Canova et al. IZA Journal of European Labor Studies (2015) 4:17
DOI 10.1186/s40174-015-0040-3

IZA Journal of European Labor Studies
a SpringerOpen Journal

ORIGINAL ARTICLE Open Access

An ex ante evaluation of the Revenu de Solidarité Active by micro–macro simulation techniques

Luciano Canova[1], Luca Piccoli[2*] and Amedeo Spadaro[2,3]

* Correspondence:
luca.piccoli@uib.es
[2]University of Balearic Islands, Cra. De Valldemossa km 7.5, 07122 Palma, Spain
Full list of author information is available at the end of the article

Abstract

This paper aims to investigate the effects of the introduction of an active welfare state measure in France, the Revenu de Solidarité Active, which replaced the old system of social minima. By using a micro–macro simulation model, we characterize the effects on households' disposable income, labor supply, wages, GDP, public deficit, and other micro and macroeconomic aspects. Our findings suggest that although increasing public expenditure, the reform largely repays its cost by reducing involuntary unemployment, increasing labor supply and private consumption and thus improves GDP and the deficit/GDP ratio. If the great recession did not occur, poverty and inequality would have been significantly reduced by the RSA reform.

JEL codes: I38, C63, C68, J22, H31

Keywords: Revenue de Solidarité active; RSA; Active welfare state; Microsimulation; CGE; Micro–macro; Labour supply; Policy evaluation

1 Introduction

In this paper we aim to study the micro and macroeconomic implications of the implementation of an active welfare state reform in France, the Revenu de Solidarité Active (RSA). RSA is a modification of the pre-existent minimum income scheme, which had been adapted in 2009 after experimentation and had substituted the Revenu Minimum d'Insertion (RMI) and the Allocation Parent Isolé (API). To this aim we use SYSIFF 2006, a micro–macro simulation model for the French fiscal system based on the 2006 Budget de Familles survey data, a nationally representative household budget data survey collected in France every five years (see Canova et al. 2009 and Magnani et al. 2013 for a technical description of the model).

The international crisis, together with the Euro-zone recession, has put substantial pressure on the nature and structure of welfare states, particularly with regards to minimum income schemes. Governments are therefore trying to react in order to design policy instruments more adapt to answering the needs of a modern and inclusive active welfare state, which, at the same time, does not produce negative effects on labor supply with the beneficiaries trapped into a sort of never-ending job instability.

All 27 EU countries except Greece and Italy have a national minimum income scheme, providing to recipients a monetary buffer to cope with periods of unemployment for a usually limited period of time. Frazer and Marlier (2009), and subsequently

a report of the Parliamentary Budget Office of Hellenic Parliament (2014)[1], classify EU minimum income schemes in four different types of measures (see also Spadaro et al. 2014 for an overall description of EU welfare states):

i. *'Universalistic measures'* as simple and comprehensive schemes (AT, BE, CY, CZ, DE, DK, FI, NL, PT, RO, SI, SE) open to all potential applicants with insufficient means to support themselves. In some countries (e.g. AT, DE) unemployment benefits and social assistance schemes are separated, whereas in others (e.g. PT, SE) just one tool covers both needs.
ii. A '*basic and discretionary measure*': Some countries (EE, HU, LT, LV, PL, SK) have quite simple and non-categorical schemes, with rather restricted eligibility and coverage of people in need, often due to the low income level at which the means test is set.
iii. An '*integrated network of different categorical measures*': other Member States (ES, FR, IE, MT, UK) have developed a complex network of different, often categorical, non-contributory schemes supporting specific target groups such as lone parents, the ill or disabled, the unemployed, carers, survivors and pensioners and low-paid workers. In some cases these categorical measures are accompanied by a general scheme of last resort.
iv. Finally, there are Member States (BG, EL, IT) who have very '*limited, partial or piecemeal arrangements*', which are in effect restricted to quite narrow categories of people and do not cover many of those in urgent need of income support.

With regards to Italy, no widespread minimum income mechanisms have been created at a national level, even though innovative examples of local welfare systems exist through experimentations; however, they are often weakened by a fragmented and inefficient legal framework for social protection together with the targetization to specific characteristics.

Greece too has been implementing a pilot scheme established by the Law 4093/2012 in order to ensure a decent minimum standard of living. First, implementation regards 13 municipalities for the cost of €20 million (period 2013–2014). The amount of the minimum income starts from 200 euros for a single person and increases depending on the recipient's marital status. For married couples it adds 100 euros for each adult member of the family other than the spouse and 50 euros for each child. To make it clear, a couple with two children without any source of income will receive the entire amount, i.e., 400 euro. Availability criteria include residence, income and assets.

With an unemployment rate at 11.4% at the European level[2] in December 2014, the background of this article is the investigation of how restructuring the welfare state can be necessary in order to guarantee both social protection to workers and an incentive for people to work and therefore contribute to boost the economy. Through the reform of RSA, France has gone towards a minimum income scheme combining flexibility of the measures, therefore, thinking towards efficiency of public expenditure, and security of workers. In a word, RSA constitutes a typical example of the flexicurity[3] framework.

The research questions we try to answer are: does the introduction of RSA produce significant positive effects in terms of employment, poverty and inequality? Is the cost of the reform sustainable for the French public finances?

The rest of the paper is organized as follows. Section 2 sums up what literature has produced in terms of empirical evaluation of costs of RSA. Section 3 describes the

mechanisms to compute the fiscal instruments under investigation. Section 4 presents SYSIFF 2006, the micro–macro simulation model used to perform the reform simulations. Section 5 reports the results and Section 6 concludes.

2 Empirical evaluations of the cost of RSA: the previous literature

The crisis has determined a huge impact on the number of potential beneficiaries of RSA: in September 2010, 1.8 million households (which corresponds to 3.8 million individuals, or about 6% of total population). 1.1 million households benefited from basic RSA — the full benefit given to the unemployed — which is in line with the coverage of previous measure, RMI. The crisis led to a sharp increase in people eligible for this minimum income scheme, in the order of 20% in the first year.

Numbers in June 2011 showed a stable path for RSA beneficiaries (1.87 million households and 3.9 million people) with a slowing down in the increase (3.7%) but a significant boost of families which get the basic RSA, (1.4 millions).

But statistics worsened again at the end of 2013, with RSA beneficiaries increased to 2.3 million households (4.9 million people), 7% of the whole population (Cazain 2014).

Most of the beneficiaries are in the cohort 25–34 years old (36%), while recipients in the 50–65 population constitute 21% of the entire sample. About 75% of RSA recipients have benefited from the scheme for more than 1 year, while 33% is still getting this transfer after 3 years (OECD 2011).

In terms of the impact of RSA on labor supply and the labor market, any evaluation is extremely complex and therefore only qualitative investigations are available so far from the government side. To our knowledge, a complete ex-post evaluation of RSA does not exist in literature. Therefore, we could not find any official report with final estimations of costs and number of beneficiaries.

An experiment involving 15,800 households of potential beneficiaries had been run in 34 Departments from 2007 to 2009 (Comitè National de Evaluation RSA 2012), but Thibault (2014) criticized its results because of confounding effects in the payment schedule and non-comparable duration of the transfers. Timing of experimentation was not sufficient to provide empirical evidence able to modify or even cancel the generalization of the measure to the entire population, and, for this reason, the experiment has been consider more a simulation of the potential effects of RSA than a statistical test of its efficacy.

