

The Economic Effects of the Consumer Over-Indebtedness Legislation in Italy: An Agent-Based Model

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ABSTRACT

Consumer over-indebtedness is a growing phenomenon in EU countries. Legislation addressing debt solutions for consumers does not have a long tradition in Italy. In 2012 Italy defined debt settlement procedures to reduce the impact of *over-indebtedness*. We build a *disequilibrium* agent-based model (abm), populated by heterogeneous consumers who behave according to boundedly rational behavioral rules. Through abm model, it will be possible to test the effects of this regulatory framework on the credit market, wealth distribution, and savings. In particular, the probability by means the local Tribunal accepts the consumer plan has an important role to balance between the need to provide an appropriate solution for enabling over-indebted individuals to start over with their lives, on one hand, and economic efficiency that debts should be paid.

Keywords: consumer; over-indebtedness; regulation; agent-based model

1. Introduction

Between 1998 and 2007, the European credit market has registered an unprecedented expansion, which has significantly contributed to economic growth in the EU. Financial integration and the adoption of a single currency are two major factors at the root of this remarkable expansion across all the EU member states. After 10 years of continuous expansion, the combination of the financial and sovereign crises caused an immediate standstill in the European credit market. Over the period 2008-14, an increasing level of unemployment generated an alarming expansion in the number of over-indebted consumers.

In the absence of an adequate legislative framework, over-indebtedness may lead to severe consequences both for individuals concerned and for the stability of the financial sector as a whole. Before the crisis, in Italy, the law foresaw no personal insolvency procedures, as consumers were not entitled to objective and subjective conditions required by the law to initiate bankruptcy procedures. Insolvency procedures were strictly reserved for corporations or commercial activities in general.

In Italy, as provided by Law 3/2012, was introduced a solution to the problem of over-indebtedness with serious delay in comparison to the other judicial systems. Italian legislator introduced ("Dispositions on usury and extortion, as well as on the composition of the over-indebted crises"¹) a new regulation on over-indebtedness which could be accessed by individual consumers.

The primary goal is to realize a *Fresh start*² for consumers heavily indebted, by means: *a)* restructuring insolvency (reduction debt exposure and postpone the payment); *b)* discharging from remaining debts and obligations, at procedure's end.

All procedures start with a proposal made from the indebted consumer to the creditors with whom he/she pledged to pay part of the debts. The conditions for admission are the *status* of non-fallible debtor, as objective condition, the *status* of over-indebtedness, that consisted in the situation of "*persisting unbalance among the obligations and the patrimony of the debtor and the incapability of the debtor to regularly carry out his obligations*".

On this basis, consumers have different debt settlement procedures. First of all, consumers can enter into a debt restructuring agreement (*Accordo di ristrutturazione dei debiti*) which entitles debtors to seek a solution with creditors with the involvement of the bodies operating as facilitators of crisis-indebtedness. These consist of operators (Organismo di Composizione Della Crisi) who need to be listed in a special register for offering assistance activities aimed at helping debtors to overcome solvency problems and supervising a debt repayment plan. To go ahead, the plan needs the approval of 60 percent of the creditors by value.

Alternatively, consumers may apply for a consumer plan (*piano del consumatore*), another court settlement procedure that

¹ Many criticisms have followed the introduction of the law. n. 3/2012 have brought to the approval of the D.l. n. 179/2012, entitled "Further urgent measures for the growth of the Country", subsequently converted in law. n. 221/2012.

² The expression "fresh start" was used for the first time by Lord MacNaghten, in the sentence *Hardy v. Fothergill*, 13 App. Cas. 351, 1888

also involves the above-mentioned operators. It is a procedure led by the Court, and in the end, the Tribunal accepts the consumer plan if the applicant can demonstrate his/her good faith – the Judge has the authority to exclude approval of the plan when the consumer has caused over-indebtedness through negligence and if the plan itself looks reasonable. As the recent case law demonstrates, the Judge has a significant role of supervision with discretion in approving and revoking the plan.

Recently, Legislative Decree n. 14 dated 12 January 2019, “Code of corporate crisis and insolvency”⁽³⁾, entirely introduces in the new code the over-indebtedness procedures under Law n. 3/2012, with significant news in regulation. The over-indebtedness concerning now consumers, families Company’s partners, and all those subjects classified as “non-fallible” (i.e. that cannot go bankrupt) that are in a “persistent instability and are overburdened by debts that they cannot repay”.

