EUROPEAN COMMISSION
Research Executive Agency
Marie Curie Actions – International Fellowships

Project No: 298094

Project Acronym: ALLEGRO

Project Full Name: Consumer Behavior and Energy Taxation: Exploiting Psychological Biases in Designing a Green Tax Reform

Marie Curie Actions

Periodic Report

Period covered: from 01/04/2012 **to** 31/03/2013

Period number: 1st

Start date of project: 01/04/2012

Project coordinator name:
Prof. Marco Paolo Tucci

Version: 1

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Project coordinator organisation name:
UNIVERSITA' DEGLI STUDI DI SIENA

Periodic Report

PROJECT PERIODIC REPORT

Grant Agreement number:	298094
Project acronym:	ALLEGRO
Project title:	Consumer Behavior and Energy Taxation: Exploiting Psychological Biases in Designing a Green Tax Reform
Funding Scheme:	FP7-MC-IOF
Period report:	1st
Period covered - start date:	01/04/2012
Period covered - end date:	31/03/2013
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DECLARATION BY THE SCIENTIST IN CHARGE

I, Prof. Marco Paolo Tucci, as scientist in charge of the project (298094, ALLEGRO), hereby confirm that:

- The attached periodic report represents an accurate description of the work carried out in this project for this reporting period;

- The project:

( ) has fully achieved its objectives and technical goals for the period;

(o) has achieved most of its objectives and technical goals for the period with relatively minor deviations;

( ) has failed to achieve critical objectives and/or is not at all on schedule.

- The project Website (if applicable) is up to date.

- To my best knowledge, the financial statements which are being submitted as part of this report are in line with the actual work carried out and are consistent with the report on the resources used for the project and if applicable with the certificate on financial statement.

- The beneficiary, in particular non-profit public bodies, secondary and higher education establishments, research organisations and SMEs, have declared to have verified their legal status. Any changes have been reported under section 6 (Project Management) in accordance with Article II.2.f of the Grant Agreement.

1. PUBLISHABLE SUMMARY

This section normally should not exceed 2 pages.

It shall be of suitable quality to enable direct publication by the REA or the Commission. You may extract this wholly or partially from the website of the project, if suitable, but please ensure that this is set out and formatted so that it can be printed as a stand-alone paper document.

Please include:

- a summary description of the project objectives,

- a description of the work performed since the beginning of the project,

- a description of the main results achieved so far,

- the expected final results and their potential impact and use (including the socio-economic impact and the wider societal implications of the project so far).

You should update this publishable summary at the end of each reporting period.

Please include also, as appropriate, diagrams or photographs illustrating and promoting the work of the project, the project logo and relevant contact details.

Please ensure that all publishable reports submitted to the REA for publication are of a suitable quality to permit direct publication without any additional editing. By submitting the publishable reports to the REA, you are also certifying that they include no confidential material.

The address of the project public website should also be indicated, if applicable.

The internet address should be active.

Publishable summary:

1.1 SUMMARY DESCRIPTION OF THE PROJECT OBJECTIVES

The goal of this research is to design a carbon tax taking account of insights from behavioral economics. The research should identify how the predicted acceptability of a Green Tax Reform and predicted impacts on behavior depend on the assumptions one makes about the psychology of economic agents. The project has two main components. The first is the design of experiments aimed at providing experimental evidence on psychological effects biasing acceptability and effectiveness of energy taxes. The second involves the estimation of a demand system for US consumers specifying how individuals or households allocate their disposable income to available goods and services, using micro data from the Consumer Expenditure Survey (CES), and the calculation of direct and cross-price elasticities for the basket of goods and services on which households allocate their current expenditure.

Influencing consumers' behavior with regard to environmentally relevant actions by fiscal signals is a new policy area. This project aims at providing important additional knowledge to this area and at contributing to improve policy making in a key area of European Economic Policy.