Besides that, RSA implementation took place during the crisis, changing completely the setting and the context of the experiment.

Data from the report 2012 show that RSA beneficiaries find more often temporary or part-time jobs. On average, 3% of the beneficiaries find a job each month, but, overall, recipients seem to be trapped in a long term unemployment path.

A few empirical works tried to evaluate instead the effects of RSA focusing on specific aspects. Danzin et al. (2012), for example, found that RSA increase the opportunity to exit unemployment only for single women with children.

Bargain and Vicard (2012), using yearly data from INSEE (the French statistical institute) and including a representative sample of the French population over the period 2004–2011, assessed the effect on employment of the over 25-year-olds, finding that RMI had a slight positive impact on employment, while RSA did not produce any significant effect in 2010–2011.

Bargain and Doorlay (2013), using a regression discontinuity method, study the effect of the pre-2009 French social assistance program, the RMI, on labor supply, and they find a drop between 5 and 9% in the employment rate of young high-school dropouts. The introduction of RSA restored financial incentives to work and alleviated the inactivity trap.

Final, a study by Domingo and Pucci (2012) has been devoted to people who, even if eligible for the RSA in 2011, did not get the transfer or the total amount available. The article addresses the problem of non-take up, estimating that more than 400,000 people would have exited poverty if RSA had been received by all potential beneficiaries.

3 Computation of social benefits

One of the objectives of the RSA reform is to simplify the computation of the benefit itself, especially as regards the exit mechanism, which under the previous scheme was rather complicated. In what follows we describe in details of how RMI, API, PPE (Prime Pour l'Emploi, an in-work tax credit) and RSA are computed.

3.1 Revenu Minimum d'Insertion (RMI)

The computation of RMI starts with the definition of a maximum amount of benefit depending on household composition. For 2008, the last year in which RMI was at work, these maximum amounts can be calculated from Table 1. For example, the maximum amount of RMI for a couple with two children was €940.61 per month. The maximum amount of RMI is paid to the unemployed for a maximum period of 12 months.

If an unemployed person entitled for RMI starts working, the benefit is reduced according to the income received, the RAP (Revenus d'Activité Professionel). This mechanism is called *dispositif d'interessement* and works as follows. For part-time workers (those working less than 78 hours per month) the amount of the benefits received is fully cumulated with income from work for the first 3 months; then, from the 4^{th} to the 11^{th} month, RMI is computed curtailing 50% of the RAP from the maximum amount of the benefit; after 12 months, 100% of RAP is curtailed from the benefit. For full-time employees, instead, for the first 3 months, the maximum amount of RMI is given regardless of the RAP; later on RMI is substituted by a monthly *forfeit* of €150 for a single person and €225 for larger families. A "prime de retour à l'emploi" (a sort of award for having found a job) of €1,000 is given to full-time workers at the end of the entitlement period (12 months). The mechanism of computation of RMI with respect to job duration is summarized by Table 2.

Table 1 Maximum monthly amounts of Revenu Minimum d'Insertion (RMI) by family composition in 2008

Family size	Resources threshold
Singles	€447.91
Second person in the household	Add €223.96
Each additional person	Add €134.37
Each child after the 3^{rd}	Add €179.16

Source: Memento Social 2008, Francis Lefebvre Editions.

The income resources that compute in the RAP are (see the acronyms table for a short description of each voice): *indemnités journalieres*; *allocations chômage*; pensions of any type; *prestations familiales*; *allocation aux adultes handicapés*; revenues from real estate and from capital; income from work; *Aide au Logement* (reduced by a *forfeit* according to the household size). The resources that do not enter the RAP are: *Allocation Pour Jeune Enfant*, for the period of pregnancy till the first month after child's birth; *Allocation Rentrée Scolaire*; *Allocation Education Speciale*; scolarships; and *Prime de Retour a l'Emploi*.

3.2 Allocation Parent Isolé (API)

API is an allowance provided to single parents (or divorced, or widows) who have one or more children. The maximum monthly amount of API is €566.79 for a pregnant women plus €188.93 from the birth and for each additional child. Similar to the RMI, the benefit is means tested and is reduced if the parent earns some RAP. If a beneficiary exits unemployment and starts working, the same *dispositif d'interessement* as that for RMI is applied. So RMI and API work exactly in the same way except that the maximum amounts are different.

3.3 Prime Pour l'Emploi (PPE)

The PPE is a tax credit which is given to low income workers. In terms of RAP, the ceiling must respect the following thresholds: from €3,743 to €17,451 for singles, divorced or widows without dependent children or for bi-active couples; up to €26,572 for singles, divorced or widows raising their children alone or for mono-active couples.

The amount of PPE is computed as follows: 7.7% of the amount of RAP up to €12,475; 19.3% times the difference between €17,451 and the amount of RAP above €12,475; and 5.1% times the difference between €26,572 and the RAP above €24,950. A benefit supplement is provided for specific cases: €36 for each dependant family member for singles, bi-active couples and mono-active couples up to €17,451, or €36 independently of the person

Table 2 Mechanism to compute the Revenu Minimum d'Insertion (RMI) in 2008

Part time worker	
Working period	Monthly disposable income
0 months	100% RMI
0-3 months	RAP + 100% RMI
4-11 months	RAP[1] + max{RMI − 50% RAP; 0}
12 months	RAP + max{RMI − 100% RAP; 0}
Full time worker	
Working period	Monthly disposable income
0 months	100% RMI
0-3 months	RAP + 100% RMI
4-12 months	RAP + €150 for a single
	RAP + €225 for larger families
After 12 months	€1000 *forfeit* (Prime de Retour á l'Emploi)

Note: 1. RAP is the acronym for Revenu d'Activité Professionelle, or income from work.
Source: Memento Social 2008, Francis Lefebvre Editions.

in charge for mono-active couples above €17,451. The mechanism for the computation of PPE is summarized by Table 3.

3.4 Revenu de Solidarité Active (RSA)

The RSA is a household benefit which has been introduced in France on July 2009[4] in order to reduce the administrative costs and its economic inefficiencies. RSA is therefore projected to rationalize the French system of social minima, which was composed before by RMI, API and PPE. RMI and API are a source of minimum income, respectively, for people not working (but in search for a job) and for singles with one or more children. PPE, instead, works as a tax credit giving an extra-amount of money to low income workers. Again, the idea of RSA is to unify the two pre-existing public transfers (RMI and API) into a single measure which provides beneficiaries with a minimum set of resources and will constitute an incentive for people to exit unemployment and find a new job as an income complement.

The computation of RSA is simpler than those of RMI and API and is synthesized by the following formula

$$RSA = RSA_{max} - 0.38RAP,$$

where RSA_{max} is the maximum amount computed exactly by the same values that apply for RMI and API. The new system provides a fixed withdrawal rate of 0.62. This means that if a person exits unemployment, for each earned euro from work, she can save €0.62 of RSA.

An important difference with RMI and API is the elimination of *dispositif d'interessement* and of the limit of 12 months of entitlement. The amount of RSA varies over time according to the income from work of the beneficiary, but there is no change in the formula.