The main new provisions concerning the so-called “familiar procedures”⁽⁴⁾, the *Fresh start* for a creditable/deserving individual who is not able to guarantee any direct or indirect profit, both now and in the future, can get free of debts, though only once⁽⁵⁾. Lastly, the new provisions about “creditors deserving” introduced an extension of the creditor’s responsibility: those who are responsible for having worsened the situation of the over-indebted individual are subject to penalties and cannot object or complain, even if they dissent, except in case of malicious behavior by the debtor.

Both lawsuits’ requirements, therefore, introduce uncertainty and significant variability element about the number of over-indebted consumers that obtain the *Fresh-start*. Moreover, the “deservingly” requirement imposes on the judge an evaluation, even ethical, of certain debtor’s behavioral conditions, implying broad discretionary powers based on non-objective interpretation criteria, which depend fundamentally on the appreciation, in the concrete case, of the reasons that produced over-indebtedness.

The paper is organized as follows. “Economic literature” reviews some of the main contributions of theoretical and empirical studies on the subject. “The Model” illustrates the abm model and describes the calibration of the variables used in our analysis, and “Simulations” develops the results of the abm analysis. “Conclusions” outlines many conclusions.

2. Economic literature

There are many reasons why a consumer may accumulate more debt than she/he can repay. A first driver of over-indebtedness is financial imprudence, i.e. poor financial decisions caused by an inadequate understanding of the real cost of repaying the loan. This factor may be linked both to the issue of the transparency of lenders’ terms and conditions and to borrowers’ financial literacy and ability to manage their finances correctly (plan expenses and income) (Lusardi and Tufano, 2009).

The imprudence may also derive from psychological biases and mental shortcuts that affect consumers’ decisions and predictions about borrowing, such as the overconfidence bias, i.e.

the tendency to underestimate the probability of suffering an adverse event (Kilborn, 2005).

Over-indebtedness may also arise, however, when unexpected events modify the initial conditions in which the contract between creditor and debtor was concluded. An unexpected reduction of consumer income (e.g. a job loss), an unforeseen expense (e.g. expensive medical care), an increase in the cost of debt (e.g. a rise in interest rates) are all events that can lead to over-indebtedness.

Unexpected changes in family structure may also affect the ability to repay the debt (e.g. divorce or the birth or death of a family component). In some cases, the condition of over-indebtedness derives from poverty, which pushes individuals incapable of coping with their expenses to ask for a loan that has little chance of being repaid; this mainly happens when creditors are unable to select the right debtors. It is also important to note the particular situation when the need for a loan is determined by the condition of over-indebtedness itself, thus causing a vicious cycle that is potentially disruptive for families and dangerous for financial intermediaries.

In microeconomic theory a consumer’s decision on whether to borrow and how much is the solution of an intertemporal optimization problem. In this approach, consumers will never go bankrupt since according to the assumptions of the model, rationality implies that they will always obey their solvency constraint.

Therefore alternative approaches are needed that abandon the strict rationality assumption. Recently, many agent-based models (abm) have investigated the role played by consumption behavior and household over-indebtedness. Erlingsson et al. (2013) modeled a wealth effect of housing wealth into workers’ consumption budget and bank extended mortgages to workers only if the expenditure on housing, as a proportion of total income, was lower than a given threshold.

Konig & Grossl (2014) explicitly focused on consumption credit in a framework in which desired consumption was driven by workers’ disposable income as well as a social norm of consumption, a behavior that reflects a willingness to take on loans.

Russo et al. (2015) show mixed support for the increase of consumer’s debt as a beneficial for the systemic level. On the one hand, the greater availability of credit on the household side boosted aggregate demand; on the other hand, it could progressively lead to a crisis. D’Orazio & Giulioni (2017) analyze households’ borrowing dynamics in the different phases of the business cycle. They model the main implications of the interaction between consumers’ wants (desired consumption), consumers’ beliefs, the behavior of the banking sector, and the behavior of the production sector.

Taking a bottom-up approach, our paper develops an agent-based model populated by heterogeneous consumers, a banking sector, and a judicial system.

³ The Code of Corporate crisis and insolvency was published in the Italian Official Gazette on 14 February 2019, implementing Law n. 155/2017 (Legislative Decree n. 14 of 2019). The new code is the result of a long reform procedure of the bankruptcy law, which began in 2005-2006. In short, this new code represents a major change in the overall approach to the corporate and consumer crisis, which reforms the insolvency proceedings under Royal Decree n. 267 dated 16 March 1942 and includes, with amendments, those introduced by the regulation on the composition of over-indebtedness crisis as per law n. 3/2012.