1. 2 SUMMARY OF PROGRESS TOWARDS OBJECTIVES

The outgoing phase of the project has been carried out by the researcher at Carnegie Mellon University, Department of Social and Decision Sciences, which has provided the ideal environment where the experimental part of this project has been developed.
The first step has consisted of reviewing the relevant literature to identify, in a precise manner, the objectives of the experimental research. This literature review has been the object of an internal seminar held at Carnegie Mellon University (attached Document 1). This work has highlighted the relationship between effectiveness and acceptability of a Pigouvian Tax. Policies that are effective in changing behavior also tend to have greater impacts on consumers and therefore tend to be less acceptable, producing a tradeoff between effectiveness and acceptability, as in Figure 1 (Attached).

Figure 1 (Attached)

After accurate review of the literature, it was decided that the first step towards the objectives of the

project would be to conduct experimental work focusing on factors influencing the acceptability of energy taxes, i.e. public support for Pigouvian Taxes. Identifying factors affecting public support for taxation may help the policy maker to also identify measures that may shift the best acceptable policy vertical dotted line in Figure 1 towards the left.

The chosen experimental method to address this research question is the design and analysis of controlled laboratory experiments. Controlled laboratory experiments were designed to test the hypothesis that the delay of the benefits of taxation can be one of the main determinants of low public support for taxation. In particular, controlled laboratory experiments were conducted to examine whether, in a dynamic market experiment with negative externalities, people's willingness to accept Pigouvian taxes aimed at restoring efficiency is affected by whether individuals bear the negative consequences of the externality now or later.

1.3 MAIN RESULTS ACHIEVED SO FAR

The results achieved so far are described in the main deliverable of this phase of the project: the essay "Time Delay and Support for Taxation" (attached Document 2) co-authored by Silvia Tiezzi (the Researcher) and Erte Xiao.
In this paper, the authors provide strong experimental evidence of a negative relationship between Time Delay and Support for Taxation. More specifically, the paper shows that when the negative external effects of consumption are delayed, people are less willing to accept the introduction of Pigouvian Taxes as incentives to change consumption behavior. Such lower public support for taxation is not explained by a conventional (exponential) model of discounting and it is consistent with very strong present-bias (Beta = 0.55). The relationship between support for taxation and the temporal structure of the costs and benefits of taxation is very robust and not affected by the introduction of Default options. There is also evidence that experiencing the tax improves decisions, i.e. that the majority of those who experienced the beneficial effects of taxation vote to uphold the tax policy in later periods. One attractive unifying explanation of these results is that greater tax aversion (i.e. lower public support for taxation) results from both a preference for the present and bounded rationality.

1.4 POTENTIAL IMPACT OF RESULTS

To the extent that the results described above hold outside the Lab, they have important policy implications for the design of the tax system. Incentive based instruments like taxes are generally suggested as the main policy tool to address externalities and, more generally, to change behaviour since they modify the relative prices that agents face. Yet, they are very difficult to implement because public support for these incentive based instruments is extremely low.
When asking the public to take action against complex social dilemmas the government should design and communicate those actions in the simplest possible way. However, providing clear information about the effects of taxation might not be enough if the economic environment to which the tax tool is applied is complex and if processing the information increases the cognitive load of agents. If bounded rationality is what prevents the subjects from ackowledging the beneficial effects of taxation, experiencing the tax may play a significant role in increasing public support for these policy measures.

2. PROJECT OBJECTIVES FOR THE PERIOD

Please provide an overview of the project objectives for the reporting period in question, as included in Annex I of the Grant Agreement. These objectives are required so that this report is a stand-alone document.

Please include a summary of the recommendations from the previous reviews (if any) and indicate how these have been taken into account.

Project objectives for the period:

The goal of this research is to design a carbon tax taking account of insights from behavioral economics. The research should identify how the predicted acceptability of a Green Tax Reform and predicted impacts on behavior depend on the assumptions one makes about the psychology of economic agents. The project has two main components.

The first is the design of experiments aimed at providing experimental evidence on psychological effects biasing acceptability and effectiveness of energy taxes. The outgoing phase was dedicated to the development of this part of this project. The outgoing phase has been conducted at Carnegie Mellon University, Department of Social and Decision Sciences, which has provided the ideal environment to develop the experimental part of this project.

The second involves the estimation of a demand system for US consumers specifying how individuals or households allocate their disposable income to available goods and services, using micro data from the Consumer Expenditure Survey (CES), and the calculation of direct and cross-price elasticities for the basket of goods and services on which households allocate their current expenditure.