Since the first phase of implementation, PPE has been coexisting with RSA, while in the long run the policy proposal is to eliminate PPE from the set of available measures. While the two measures coexist, the mechanism is such that potential beneficiaries to both benefits are entitled to ask for the largest one. Although the two instruments work almost as substitutes, there are relevant differences between the two:

i. RSA works as an income complement and is paid immediately, while PPE, being a tax credit, is paid to the beneficiary after 18 months;
ii. RSA is really for low incomes (up to about €14,500 per year of gross salary for a childless single), while PPE is available also to better paid jobs (up to almost €22,200 of gross salary);

Table 3 Mechanism to compute the yearly amount of Prime Pour l'EMPLOI (PPE) in 2008

Household type	RAP[1] thresholds	Amount	Extra
Singles, widowed, divorced, bi-active couples, families with one worker in charge	3,743 ≤ RAP ≤ 12,475	RAP × 7.7%	€36 for each person in charge
	12,475 < RAP ≤ 17,451	(17,451 - RAP) × 19.3%	
Mono-active Couples	3,743 ≤ RAP ≤ 12,475	(RAP × 7.7%) + €83	€36 for each person in charge
	12,475 < RAP ≤ 17,451	(17,451 - RAP) × 19.3% + €83	
	17,451 < RAP ≤ 24,950	€83	€36 independently of persons in charge
	24,950 < RAP ≤ 26,572	(26,572-RAP) × 5.1%	

Notes: 1. RAP is the acronym for Revenu d'Activité Professionelle, or income from work.
Source: Memento Fiscal 2008, Francis Lefebvre Editions.

iii. PPE increases with labor income up to a certain threshold, about €12,500 per year, which corresponds to around €950 of benefit. In contrast, the amount of RSA decreases with income from work and is about €620 for a salary of €12,500.

Although the overlapping area can be larger or smaller depending on the family composition, it is clear that the two instruments address different work incentive targets: PPE aims to favor full-time employment, while RSA makes part-time work more attractive than not working at all.

It is also worth noting that RSA is clearly appealing with respect to RMI as an active welfare state measure because its implicit marginal tax rate (due to the benefit reduction as long as income increases) is lower, 38% respect to 50%, or 100% of RMI and API depending on the work situation. In this respect, however, it should be noted that there exist other relevant benefits for low-income households that need to be acknowledged. Most notably, the Aide Logement (AL), a housing benefit provided to low-income families that pay rent. The AL is a fixed amount upon a certain income threshold, but then reduces as household income grows by about 35 percent, thus adding to the implicit marginal tax rate. As shown by Figure 1, the implicit marginal tax rate is much larger in the range, corresponding to about €5,000 to €12,000 of gross labor income, thus reducing the work incentive in this range.

There are two fundamental objectives of this policy: to create incentives for people to exit unemployment and to alleviate poverty, by reducing the number of people below the poverty line by one third (Hirsh 2008). The 'RSA activité,' those given to the working poor, increased the median income per capita from €699 to €825 per month at the end of 2009. The effective gain may nonetheless be overestimated due to the concurrent decrease of PPE. Estimates show that the poverty rate (measured as the percentage of households below 60 percent of the median income) would be 0.3 percentage points higher without the implementation of RSA (Comitè National de Evaluation RSA 2012), which corresponds to 135,000 people out of poverty in contrast with the projection of 700,000. Of course the adverse effect of the crisis played and still plays a crucial role in affecting this trend.

3.5 RSA vs. RMI from a work incentive perspective

Before turning to our micro–macro simulation model and the analysis of the results of our simulations, in this section we analyze the hypothetical effect of the two systems on disposable incomes and work incentives. To this aim we use a graph based on artificial data for specific types of households and work contracts, plotting disposable income on months worked. In particular, in Figure 2 we analyze the case of a childless single with a part-time job and a monthly wage equal to 50% of SMIC (Salaire Minimum Interprofessionnel de Croissance, or gross minimum wage for a full time worker), which is the most favorable case to RMI.

This type of analysis is useful for the purpose of comparing the two systems because it is possible to verify which of the instruments determines a net gain for the beneficiary household. Because of the *dispositif d'interessement* that we presented in Section 3.1, if we compare RMI and RSA, in the very first months of work, the old benefit implies a better financial situation for the recipient due to the possibility of cumulating 100% of work income with the public transfer. But, as depicted below, there is a relative advantage of RSA

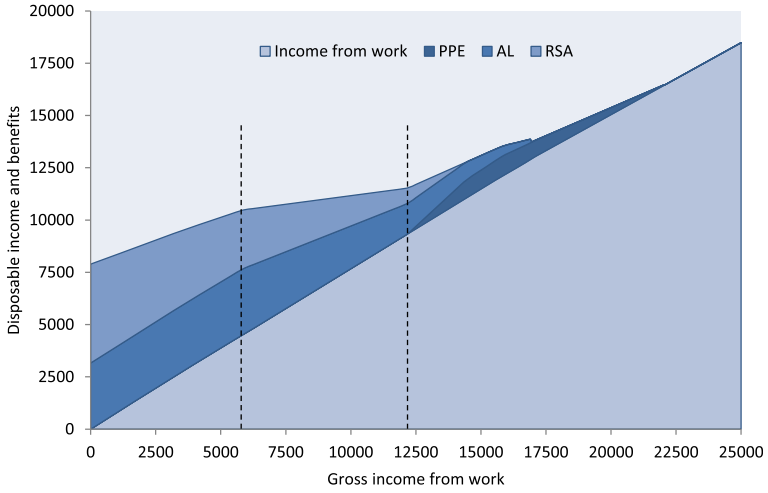

Figure 1 Disposable income composition by gross labor income. The graph illustrates the disposable income and the amount of benefits reived by a childless single worker depending on his gross labor income. The simulated benefits include: Revenu de Solidarité Active (RSA), Aide Logement (AL), and Prime pour l'emploi (PPE). Source: our simulations using SYSIFF2006 micro–macro simulation model.

in time for two reasons. First, after the first three months, RSA has a withdrawal rate larger than RMI (62% vs 50%), and second, RSA does not have time limits, while RMI stops after 12 months.

This kind of comparison also allows determining the break-even point, that is to say, the month after which the cumulated disposable income with the new benefit becomes greater than with the old one. Figure 2 shows the amount of disposable income for each month of work since the start of a new job. Hence the sum over time determines the cumulated available income for the time period considered.