⁴ Concerning those cases in which more cohabitants are over-indebted or in which over-indebtedness is due to a common reason and can be therefore solved jointly.

⁵ A further update provides that debt deriving from a mortgage loan for the purchase of the main house can be excluded, for repayment purposes, from the total debt due by the over-indebted individual, therefore ensuring an easier access to the procedures provided for over-indebted consumers and the possibility to safeguard their house.



3. The Model

In this paper, we build a general *disequilibrium* agent-based model, populated by heterogeneous consumers who behave according to boundedly rational behavioral rules. The objective of the model is to give evidence to some economic effects of judicial decisions about a consumer over-indebtedness procedure. The choice to use an abm on a typical law and economics analysis is devoted to the complex nature of relations between the judicial system and economics. Three sectors interact with each other in the model: the business sector, credit market, and judicial regulation of over-indebted consumers.

Before describing the details of the model, it is worth emphasizing that it has been mainly motivated by the aim to investigate the role of the judicial system and over-indebtedness legal procedure over changing macroeconomic conditions. The purpose of the model is indeed to build a minimal framework to study this specific phenomenon, leaving aside at this stage of the research other major issues and modeling details related to the other sectors (i.e. labor market, production sector, etc.) of the macro setting.

We consider three kinds of agents, namely consumers, a central bank, and a judge. At the beginning of each period, each consumer receives an income and begins to do business. In the case, that business activity has a positive budget the consumer wishes to save. In the opposite case, the consumer wants to borrow.

As one crucial assumption of our model, business activity does not depend on current income but the business behavior of others consumers. This assumption is crucial to our analysis because explains why individual consumption may exceed a consumer's current income and hence requires borrowing. We assume that consumers may be business constrained only when they became over-indebted.

In this model the business is a very rudimentary activity, that is to say, it is represented through a random exchange of money between random pair of consumers. The money exchange between the consumers represents two different activities: the consumption (buy), and the production (sell). Every consumer is a seller and buyer at the same time and will get a positive or negative wallet every day.

The second component of the model is represented by a single central bank that provides credit to consumers to finance business activity. The bank controls the money supply through the reserve ratio. The simplified model considers a single bank, thought of as a monopolistic or representative commercial bank, acting as a supplier of consumer credit.

It models the creation of money in an economy through a private banking system. As most of the money in the economy is kept in the bank but only a little of it needs to be used (i.e. in cash form) at any one time, the bank needs only keep a small portion of their savings on hand for those transactions. This portion of the total savings is known as the banks' reserves. The bank is then able to loan out the rest of their savings.

The third and main component is represented by a judge that regulates the consumers' over-indebtedness. Compared to the previous papers on this topic judicial regulation is a novelty in the abm economic literature. The judicial system is modeled with a territorial judges' distribution, that is calibrated on the Italian judges/population ratio. In each step of the simulation, the judge can apply worthy criteria and modify the probability for admission to the over-indebtedness procedure. Through the over-indebtedness procedure, the judge will select randomly an over-indebted consumer and delete his/her debt. The same value of debt will be reduced from the total amount of savings.

For a sake of simplicity, we neglect the production sector and the business activity simulates an everyday market activity in which consumers interact with each other with a random exchange of money without goods/services production.

4. Simulations

4.1 Sequence of events

1) In each round, consumers interact with each other to simulate everyday economic activity. Given a randomly selected number, when a consumer is on the same patch as someone else it will either give the consumer two or five, or no money at all.

2) After this, consumers must then sort out the balance of their wallet with the bank. Consumers will put a positive wallet balance in savings, or pay off a negative balance from funds already in savings. If the savings account is empty and the wallet has a negative balance, a consumer will take out a loan from the bank if funds are available to borrow (if $bank-to-loan > 0$). Otherwise, the consumer maintains the negative balance until the next round. Lastly, if someone has money in savings and money borrowed from the bank, that consumer will pay off as much of the loan as possible using the savings.

3) The consumers have a *wealth* distribution and the number of *rich* consumers in each moment is calculated by enumerating the number of consumers whose savings exceed a parametric income level. *Poor* is the total amount of consumers whose loans exceed income. If the consumer is *poor* for more than 10 steps he/she became an *over-indebted* consumer and his/her business activity is constrained in the next periods. The rest of the consumers are considered to belong to the *middle-class*.