To reach the objectives included in the first part of the project, the researcher and co-authors have conducted controlled laboratory experiments in which they draw attention to the fact that people often experience the benefits of taxation with time. Climate Change is an excellent example. While the current generation is asked to bear the costs of taking action against Climate Change, the benefits will materialize only tomorrow and will be appropriated only by the future generations. The inter-temporal structure of the Climate Change problem implies that citizens might be less willing to take or accept action against it. For example voters/taxpayers may be less willing to take actions that require immediate costs, such as Pigouvian taxes, against far in the future benefits. No previous experimental research has tried to assess the impact of delayed externalities on public support for Pigouvian Taxes.

3. WORK PROGRESS AND ACHIEVEMENTS DURING THE PERIOD

Please provide a concise overview of the progress of the work in line with the structure of Annex I of the Grant Agreement - except project management, which will be reported in section 6.

- A summary of progress towards objectives and details for each task;

- A summary of the progress of the researcher training activities/transfer of knowledge activities/integration activities (as it applies for the MC action);

- Highlight clearly significant results;

- If applicable, explain the reasons for deviations from Annex I and their impact on other tasks as well as on available resources and planning;

- If applicable, explain the reasons for failing to achieve critical objectives and/or not being on schedule and explain the impact on other tasks as well as on available resources and planning (the explanations should be coherent with the declaration by the scientist in charge) ;

- A statement on the use of resources, in particular highlighting and explaining deviations between actual and planned researcher-months in Annex 1 (Description of Work)

- If applicable, propose corrective actions.

Work progress and achievements during the period:

3.1 WORK PROGRESS

Controlled laboratory experiments were designed to test the hypothesis that the delay of the benefits of taxation can be one of the main determinants of low public support for taxation. In particular, controlled laboratory experiments were conducted to examine whether, in a dynamic market experiment with negative externalities, people’s willingness to accept Pigouvian taxes aimed at restoring efficiency is affected by whether individuals bear the negative consequences of the externality now or later.

The experiments were conducted both at Carnegie Mellon University (CMU) and at the University of Pittsburgh Experimental Economics Laboratory (PEEL) between January and March 2013 with a total of around 300 students as participants (212 students participated in the experiments ran at the University of Pittsburgh and the remaining students participated in six pilot experiments ran at CMU). Each subject could participate in only one of the three designed treatments. There were a total

of 13 sessions with 4 (or 5) sessions per treatment for a total of 54 markets. Subjects were able to earn real money from trading. Participants earned on average $28, including a show-up fee of $5. All sessions were programmed and conducted using the software Z-tree.

Tasks T1.1; T1.2 and T1.3 as described in Annex 1 of the Grant Agreement have been fully achieved. Milestone 1.3 as described in Annex 1 of the Grant Agreement consists of the essay "Time and Support for Taxation" (attached Document 2).

3.2 DEVIATIONS FROM ANNEX 1

As stated in Annex 1, the experimental purpose of the project was the design and set up of experiments to infer consumers psychological biases in reacting to a carbon tax. In particular, the stated purpose of the proposed experimental analysis was to test for which energy goods monetary incentives act as positive (crowding in) or negative (crowding out) reinforcers of intrinsic motivation.

In fact, the literature review and brainstorming work carried out at Carnegie Mellon University at the beginning of the outgoing phase highlighted that for the specific case of a carbon tax on fuels, intrinsic motivation crowding is unlikely to be a crucial issue. Instead, studying the trade-off between acceptability and effectiveness of a carbon tax is the critical starting point, because the main reason why market based instrument like taxes are not more widely used to address environmental externalities is the lack of public support for these policy measures.

For these reasons, the researcher and co-authors decided to focus on experimental work that would identify the main factors affecting acceptability (i.e. public support) for Pigouvian Taxes.

3.3 SUMMARY OF THE PROGRESS OF THE RESEARCHER TRAINING ACTIVITIES

The researcher did not have any expertise in the field of controlled laboratory experiments prior to the start of this project. The training activities undertaken by the researcher during the secondment period have been mainly directed at developing skills and expertise in the field of Controlled Laboratory Experiments. This research field is consistent with both the previous background of the researcher and with the purposes and goals of the funded project as per section B.2 of Annex 1.