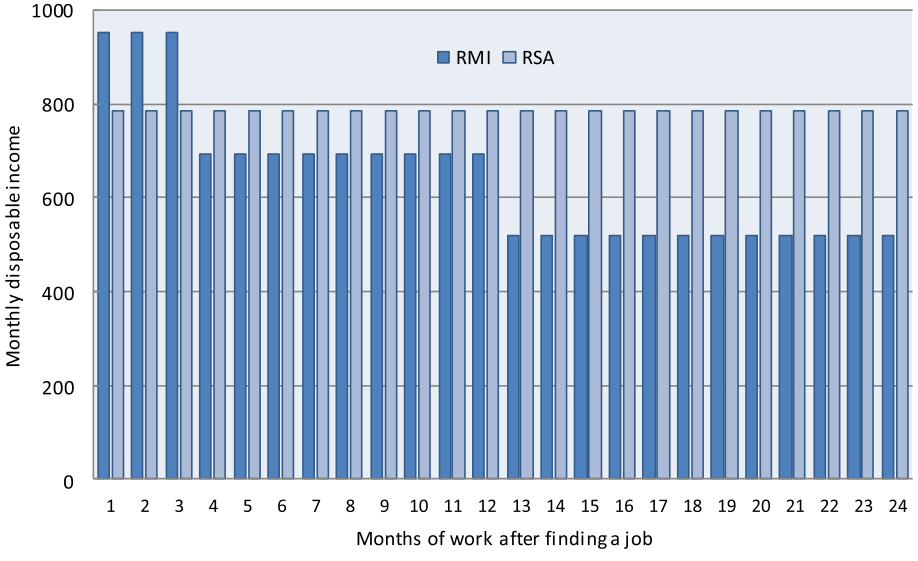

Figure 2 Disposable income with RMI and RSA for a single part-time worker (50% SMIC). The graph illustrates the amount of disposable income received by a childless single working part-time, receiving 50% of the minimum salary for a full-time worker (SMIC) by months of work after finding a job. Source: our simulations using SYSIFF2006 micro–macro simulation model.

RSA is winning against RMI after the 3rd month of work, when the 100% accumulation of income from work and RMI stops. The difference from the 4th to 12th month is just of 60 euros monthly but becomes higher when entitlement to RMI finishes after one year. From that point on, the advantage of RSA corresponds to a monthly gain of €267. The cumulative advantage of RSA starts at the 9th month.

Beneficiaries of RMI who have been working continuatively since 12 months are always better off after the introduction of RSA. On the other hand, if the recipient has been working for less than three months, RMI wins against RSA because of the possibility of accumulating the household's benefit with 100% of income.

Due to the *dispositif d'interessement*, RMI guarantees to the recipient an advantage in terms of income only in the very first period. RSA, instead, is more long-term oriented, with a fixed withdrawal rate of 62% and a benefit that continues over time.

To get an idea of how relevant the *dispositif d'interessement is* for RMI, in 2006 the distribution was the following: 68.5% of beneficiaries did not work, 8% started working less than four months before, and 23.5% were working for 4–12 months. Thus, almost 32% of RMI beneficiaries are likely to be temporary workers, and the relevant question is: is this a sustainable working condition in the long run?

Due to the nature of RMI itself, people who get minimum income may find it convenient to be employed for a short time to exploit the *dispositif d'interessement* and, at the same time, not lose entitlement to get RMI. This is possible if RMI recipients continue to enter and exit unemployment with temporary formal contracts and may rely on the informal sector in uncovered periods.

For these workers, RMI works as a sort of perverse inactivity trap in the sense that the minimum income constitutes the real stable source of income and temporary/informal job salaries represent just a complement.

On the contrary, RSA is thought to have an opposite effect and determines a situation for which the most convenient strategic behavior is to exit unemployment and find a stable job. This is true independently of the choice of working part-time or full-time. In fact, part-time workers benefit from a higher income complement but will possibly choose to have a stable contract. In this sense, part-time is facilitated. For example, think about a single mother with a young child; she could prefer a part time job and save on the child care expenses. With RSA she will receive a noticeable income complement, facilitating her choice.

It has been argued that RSA could create a sort of part-time trap[5], but it is rather unluckily that full-time workers will choose to downgrade to part-time, while currently (voluntary) unemployed could decide to switch to a part-time job since RSA increases this opportunity value. Moreover, in order to guarantee some labor market flexibility, part-time jobs should be preferred to temporary jobs since at least they do not imply the uncertainty of the next job and the costs related to a continuous job search.

4 The SYSIFF2006 micro–macro simulation model

SYSIFF2006 is a combination of a behavioral microsimulation model for the French tax-benefit system tightly integrated into a multi-sectorial static Computational General Equilibrium (CGE) model. The integration of the micro and macro model relies on an iterative approach similar to Aaberge et al. (2007) and Peichl (2009) (See Bourguignon and Bussolo 2013 and Figari et al. 2015 for a review of micro–macro integration techniques). While a

detailed description of the micro–macro model, including all estimation results, full CGE specification and calibration, and the iteration procedure can be found in Magnani et al. (2013), a short summary of the main characteristics is provided below.

4.1 The SYSIFF2006 behavioral microsimulation model

SYSIFF2006 (*Système d'Imposition Fiscale Français du 2006*) is an arithmetical microsimulation model for the French fiscal system integrated with two behavioral models concerning consumption and labor supply decisions. It is a microsimulation model since it is based on micro data on a sample of families representative of the French population (the *Budget des Familles* 2006 – the household budget survey provided by INSEE). The arithmetical part of the model simulates, for each of these families, social contributions, income taxes, VAT, local taxes and social benefits due or to be received by the state. The behavioral part includes two different microeconometric estimations: a quadratic, almost ideal demand system for consumption decisions and a discrete-choice labor supply model with involuntary unemployment.

The estimation of consumption demand is based on the Almost Ideal Demand System proposed by Deaton and Muellbauer (1980) and extended by Banks et al. (1997) with the introduction of a quadratic income term in the demand functions that fulfils the necessity of having a higher rank demand system (useful when Engel curves are non-linear). Along with the quadratic extension, we also introduce demographic heterogeneity through an income translating function, firstly introduced by Gorman (1976). The system of demand equations is estimated simultaneously by Full Information Maximum Likelihood, and a generalized Heckman correction for zero expenditures is applied (Shonkwiler and Yen 1999).

A standard way to estimate labor supply is to consider that individuals choose the optimal number of hours worked in order to maximize their well-being under a budget constraint. The non-linearity and non-convexity of the budget constraint, due to the characteristics of the tax system, implies the impossibility to derive an explicit solution to this standard utility maximization problem. In the last decades, this problem has often been addressed by using discrete choice labor supply, first introduced by Van Soest (1995). This approach allows for directly estimating the utility function parameters without the need of a Marshallian labor supply function. In particular, discrete choice models have the advantage of capturing behavioral changes in corner solutions, accounting for market rigidities and avoiding the computational and analytical difficulties arising from non-linear and non-convex budget constraints, since the budget constraint is computed by the microsimulation model and introduced directly into the utility function (See Aaberge and Colombino 2014 for a review of labor supply models integrated within microsimulation models).

The analysis of the distribution of the work alternatives has led to the choice of four work alternatives: not to work (0 hours), 50% part-time (18 hours), 80% part-time (28 hours), and full-time (36 hours). The estimates of labor supply are performed on a sub-sample of potential wage earners separately for single men, single women and couples. In particular, for each single (man or woman) we define a utility level for each of the four alternatives depending on individual characteristics and the yearly disposable income associated to each alternative. In contrast, for each couple, we estimate the work decision jointly by considering eight alternatives, four for the

woman and two (full-time work or not to work) for the man. Then, we define a utility level for each of the eight alternatives depending on family characteristics and the yearly disposable income of the family associated to each alternative. Of course, in order to compute the disposable income for the non-observed alternatives it is necessary to generate a potential salary for the unemployed. Potential salaries are estimated using a Heckman correction model (Heckman 1979) to account for potential self-selection bias issues.