4) At the end of each step an exogenous judicial over-indebtedness procedure, represented by the *judge*, selects with variable probability a random number of over-indebted consumers. Each selected over-indebted consumer will be admitted to a *fresh start* procedure, that is to say, that the consumer's debts will be canceled and the same value will be reduced from the savings amount. The consumer will be able to continue the business activity.



Figure 1 – Flowchart of consumer over-indebtedness model.

4.2 Parametrization

First of all, we report the baseline parameters values used in the simulations (Table 1). In particular, the parameters are

single instances, i.e. they are valid for the whole system and their values are used in computations performed by all agents.

Table 1- parameters setting: baseline scenario.

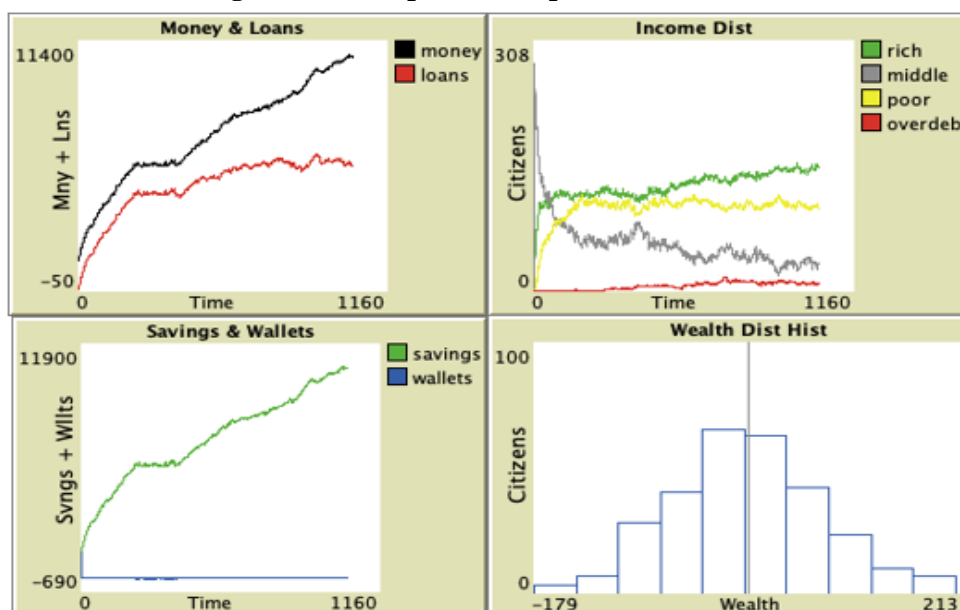
parameter	description	value
Consumers-density	Number of consumers	1000
Judge-density	Number of judges	1
probability	Probability of <i>fresh-start</i>	[0,1]

We investigate the macroeconomics properties of the model described in the previous section through extensive computer simulations. Hereby, we report the simulation analysis of the model in two steps. In the first one, we consider an expansive policy of credit market with a large amount of money supply (*reserve ratio* < 2%), and low-interest rates. Instead, in the second test we consider a constrained policy of the credit market with low money supply (*reserve ratio* > 2%), and high-interest rates.

model, we report detailed results and sensitivity analysis for a range values [0, 1] of this variable about some macroeconomic effects. When the *probability* is equal to 0 no one over-indebted consumer is admitted to the *fresh-start* procedure, while if the probability is equal to maximum value 1, there is not a random decision about meritocracy and all over-indebted consumers are admitted to the *fresh-start* procedure. The main aim of this section is to monitor the evolution of some macroeconomics (wealth, loans, and savings) indexes related to a progressive increase of probability for admission to the over-indebtedness *fresh-start* procedure.

Remarkable attention is given to the effects of changing the *probability* for admission to an over-indebtedness *fresh-start* procedure. Because this variable plays a crucial role in our

Figure 2 - Example: the output of a simulation



4.3 First test with the high money supply.

In this first test, we observe the effects of a variable *probability* of admission to the procedure on average consumers' *wealth*⁶, the number of loans, and income class distribution of the population (*rich*, *poor*, and *over-indebted*).

From a macroeconomic point of view, we can observe that the *fresh start* procedure increases the average amount of consumers' wealth. Figure 3 shows a positive relationship between the *probability* to be admitted to the *fresh-start* procedure and the average consumers' *wealth*.

⁶ The average *wealth* is calculated as the total amount of savings divided the population.