In particular the following training activities have been carried out during the outgoing period.

1. The researcher has joined, on a weekly basis, the Behavioral Economics Lab Meeting held at the Department of Social and Decision Sciences and chaired by George Loewenstein, during which graduate students, faculty member and researchers brainstorm on their ongoing research. The researcher has also attended, on a regular basis, the Department of Social and Decision Sciences' seminar series.

2. The researcher has become a research associate of the Center for Behavioral Decision Research (http://www.cbdr.cmu.edu/people.html) gaining access to the experimental laboratories facilities of the Center and attending the weekly seminar series organized by the Center (http://www.cbdr.cmu.edu/seminars.asp).

3. The researcher has attended a course in "Applied Experimental Design" during the Summer Term (May - July) 2012. The course was offered by the Department of Statistics of the University of Pittsburgh and taught by prof. Carl Bodenschatz (http://www.stat.pitt.edu/people/bodenschatz.php).

4. The researcher has attended a semester long course in "Experimental Design for the Behavioral and Social Sciences" during the Fall semester (August - December) 2012. The course was offered by the Department of Statistics of Carnegie Mellon University and taught by prof. Howard Seltman (http://www.stat.cmu.edu/~hseltman/309/).

5. The researcher has completed and passed a CITI (Collaborative Institutional Training Initiative) course on Social & Behavioral Research (attached Document 6). Passing this course was a pre-condition to submit an application to the Institutional Review Board (IRB) of Carnegie Mellon University (CMU) to obtain approval to run the experiments in one of the experimental facilities at

CMU.

6. The researcher has completed and passed additional modules of the CITI (Collaborative Institutional Training Initiative) courses on Social & Behavioral Research (attached Document 7). Passing these additional modules was a pre-condition to submit an application to the Institutional Review Board (IRB) of the University of Pittsburgh to obtain approval to run the experiments at the Pittsburgh Experimental Economics Laboratory. The reasons for running the experiments at UPITT are the following. Carnegie Mellon University is not equipped with a proper experimental economics laboratory, but with a number of small laboratories without dividers which are normally used to run psychological experiments. The experiments conducted under this project required the availability of a proper experimental economics laboratory with dividers, such as the one located at the University of Pittsburgh.

7. The researcher has applied and obtained the approval of the Carnegie Mellon University IRB to run six pilot experimental sessions at CMU. The researcher has also applied and obtained the approval of the University of Pittsburgh IRB to run 13 experimental sessions at the University of Pittsburgh. The consent forms approved by CMU and UPITT are attached (Document 8 and Document 9).

8. The researcher has obtained a license (attached Document 10) to download the software Z-tree (Zurich Toolbox for Experiments in Economics) and has learned how to program and write codes in Z-tree.

9. The researcher has personally run 6 pilot experimental sessions at Carnegie Mellon University, between October and November 2012, and 13 experimental sessions at the University of Pittsburgh, between January and March 2013.

10. The researcher had to become familiar with non parametric statistics for the purpose of statistically analyzing the data from the experiments.

11. The researcher has become a member of the Experimental Science Association (https://www.economicscience.org/esa/index.html;jsessionid=9B7B168FAAB5649A0471DCE8123C0F65) for the purpose of exchanging ideas and getting involved with the Experimental Economics Community.

3.4 USE OF RESOURCES

The detailed description of the use of resources devoted to the Fellow Participation Expenses during the Secondment Period is contained in the attached Document 11.

In particular, the following use of resources has to be highlighted. The Contribution of the Union to the training expenses of eligible researchers and research/transfer of knowledge programme expenses did not include any funds for running experiments. This is because, at the time the project was submitted, the type of experimental work to be carried out under Annex 1 had not yet been identified.

The contribution of the Union to the training expenses of the researcher has been mostly used for the payment of experimental subjects participating in 19 experimental sessions (6 pilot sessions at CMU and 13 experimental sessions at the University of Pittsburgh) ran during the outgoing phase of the project, as documented in the attached Document 11.