As for the discrete choice labor supply model, we extend the standard approach, which implicitly assumes that all non-working people choose not to work, by considering that unemployment may be either voluntary or involuntary, as in Magnac (1991), Bingley and Walker (1997), and Haan and Uhlendorff (2013). Our micro dataset allow us to identify involuntarily unemployed: 19.7% of working age individuals do not work but only 6.3% of them is involuntarily unemployed, implying that the unemployment rate is 7.3%. Involuntary unemployment is introduced into the model by randomly assigning (respecting the actual distribution of observed choices) a choice among the work alternatives to involuntarily unemployed. Thus, the involuntarily unemployed would choose to work but cannot find a job. Then, we estimate the probability of being involuntarily unemployed and rank individuals according to this probability. If at macro level the unemployment rate increases, more individuals from this ranking will be assigned to not work even if their actual choice would be to work.

4.2 The CGE model

The CGE model that represents the macro component of our Micro–macro simulation model is a multisectoral and static model with two foreign zones: the Eurozone and the rest of the world. The model is built by using the 2006 French input–output data-set provided by INSEE. The construction of the SAM (Social Accounting Matrix), necessary to calibrate our CGE model, is completed by using national accounts concerning the government accounts and the balance of payments.

An important feature of the CGE model is its macro closure. The macroeconomic equilibrium condition states that aggregate investments must be equal to aggregate savings. The neoclassical closure, which is the most frequently used in general equilibrium models, implies that investments are then savings-driven, i.e., the macroeconomic equilibrium condition determines the aggregate investment. The use of the neoclassical closure implies that a shock which increases the value of a component of the aggregate demand produces a strong and unreasonable effect on investments, while the effect on the GDP is negligible since GDP is determined by the supply of production inputs that are assumed to be fully employed in the economy.

With respect to the neoclassical closure, the Keynesian closure consists of fixing the level of investments at a predetermined level (see Álvarez-Martínez and Polo 2012) and to endogenize the unemployment rate. The unemployment rate is then determined in order to satisfy the macroeconomic equilibrium condition between investments and aggregate savings, implying that aggregate production is demand-driven. In particular, and in contrast to neoclassical models, the macroeconomic equilibrium may be an under-unemployment equilibrium, implying that unemployment appears in the case in which the level of the aggregate demand is insufficient.

However, even the Keynesian closure presents a major shortcoming since the reaction of the unemployment rate may often be excessive. This is why we chose to use in our CGE model a closure rule which is between the neoclassical and the Keynesian ones. The idea is the following: with a neoclassical closure in which investments are savings-driven, an increase in the current account, or in any other component of the aggregate demand, produces a crowding-out effect on investments; in contrast, with a Keynesian closure, the same shock produces no effects on investments (if investments are fixed at a given value) or just an indirect effect via the interest rate. Our idea is to introduce an investment function which takes into account the (partial) crowding-out effect on investments produced by a change in the components of the aggregate demand. Thus, the introduction of this investment function allows us to build a CGE model with a macro closure that is between the neoclassical and the Keynesian ones.

4.3 Integration of the two models

The Micro and Macro models are integrated by an iterative approach. This means that the models are run sequentially, and the output of each model is an input to the other. Iterations continue up to a point in which from one iteration to the other variations of all relevant variables are sufficiently small.

The workflow of the model can be summarized as follows (again, for more details, see Magnani et al. 2013). First (optional), the CGE model simulates a shock and determines the macroeconomic effects, in particular, the percentage variations of (i) the equilibrium domestic wage, (ii) the equilibrium consumer prices of the goods and services, (iii) the consumer price index, and (iv) the equilibrium unemployment rate.

Second, these variations are passed to the Microsimulation model in order to compute, for each individual, the effects on (i) the labor supply, (ii) the demand of goods and services, (iii) the employees and employers social contributions, (iv) the taxes on incomes, (v) the transfers from the government, and vi) the disposable income. Fiscal reforms, such as the RSA, can be (optionally) introduced in this step.

Third, the individual effects are then aggregated, and the percentage variations computed in the Microsimulation model are passed to the CGE model as exogenous variables, in particular: (i) the total quantity of labor supply, (ii) the total demand of goods and services, (iii) the total contributions paid by employees and employers, (iv) the total income taxes collected, and (v) the total transfers paid by the government.

Fourth, the CGE model is then solved by considering the new values of the exogenous variables determined in the Microsimulation model. The solution obtained by the CGE model (i.e., the percentage variations of the equilibrium prices) is then introduced in the Microsimulation model again, and so on.

Iterations are stopped when variations in all relevant variables remain (sufficiently) unchanged between consecutive iterations.

5 Results of the simulations

To assess the impact of the RSA reform, we simulate three different scenarios. The baseline scenario is named “baseline” and corresponds to the last year of full implementation of RMI, 2008. As our model is based on the 2006 data and fiscal system, we update both

components to reflect the 2008 system and aggregate data (for example we update incomes to obtain 2008 aggregate values, but we do not change the distribution). This scenario is used as reference for comparisons with the RSA reform, which is then evaluated as if it substituted RMI and API in 2008.

The first reform scenario refers to the very short run. In this case we only present the results of an arithmetic simulation of the introduction of RSA that we call "short run". Here behavioral responses and macro adjustments are omitted, and it is supposed to show what would happen the day after the reform. In the long run both behavioral reactions and macroeconomic adjustments are allowed. Since there is no indication for the moment about eliminating PPE, for simplicity of exposition, we present only the results of a long run scenario in which PPE survives and only mention the main differences in case of PPE elimination. Full simulation results are available upon request. We name this scenario "long run."

It is important to stress that in these simulations, we assume that other macroeconomic conditions are unchanged, so we are able to avoid the effects of the big recession that occurred just after the introduction of the RSA. At least we can provide evidence that the introduction of the RSA contributed to alleviate the effects of the crisis, since in our simulations, it produced an increase in real GDP and a reduction in the unemployment rate.

5.1 The costs of the reform

One of the most important points of the reform is its impact on the public budget. Evaluating the cost of the introduction of RSA is decisive to assess the effectiveness of the new instrument and its efficiency in terms of resource allocation.

First of all, a distinction must be made between the short and long run. In the long run, the new social minimum is intended to rationalize the whole system of households' benefits by increasing incentives to start working. In this scenario, RSA and PPE are going to coexist, and costs must be estimated taking that properly into account.

Official public expenditures for 2008, as reported by Hirsh (2008), include RMI for €6 billion; API for €1 billion and PPE for €4.5 billion, for a total amount of €11.5 billion. Our simulations for the same instruments produce a total expenditure of €11.04 billion, with a good precision in simulating beneficiaries of RMI and API, with just 0.7% more beneficiaries. The government cost of RSA was assumed to be around €9.75 billion, while PPE in 2009 was expected to cost €3.9 billion (Assemblée Nationale 2008). This totals to €13.65 billion which would indicate a short run cost of €2.15 billion. SYSIFF2006 instead produces an estimated cost of almost €7 billion (see Table 4), mainly because of the much larger estimated cost for the RSA "active", that is, the RSA claimed by working poor. We estimate a cost of about €7.7 billion for them, while government estimates a cost of €3.25 billion (Hirsh 2008). Ex-post evidence provided by Domingo and Pucci (2012) show that about half of active families entitled to RSA do not claim it. Accounting for this difference, we would obtain figures that are much closer to the governmental estimates. The elimination of PPE would reduce total costs by about €4 billion in the long run.