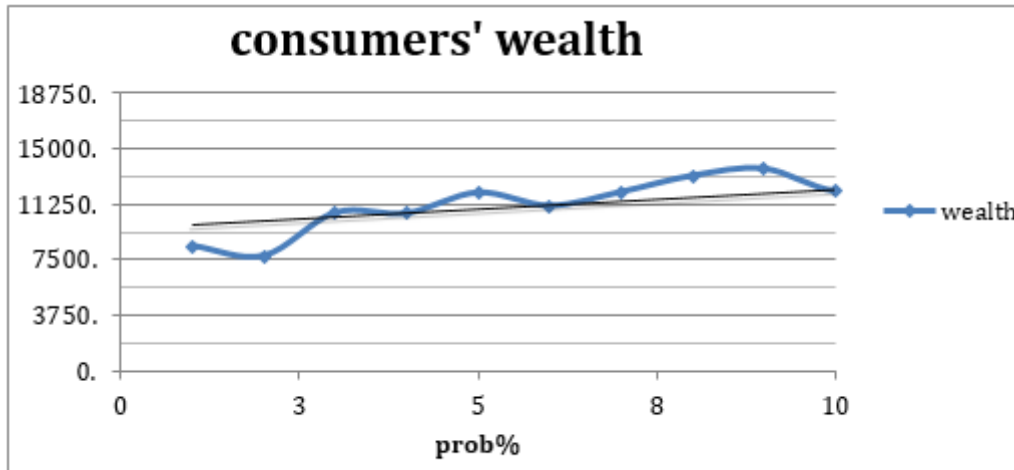


Figure 3 – the average consumers' wealth

Moreover, we can observe a positive effect on the income composition of the income distribution. The amount of rich distribution of the population. Increasing the *probability* of consumers increases with a progressive reduction of poor and admission to the *fresh-start* procedure there is a better over-indebted consumers (Figure 4).

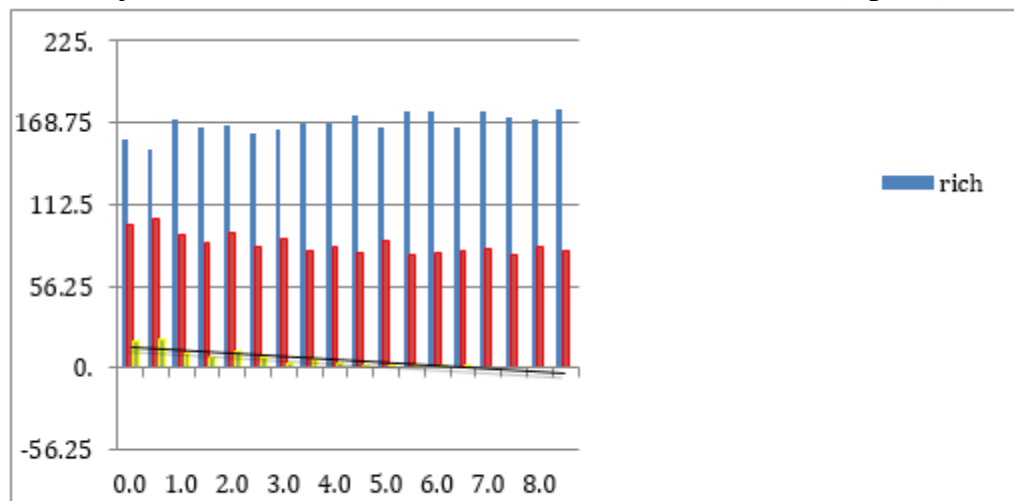


Figure 4 – Income distribution

Moreover, the simulations show a negative relationship for *fresh start* admission increases. Therefore, when there is a high probability for a *fresh start* and many over-indebted consumers are admitted to the procedure, the loans demand in particular, the demand for loans decreases when the probability decreases.

