8.9  | 3.8  | 6.9  | 11.0 | 10.4 | 9.0  | 12.3 | 15.7 |

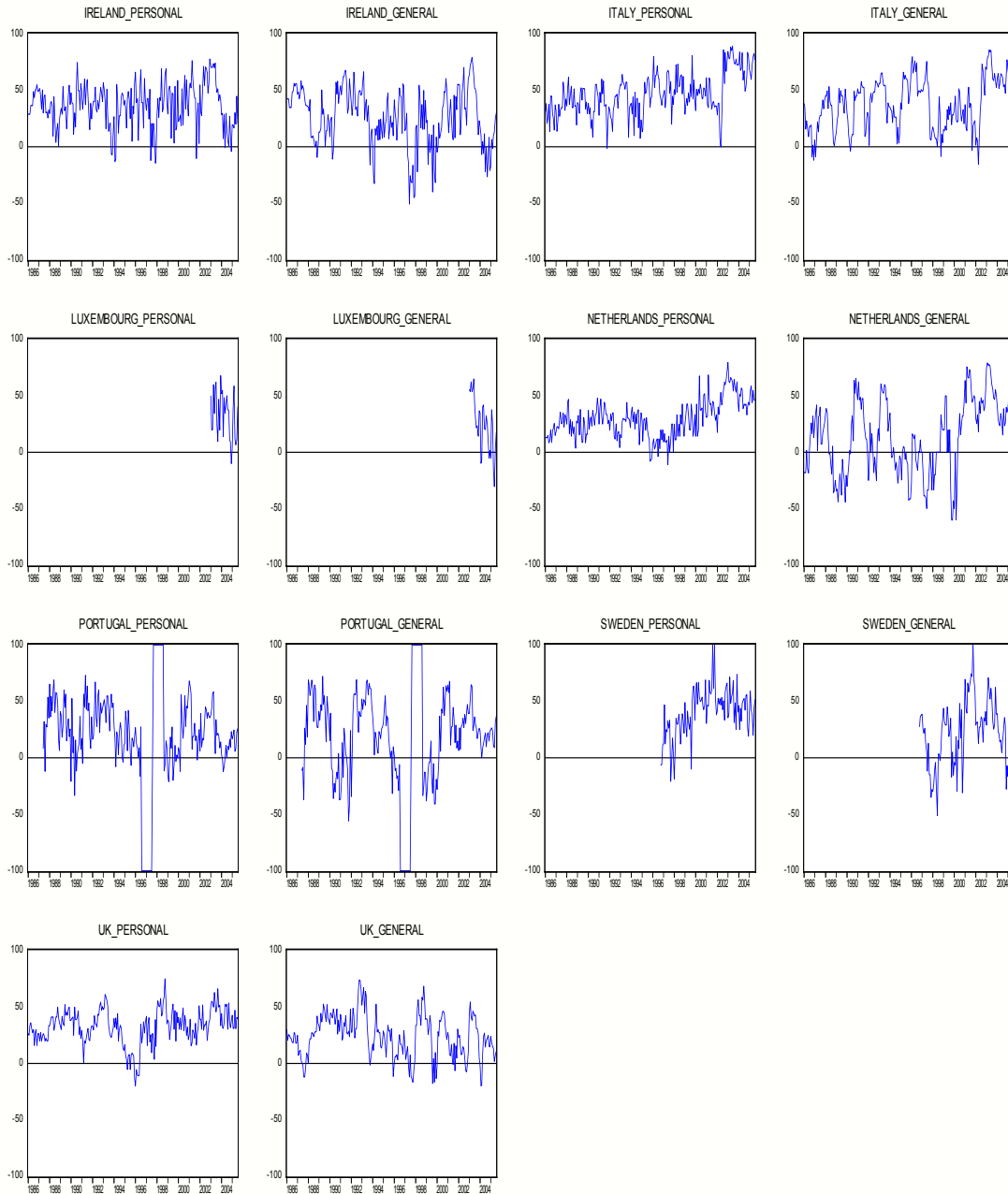


|                     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|---------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Mean                | 21.7 | 4.6  | 32.8 | 20.3 | 7.6  | 26.1 | 4.4  | -6.3 | 12.1 | 14.1 | 7.1  | 6.2  | 13.8 | 12.7 |
| Std. Dev.           | 10.8 | 15.2 | 14.9 | 13.5 | 12.1 | 13.3 | 16.9 | 28.5 | 12.4 | 15.1 | 13.5 | 26.2 | 9.4  | 12.1 |
| J-B Prob.           | 0.1  | 0.7  | 0.2  | 0.4  | 1.0  | 0.3  | 0.2  | 0.1  | 0.0  | 0.8  | 0.8  | 0.3  | 0.7  | 1.0  |
| % in $\pm 5\%$ band | 5.1  | 29.8 | 1.7  | 13.6 | 25.8 | 3.2  | 21.7 | 16.6 | 25.2 | 18.3 | 29.2 | 17.0 | 16.2 | 17.4 |

# MM



|                     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|---------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Mean                | 34.1 | 31.8 | 36.9 | 25.4 | 35.6 | 29.3 | 39.5 | -0.7 | 13.3 | 9.6  | 35.6 | 27.1 | 42.3 | 21.3 | 33.5 | 31.2 |
| Std. Dev.           | 17.7 | 22.2 | 27.2 | 28.6 | 17.1 | 30.5 | 19.9 | 31.1 | 29.1 | 28.8 | 25.9 | 21.7 | 16.0 | 36.0 | 14.6 | 18.7 |
| J-B Prob.           | 0.4  | 0.3  | 0.1  | 0.1  | 0.2  | 0.0  | 0.9  | 0.4  | 0.1  | 0.0  | 0.0  | 0.0  | 0.2  | 0.0  | 0.3  | 0.3  |
| % in $\pm 5\%$ band | 3.8  | 7.5  | 8.1  | 9.8  | 1.3  | 5.1  | 4.3  | 18.7 | 11.5 | 11.5 | 1.8  | 5.0  | 3.0  | 10.4 | 1.7  | 7.2  |



|                     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|---------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Mean                | 36.5 | 25.6 | 46.7 | 38.2 | 33.0 | 24.4 | 29.5 | 13.7 | 21.8 | 18.4 | 40.5 | 22.0 | 32.8 | 24.4 |
| Std. Dev.           | 19.3 | 25.7 | 18.4 | 22.7 | 20.8 | 24.7 | 16.6 | 32.4 | 39.8 | 43.7 | 21.3 | 28.7 | 15.2 | 19.0 |
| J-B Prob.           | 0.1  | 0.0  | 0.7  | 0.1  | 0.4  | 0.6  | 0.1  | 0.0  | 0.0  | 0.0  | 0.0  | 0.9  | 0.0  | 0.9  |
| % in $\pm 5\%$ band | 3.8  | 5.5  | 0.9  | 5.1  | 3.2  | 6.5  | 3.0  | 14.0 | 8.3  | 6.0  | 1.9  | 6.6  | 1.3  | 8.5  |

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