5.2 Labor supply reactions

As mentioned earlier, much of the debate around the reform was about its potential positive effect on labor supply. Some critics suggested that the introduction of RSA

Table 4 Costs of minimum income benefits and rsa (In Billions of €)

	Baseline	Short run	Long run
RMI	5.95	-	-
API	0.93	-	-
PPE	4.16	4.16	4.13
RSA	-	13.80	14.23
Total cost	11.04	17.96	18.36
Cost of the reform	-	6.92	7.32

Notes: The cost of the reform is computed as the difference between the total cost of a reform scenario and the total cost of the baseline scenario.
Source: Our simulations using SYSIFF2006 micro–macro simulation model.

would have changed a temporary job trap into a part-time trap, because working part-time entitles a larger amount of benefit.

Table 5 and Table 6 are the so called transition matrices. They represent the percentage of workers that change their labor supply from one category to another. On the diagonal is the percentage of workers that do not change their labor supply decisions (the observed choice is equal to the prediction after the reform). The results show that the expected labor supply reactions are rather modest, with the strongest effects being 1.1% of singles that start full time work from an unemployment or inactivity condition (this means that about 7% of non-working singles find a full time job), 1% of couples passing from bi-active to mono-active, and 0.5% of couples going the other way from mono-active to bi-active. Overall, we do not predict a massive shift towards part-time jobs.

These relatively modest results seem to partially confirm the studies which tried to assess the overall effects in term of unemployment and found no significant impact (Bargain and Vicard 2012). However, even though figures are not large in percentage terms, they correspond to relevant absolute numbers.

5.3 Poverty and inequality

Table 7 reports poverty and inequality figures for the pre- and post-reforms simulations. Poverty measures, the head count ratio, and the poverty gap ratio are computed on the equivalized disposable income[6] using 60% of the median income of the pre-reforms distribution as the poverty line for all scenarios. The indices of inequality are the Gini and the interdecile ratio, also computed on the equivalized disposable income.

As to the baseline scenario, we find a poverty rate of almost 14%, a poverty gap ratio of about 3.7, a Gini coefficient of 29.5 and an interdecile ratio of 3.7. In the short run, the reform brings a quite substantial reduction in poverty, about 1.4 percentage points, which is slightly strengthened by the behavioral reaction in the long run. Overall, this corresponds to an 11% reduction in poverty. On a similar pattern is the intensity of poverty, with the PGR falling from 3.7 to just above 3.3, a reduction of more than 10%.

Inequality is also reduced, even though by a smaller extent. In the long run, the Gini is reduced by almost 0.8 percentage points, a 2.6% reduction. The interdecile ratio decreases by 3.7%.

The behavioral response caused by the introduction of the RSA seems to go in the right direction, taking more people out of poverty, but the overall effect is quite limited,

Table 5 Long run labor supply reaction of singles (Transition Matrix)

Prediction		0	18	24	36	Total
Choice	0	14.4	0.1	0.2	1.1	15.7
	18	0.0	6.6	0.0	0.0	6.7
	24	0.1	0.0	8.1	0.0	8.2
	36	0.4	0.2	0.1	68.8	69.4
Total		14.8	6.9	8.4	69.9	100

Notes: Although estimation was performed separately for males and females, for simplicity this table resumes the labor reaction supply of all singles. The transition matrix should be interpreted as follows. Each cell of the matrix reports the percentage of individuals that before the reform chose the work alternative corresponding to the "choice" line and after the reform choose the work alternative corresponding to the "prediction" column. Figures in the diagonal report the percentage of individuals that did not change behavior with the reform.
Source: our simulations using SYSIFF2006 micro–macro simulation model.

possibly due to a macroeconomic compensating effect of wage reduction, as detailed in the next section. The main effect, however, is the immediate one, that is the provision of an income complement to low wage workers quite likely to bring them above the poverty line.

This intuition is confirmed by Table 8, which reports the proportions of winners and losers and the average gain and loss for several household types. Overall, the number of winners is smaller than that of losers, but the average gain is substantially larger than the average loss, likely because the former is mainly determined by the income complement due to the RSA and the latter by the slight reduction of equilibrium wages. Clearly, those that obtain more from the reform are the poor, but also singles and families with children are more often among the winners.

A clear idea of the effect that the RSA reform has on the distribution of income is provided by Figure 3, which plots the probability density function of equivalized disposable income pre- and post-reform (in the long run scenario). It clearly depicts a shift of families in the range of €5,000-10,000 of yearly equivalized income towards a higher income bracket (€10,000-15,000). The working poor receive an income complement that in many cases brings them out of poverty.

Table 6 Long run labor supply reaction of couples (Transition matrices)

Prediction		0-0[1]	0-18	0-24	0-36	36-0	36-18	36-24	36-36	Total
Choice	0-0	2.9	0.0	0.0	0.0	0.2	0.0	0.0	0.0	3.1
	0-18	0.0	0.8	0.0	0.0	0.0	0.1	0.0	0.0	0.9
	0-24	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.7
	0-36	0.0	0.0	0.0	2.6	0.0	0.0	0.0	0.3	2.9
	36-0	0.1	0.0	0.0	0.0	17.8	0.2	0.2	0.5	18.7
	36-18	0.0	0.0	0.0	0.0	0.2	9.7	0.0	0.0	9.9
	36-24	0.1	0.0	0.0	0.0	0.3	0.0	14.0	0.1	14.5
	36-36	0.2	0.0	0.0	0.1	0.8	0.2	0.1	47.9	49.4
Total		3.3	0.8	0.7	2.7	19.3	10.2	14.4	48.7	100

Notes: 1. Within each possible combination of choices, the first figure refers to the man and the second to the woman. The transition matrix should be interpreted as follows. Each cell of the matrix reports the percentage of individuals that before the reform chose the work alternative corresponding to the "choice" line and after the reform choose the work alternative corresponding to the "prediction" column. Figures in the diagonal report the percentage of families that did not change behavior with the reform.
Source: our simulations using SYSIFF2006 micro–macro simulation model.

Table 7 Poverty and inequality before and after the reform

Scenario	Headcount ratio	Poverty gap ratio	Gini coefficient	D9/D1
Baseline	0.1397 (0.0034)	0.0372 (0.0013)	0.2949 (0.0035)	3.6628 (0.0482)
Short run	0.1255 (0.0033)	0.0337 (0.0012)	0.2873 (0.0035)	3.5391 (0.0479)
Long run	0.1241 (0.0033)	0.0333 (0.0012)	0.2871 (0.0035)	3.5266 (0.0476)

Notes: Standard errors in parentheses. Poverty and inequality indices are computed on equivalized (OECD modified scales) disposable income. The poverty line is set at 60% of the median income of the baseline scenario.
Source: our simulations using SYSIFF2006 micro–macro simulation model.

5.4 Macroeconomic adjustments

By definition, an active welfare state policy has the objective of increasing the labor supply through economic incentives. As a result, not only families have more money to spend, but also, if the objective is achieved, there is a likely effect on the labor market. Moreover, a reform such as the RSA, as shown earlier, has relevant costs in terms of public budget. Thus macroeconomic adjustments are likely to happen. Table 9 presents the more relevant macroeconomic adjustments for the long run scenario.