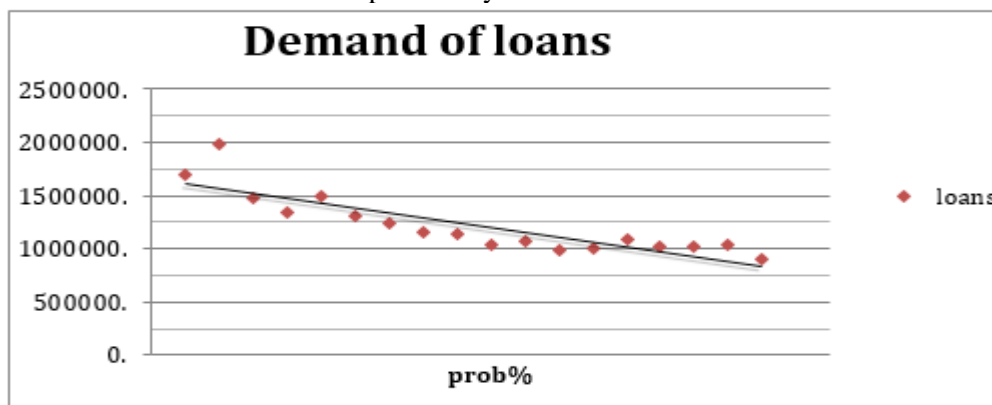


Figure 5 - The loans' demand

In this model, the number of loans is demand-led fixed, so that if the demand for loans decreases, the amount of loans is reduced too. From this point of view the judicial procedure has a positive effect on the aggregate consumer's behavior, avoiding the increase of over-indebted consumers.

4.4 Second test with the low money supply

In the second test, we simulate a restrictive monetary policy in which there is a high banks' reserve ratio and, consequently, a low money supply for the economy. The simulations show that in this state of the economy the *fresh start* procedure has different effects on macroeconomic indexes. The average consumers' wealth shows an initial reduction when

the procedure probability increases and became quite stable for the high level of *fresh start* probability (figure 6). In this situation, with a low money supply, for the low level of fresh start probability, we can observe a reduction of the amount of consumer wealth. This cost represents the aggregate cost of over-indebted regulation on the credit market.

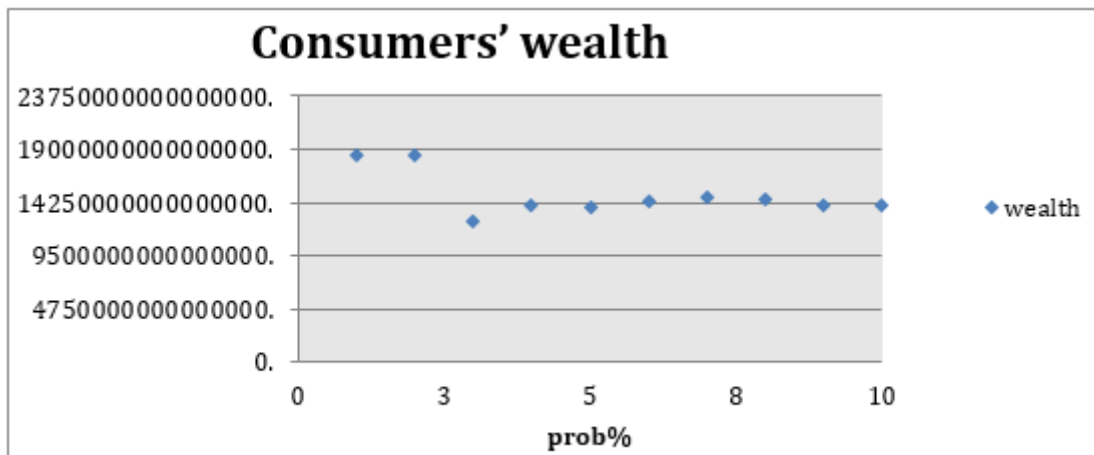


figure 6 - the average consumers' wealth

Conversely, the total amount of loans and savings show no correlation with the fresh start procedure, and there aren't over-indebted consumers.

The results of this test show that in a constrained monetary policy condition, with high-interest rates and low money supply, the judicial procedure has negligible effects on economics indexes.

5 Conclusions

We proposed an analysis of the effects of consumer over-indebtedness Italian legislation on some macroeconomic dynamics in a simple economy composed of heterogeneous consumers, a business activity, a central bank, and a local tribunal. The main question is whether having a judicial procedure that helps the over-indebted consumers is beneficial for the economy or not. The paper emphasized certain important issues related to the distribution of wealth and the implications of inequality and

the loans' demand, the concerns the sensitivity analyses over the random variable that regulates the *fresh-start* procedure admission.

Our results show that the over-indebtedness consumer procedure has generally a positive impact on the economy. It is useful to distinguish two economic periods, the expansive period and the restrictive one. In the light of the foregoing simulations, the *fresh start* procedure represents a solution to smoothing the negative effects of over-indebted consumers on macroeconomic dynamics when we are in an expansive monetary policy period. Instead, during a restrictive monetary policy period, the effects of the *fresh start* procedure are insignificant on macroeconomic indexes. From a legislative political economy point of view, the results of the simulation suggest increasing the probability of to fresh-start procedure in the expansive monetary policy periods.

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