4. ADDITIONAL INFORMATION

Comments:

5. DISSEMINATION ACTIVITIES

Use this section to summarise all dissemination activities executed during the reporting period as well as

activities planned for next period.

Dissemination activities:

The purposes and results of the projects have been communicated during the following events:

1. March 26, 2012, Seminar at Carnegie Mellon University, Department of Social and Decision Sciences (attached Document 1);

2. February 26, 2013, Seminar at Carnegie Mellon University, Department of Social and Decision Sciences, (Attached Document 3);

3. May 3, 2013, Presentation at the 2013 Behavioral and Experimental Economics Workshop held in Florence (Italy) http://www.beelab.unifi.it/workshop2013/ , May 2-4 2013 (attached Document 4);

4. July, 2013, Presentation at the 2013 Experimental Science Association World Meetings to be held in Zurich (Switzerland) in July 2013 http://esa2013.esei.ch/ (attached Document 5).

The project is advertised:

- on the main page of the Department of Economics and Statistics of the University of Siena (the host institution): http://www.econ-pol.unisi.it/dipartimento/
- on the web page of the researcher: http://www.econ-pol.unisi.it/~tiezzi/

6. PROJECT MANAGEMENT

Please use this section to summarise management activities during the period:

- Project planning and status - from management point of view;
- Problems which have occurred and how they were solved or envisaged solutions;
- Changes to the legal status of any of the beneficiaries, in particular, SME status;
- Impact of possible deviations from the planned milestones and deliverables, if any;
- Development of the project website (if applicable);
- Gender issues; Ethical issues;
- Justification of subcontracting (if applicable);
- Justification of real costs (management costs);
- Other

For 2007 and 2008 calls a detailed description of costs related to management and overhead is requested

Project management:

The researcher has regularly spent the Outgoing Phase of the Project at Carnegie Mellon University, Pittsburgh, Department of Social and Decision Sciences, as detailed in Annex 1 of the Grant Agreement, beginning April 01 2012 and ending March 31 2013.

The beneficiary and the Outgoing Host Institution have signed a Partnership Agreement (attached Document 12) for regulating the management of the project.

According to the provisions of the Partnership Agreement, the beneficiary (UNISI) has provided an amount of 9,600 Euros for use by the Fellow, during the Secondment Period, for the Fellow Participation Expenses and related overheads for an amount of 8,509.20.

The detailed justification of the real costs related to the Fellow Participation Expenses during the Secondment Period is contained in the attached Document 11.

There have been no changes in the legal status of any of the beneficiaries. No gender nor ethical

issues have arisen during the management of the project.

The following deviations between actual and planned researcher-months in Annex 1 has to be highlighted. The Contribution of the Union did not include any funds for the development of laboratory experiments. This is because, at the time the project was submitted, the type of experimental work to be carried out under Annex 1 had not yet been precisely identified.

The contribution of the Union to the Fellow Participation and Training Expenses has been mostly used for the payment of experimental subjects participating in 19 experimental sessions (6 pilot sessions at CMU and 13 experimental sessions at the University of Pittsburgh) ran during the outgoing phase of the project, as documented in the attached Document 11.

Attachments	Document 12_PA UNISI-CMU.pdf, Document 5_2013 ESA World Meetings Zurich.txt, Document 4_TimeTaxSupport_030513.pdf, Document 11_Tiezzi expenses to date 5-10-13.xlsx, Document 6_CITI-Tiezzi.pdf, Document 3_TimeTaxAversion_022613.pdf, Document 2_Time and Tax Aversion_090513.pdf, Document 1_LitRev-260312.pdf, Document 2_Time and Tax Aversion_090513.pdf, Figure 1.pdf, Document 10_ztree-license_CMU.pdf, Document 8_consent-CMU-101912.docx, Document 9_Pitt consent form_approved.docx, Document 7_CITI_SBRCR_Tiezzi.pdf

The content of this report has been approved by the researcher and the scientist in charge assigned to this project. The electronic submission of this report shall replace their signatures.

This declaration was visaed (signed) electronically by Marco P. TUCCI (ECAS user name ntuccima) on