Perhaps the most relevant effect at the macro level is the 15.2% reduction in the involuntary unemployment rate, roughly 1.3 percentage points, which goes in the right direction according to the aims of the RSA reform. As a consequence, the total labor supply increases by 0.3%, which implies an increase by 0.2% of the real GPD. The increase in labor supply also implies a wage adjustment, with a reduction of 0.2%. Total capital in the economy are almost unchanged, with a slight increase in the remuneration of capital. Prices of goods are unchanged overall, although private consumption increases by 0.8%. Total investments see a relevant reduction (1.1%) due to a decrease in the saving rate by consumers (–4.6%). Finally, government expenditure increases by 0.2%, but thanks to the positive effect on the GDP, the deficit/GDP ratio decreases by 6.6%, going from 2.4% to 2.2%. Interestingly enough, on an ex-ante perspective, the positive macroeconomic effects that RSA has on the economy surpasses its cost for the government, allowing for an improved deficit/GDP ratio.

6 Conclusions

This paper is the first systematic evaluation of the impact of the RSA reform on French economic system. After the experimentation in 2008 and the generalization of the

Table 8 Percentage of winners, average percentage gain and percentage of losers and average loss

Family type	Winners	Gain	Losers	Loss	Net gain
All families	18.7%	16.2%	29.0%	−1.8%	2.5%
Poor	20.9%	58.5%	8.7%	−2.5%	12.0%
Singles	17.7%	23.0%	38.5%	−1.8%	3.4%
Singles with children	70.6%	20.7%	18.2%	−3.0%	14.1%
Couples without children	17.8%	15.5%	32.3%	−1.4%	2.3%
Couples with 1 child	26.2%	17.0%	48.1%	−1.5%	3.7%
Couples with 2 children	25.6%	17.9%	51.3%	−1.3%	3.9%
Couples with 3 or more children	32.3%	13.0%	43.6%	−1.5%	3.6%

Notes: The table reports the percentage of winners, the average percentage gain, the percentage of losers, the average percentage loss and the overall percentage net gain for several family types.
Source: our simulations using SYSIFF2006 micro–macro simulation model.

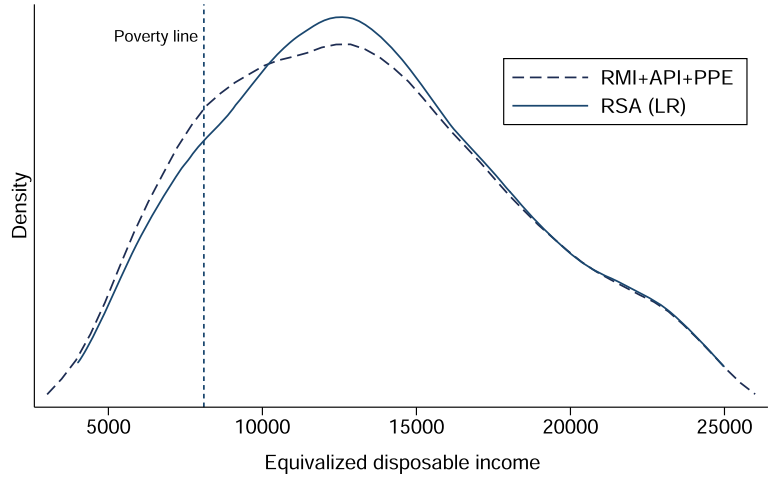

Figure 3 Probability density function of equivalized disposable income before and after the reform. The graph depicts the shift in the probability density function of equivalized disposable income for the French population before and after the RSA reform (long run scenario). To highlight the impact of the RSA reform the income distribution has been cut at €25,000 and a reference to the poverty line (about €8,100) have been included. Source: our simulations using SYSIFF2006 micro–macro simulation model.

measure to the entire population, the crisis has produced a significant and unexpected impact on the number of beneficiaries, which are now close to 5 million people. The possibility of evaluating both at the micro and macro level the effects of the reform can shed light on some issues: we use a micro–macro simulation model (SYSIFF2006) in order to simulate the monetary cost of the reform and its effects on labor supply, poverty and inequality, together with the corresponding macroeconomic adjustments, net of the great recession effects.

According to our simulations, the RSA reform produces a long run reduction of poverty of almost 1.6 percentage points (from 14% to 12.4%), corresponding to about 400,000 families out of poverty.

Table 9 Macroeconomic adjustments of the RSA reform

	% Variation[1]
Real GDP	0.2
Involuntary unemployment rate	−15.2
Labor	0.3
Capital	0.0
Real wage	−0.2
Real rate of remuneration of capital	0.2
Consumer Price Index	0.0
Private consumption	0.8
Total investments	−1.1
Government expenditure	0.2
Private saving rate	−4.6
Public deficit/GDP	−6.6

Notes: 1. % Variation can refer to the percentage variation of a quantity, as for example real GDP, or to the percentage variation of a rate or ratio, as the involuntary unemployment rate.
Source: our simulations using SYSIFF2006 micro–macro simulation model.

By integrating the microsimulation model into a CGE model, we then simulate the short run and long run effect of the RSA reform on job opportunities of beneficiaries, finding only slight variations for couples (again, confirming Bargain and Vicard 2012) but a significant effect for singles, with 1.1% of total singles (about 7% of the non-working) who exit unemployment/inactivity and find a stable full-time job.

A quite interesting result is obtained in terms of macroeconomic implications in a scenario without economic crisis. If the RSA was working as a minimum income scheme in a pro-cycle phase, the overall effect in terms of GDP (+0.2%) would have produced a positive impact on the deficit/GDP ratio, therefore counterbalancing the effect of the increased public expenditure with a multiplier effect able to boost the aggregate demand.

The macroeconomic context in which RSA has been implemented was extremely unfavorable, especially for the governmental goal of increasing efficiency of job-search activities. In this respect, any tentative ex-post evaluation is necessarily questionable because the scheme has been operating under extraordinary conditions which were not foreseeable. As our evaluation was performed ex-ante, we are able to evaluate the possible impact that RSA could have had if the great recession did not happen, and the results indicate an overall positive evaluation, which effectively combines a back to work strategy with social protection.

Endnotes

[1]http://www.pbo.gr/DesktopModules/EasyDNNNews/DocumentDownload.ashx?portalid=3&moduleid=5211&articleid=6015&documentid=3319.

[2]http://ec.europa.eu/eurostat/statistics-explained/index.php/Unemployment_statistics.

[3]http://ec.europa.eu/social/main.jsp?catId=102.

[4]Projet de Loi généralisant le revenu de solidarité active et réformant les politiques d'insertion, n°7 Sénat Session Ordinaire de 2008–2009.

[5]This is the position, for example, of Thomas Piketty: http://www.liberation.fr/economie/2009/11/13/le-rsa-contribue-a-favoriser-l-emiettement-du-travail_593459.

[6]We use the OECD-modified equivalence scale: a weight of 1 is assigned to the household head, 0.5 to each further adult, and 0.3 to each child.

List of Acronims and fiscal instruments

Acronym (Full name (in French)): Short description

RMI (Revenu minimum d'insertion): Minimum income before the reform

RSA (Revenu de solidarité active: Minimum income after the reform

(Prime de Retour à l'Emploi): *Forfeit* given to people that find a job and exit RMI

API (Allocation Parent Isolé): Benefit for single women with children in charge

PPE (Prime pour l'Emploi): Tax credit for low wage workers

SMIC (Salaire minimum interprofessionnel de croissance): Minimum wage for full-time workers

(Pensions alimentaires): Transfers for families after a divorce or for people who live outside the fiscal unit

(Prestations Familiales): Households' benefits

AL (Allocation Logement): Housing benefits

PAJE (Prestation Accueil Jeunes Enfants): Set of benefits for families with more than 2 children

APJE (Allocation Pour Jeunes Enfants): Set of family benefits substituted by PAJE in 2005

ARS (Allocation Rentrée Scolaire): Family benefit for families with children going to school

(Prestations en nature): Transfers in kind

(Indemnités journalières, maladie): Reimbursements provided by work contracts in case of accident

(Assurance maladie): Health insurance

(Assurance accidents du travail): Insurance scheme provided by employer for work accidents

AES (Allocation Education Spéciale): Family benefit for children with disability

RAP (Revenus Activités Professionnelles): Income from work

(Revenus Nets Catégoriels): Net income from work

(Allocation Chômage): Unemployment benefit

AAH (Allocation aux adultes handicapés): Household's benefit for invalid people

AEEH (Allocation Education Enfants Handicapés): Household's benefit for families with invalid children.

Competing interests

The IZA Journal of European Labor Studies is committed to the IZA Guiding Principles of Research Integrity. The authors declare that they have observed these principles.

Acknowledgements

The authors thank François Bourguignon, Riccardo Magnani, Lucia Mangiavacchi, Xisco Oliver and one anonymous referee for their useful comments, discussions and help. We thank for their useful comments the participants to the Lunch Seminars at the Paris School of Economics, to the First Microsimula conference "Microsimulation as a tool for the analysis of public policies: methods and applications" (Paris School of Economics), and to the 2nd General Conference of the International Microsimulation Association "Microsimulation: bridging data and policy" (Ottawa). The authors acknowledge financing to the French Government (CNRS, project n. BLAN06-2_139446). Luca Piccoli and Amedeo Spadaro acknowledge financing to the Spanish Government (Ministerio de Ciencia e Innovación, project n. ECO2011-28999).

Responsible editor: Alan Barrett

Author details

[1]Enrico Mattei School, c/o eni Corporate University, Via San Salvo 1, 20097 San Donato Milanese, Italy. [2]University of Balearic Islands, Cra. De Valldemossa km 7.5, 07122 Palma, Spain. [3]IZA - Institute for the Study of Labor, Schaumburg-Lippe-Strasse 5-9, 53113 Bonn, Germany.

Received: 14 November 2014 Accepted: 16 April 2015
Published online: 27 August 2015

References

Aaberge R, Colombino U (2014) Chapter 7 – Labour supply models. In: O'Donoghue C (ed) Handbook of Microsimulation Modelling (Contributions to Economic Analysis), vol 293. Emerald Group Publishing Limited: Bingley, UK; p 167–221

Aaberge R, Colombino C, Holmoy E, Strøm B, Wennemo T (2007) Population ageing and fiscal sustainability: integrating detailed labour supply models with CGE models. In: Harding A, Gupta A (eds) Modelling our future: population ageing, social security and taxation, Volume 15 of International Symposia in Economic Theory and Econometrics, Chapter 10. Elsevier, Amsterdam, pp 259–290

Álvarez-Martínez MT, Polo C (2012) A general equilibrium assessment of external and domestic shocks in Spain. Econ Model 29(6):2486–2493

Assemblée Nationale (2008) Projet de loi n°100 généralisant le revenue de solidarité active

Banks J, Blundell R, Lewbel A (1997) Quadratic Engel curves and consumer demand. Rev Econ Stat 79(4):527–539

Bargain O, Doorlay K (2013) Putting structure on the RD design: social transfers and youth Inactivity in France, IZA Discussion Paper No. 7508

Bargain O, Vicard A (2012) Le RMI et son successeur le RSA découragent-ils certains jeunes de travailler? In: INSEE Working Paper J2012/09

Bingley P, Walker I (1997) The labour supply, unemployment and participation of lone mothers in in-work transfer programmes. Econ J 107(444):1375–1390

Bourguignon F, Bussolo M (2013) Income Distribution in Computable General Equilibrium Modeling. Handbook of Computable General Equilibrium Modeling, Elsevier, vol 1A:1383–1437

Canova L, Piccoli L, Spadaro A (2009) SYSIFF 2006: a microsimulation model for French tax system. MicroSimula – Paris School of Economics. doi:10.13140/2.1.3076.3521
Cazain S (2014) Les foyers bénéficiaires du RSA fin décembre 2013. In: Cnaf, RSA conjoncture, n° 5
Comitè National de Evaluation RSA (2012) Rapport final
Danzin E, Simonnet V, Trancart D (2012) Les effets du RSA sur le taux de retour a l'emploi des beneficiaires. In: CEE Working paper n. 73
Deaton AS, Muellbauer J (1980) An almost ideal demand system. Am Econ Rev 70(3):312–326
Domingo P, Pucci M (2012) Les non recourants au RSA. In: CAF L'essentiel, n°124
Figari F, Paulus A, Sutherland H (2015) Chapter 24 - Microsimulation and policy analysis. In: Atkinson A and Bourguignon F (eds) Handbook of income distribution, vol 2. Elsevier: Oxford, UK; p 2141–2221
Frazer H, Marlier E (2009) EU Network of National Independent Experts on Social Inclusion, Minimum Income Schemes across EU Member states, European Commission - DG Employment, Social Affairs and Equal Opportunities
Gorman WM (1976) Tricks with utility functions. In: Artis MJ, Nobay AR (eds) Proceedings of the 1975 AUTE Conference, Essays in Economic Analysis. Cambridge University Press, Cambridge
Haan P, Uhlendorff A (2013) Intertemporal labor supply and involuntary unemployment. Empirical Economics 44.2:661–683
Heckman J (1979) Sample Selection Bias as a Specification Error. Econometrica 47:153–161
Hirsh M (2008) Livre vert vers un revenu de solidarité active. République Française, Haut commissaire aux solidarités actives contre la pauvretè
Magnac T (1991) Segmented or competitive labor markets. Econometrica 59(1):165–187
Magnani R, Piccoli L, Carré M, Spadaro A (2013) Would a real depreciation of the euro improve the French economy? In: DEA working paper n. 60
OECD (2011) A simplified benefits system. In: France country policy briefs
Parliamentary Budget Office of Hellenic Parliament (2014) Minimum Income Schemes in European Union and Greece, Interim Report
Peichl A (2009) The benefits and problems of linking micro and macro models – evidence from a flat tax analysis. J Appl Econ 12(2):301–329
Shonkwiler JS, Yen ST (1999) Two-step estimation of a censored system of equations. Am J Agric Econ 81(4):972–982
Spadaro A, Piccoli L, Mangiavacchi L (2014) Optimal taxation, social contract and the four worlds of welfare capitalism in Europe. Economica. doi: 10.1111/ecca.12108.
Thibault F (2014) Ambition et evaluation du Revenu de Solidarité Active. In: Economie et Statistique., pp 467–468
Van Soest A (1995) Structural models of family labor supply: a discrete choice approach. J Hum Resour 30(1):63–88