Exploring the Underground Economy to support Public Decision Makers to tackle the Growth of Irregular Workers [*]

Francesco Ceresia[*], Giovan Battista Montemaggiore[**], Enzo Bivona[***]

Abstract

The search for new resources to finance the necessary investments for fostering the economic growth led many States to adopt policies to tackle the underground economy and, in particular, to struggle the phenomenon of irregular workers. In most of the cases, such policies failed to strongly reduce the percentage of irregular workers because they were based on a linear and static approach.

Based on a research project conducted in Sicily Region (Italy), this article aims at investigating – through the System Dynamics (SD) methodology – main causes-and-effects relationships underlying the phenomenon of irregular workers at both firm and self-employment level.

In particular, through the developed SD model, different potential policies will be analysed in order to identify a systemic strategy that could hinder the phenomenon of irregular workers.

Key-words

Underground economy, irregular workers, public policies, unintended consequences.

1. Introduction [*]

As underlined by Schneider (2005), the shadow economy is a great problem for many of the 21 countries belonging to the OECD area, where the underground economy is 16,4% of their national GDP. In Italy, such phenomenon is particularly relevant in Sicily Region.

At this regard, Bivona et al. (2007) presented a preliminary qualitative analysis about the underground economy in Sicily, where they show the main cause-and-effect relationships

underlying the phenomenon of the irregular workers (Van Eck, 1987) at both firm and self-employment level. The main aim of this work was to support public decision makers in adopting public policies to hinder the underground economy in Sicily.

Statistics show that in Sicily the percentage of irregular workers is above the Italian average. Precisely, in 2002 such value was about 26%, while the Italian average rate was 14,2% (Istat 2004). Most of the irregular workers are concentrated in those economic sectors where *micro* firms (less than 10 workers) are more common.

It is worth noting that the highest percentage of irregular workers is observed in agriculture where the 44,6 % of total employees is not declared (ISTAT 2004) to the tax system or underpaid. Likewise, a high presence of irregular workers is also registered in the building industry 31,2 % (ISTAT 2004). The service industry shows an average rate lower than the regional value; however, in this sector the retail commerce and tourist activities show very high rates, respectively 45,4% and 67% (Regione Siciliana, 2004).

2.1 Main recurring reasons underlying the underground economy in Sicily

The reason for such a high percentage of irregular workers in Sicily can be explained by different factors.

From the entrepreneur's point of view, there are two main reasons hiring irregular workers: the high tax rate and the high labor costs (salary, social security contributions, workplace safety, environmental responsibility, etc.).

From worker's point of view, the main reason that drives people to choose an irregular job is very high unemployment rate. It is worthy to remark that the welfare policies that support low income families, to some extent, they also favor a low propensity to look for a regular job. This low propensity is also encouraged by the high tax rate that regular and self-employed workers have to pay on their salary.

2.2 An analysis of main public policies to repress the underground economy in Sicily

In the last decade, public decision makers have focused their attention on two main areas of intervention:

> ➢ *Financial incentives to support firms*, with the aim to foster a long term economic growth;
> ➢ *Subsidies to support low income households*, with the aim to increase the welfare state and to sustain family consumptions.

Although the goal of this policies could be appreciated, they failed in significantly reducing the size of the underground economy. As previously remarked, in some cases, they favor this *status quo*.

3. The research project phases and the methodology adopted

The methodology adopted in this research follows the "phases approach" suggested in literature (Richardson and Pugh III, 1981; Maani and Cavana, 2000), which it has been proved to be very effective in complex systems. In particular, Maani and Cavana's approach consists of 5 main phases:

1. Problem structuring
2. Causal Loop Diagram (CLD) modelling
3. Dynamic modelling
4. Scenario planning and modelling
5. Implementation and organizational learning

4. Problem structuring

The main objective of this phase is to identify the most relevant aspects of the irregular work phenomenon in Sicily. To reach this goal, several activities have been carried out.

First, an analysis of the available literature, both at the national and international level, has been conducted to better detect, understand and frame the phenomenon.

Second, in order to involve in the project main private and public authorities, it has been organized a seminar focused on the underground economy and irregular workers phenomena and their main effects on the regional socio-economical system. This event offered the opportunity to share ideas, data, information and main critics about the adopted public policies. The invited speakers were managers and representatives of regional or local public and private institutions, such as:

o National Insurance Institute for Industrial Injuries (*INAIL*)
o Revenue Guard Corps (*Gaurdia di Finanza*)
o Labour Court (*Tribunale del Lavoro*)
o Local Industrial Association (*Associazione degli Industriali*)
o Italian General Federation of Commerce and Tourism (*Confcommercio*)
o Italian Union of Chambers of Commerce (*Associazione delle Camere di Commercio*)
o Regional task force on irregular work (*Commissione lavoro nero*)
o Labour Unions (*CGIL, CISL, UIL*)
o Italian Federation of Artisans and Small Enterprises (*CNA*)

Three professors of the University of Palermo provided an analysis of the underground economy by adopting a multifaceted approach mainly based on a legal, sociological and psychological perspective.

Finally, to deeper understand the underground economy and the irregular workers phenomena, and the role played by the previous mentioned institutions, 10 semi-structured interviews with the regional and local managers of the previous institutions have been carried out.

These activities allowed us to identify and focus on the main variables of the socio-economic system underlying underground economy and irregular workers dynamics.

On the basis of the research activities outlined above, the present study is aimed at verifying the following hypothesis:

> ➤ *public policies adopted to contain and contrast irregular workers produce effective results only if short and long terms effects are made explicit and policy resistance phenomena figured out.*

In order to investigate such a complex and multifaceted phenomena, a SD approach has been adopted.

5.1 Causal Loop Diagram (CLD) modelling

According to the adopted SD approach, the variables, which have been identified in the previous phase, have been linked together to shape a preliminary causal loop diagram (CLD). This preliminary CLD allowed us to recognize the main sub-systems underlying the structure of the observed phenomena and to make explicit the causal relationships between the identified sub-systems.

To validate this qualitative model, a *two-days workshop* with regional and local managers of private and public institutions (that provided a talk or attended the previous seminar) have been organised. Such event gave us the opportunity to discuss the analysed phenomena and to take into account different opinions and critics about the hypothesized CLD. During such event, a group model building approach has been adopted (Vennix, 1996).

5.2 A preliminary feedback analysis underlying the underground economy

In the following paragraph it will be analyzed the cause-and-effect relationships between the main variables underlying the underground economy phenomenon.

The analysis allowed identifying three main sub-systems:

- the economic sub-system;
- the judiciary sub-system;
- the households services and public subsidies sub-system.

5.3 The economic sub-system

This sub-system mainly focuses on the key factors that lead firms to hire irregular workers (Figure 1).

According to the first reinforcing loop (R_1) - so called "physiologic firm development" - the higher *Sicilian firms' competitiveness* – all other conditions being equals – the higher their *revenues* and *income* [*]. The increase of the *income* allows firms to invest more financial resources in *production capacity investments* and, hence, in *hiring regular workers.* As a consequence, *production capacity* grows as well as Sicilian's *firms' competitiveness*.

However, an increase of the number of the *regular workers* implies higher *labour costs* (salaries and social security contributions), which enhance company *operating costs* and reduce *firms' incomes* and, consequently, *investments* (B_1 & B_2).
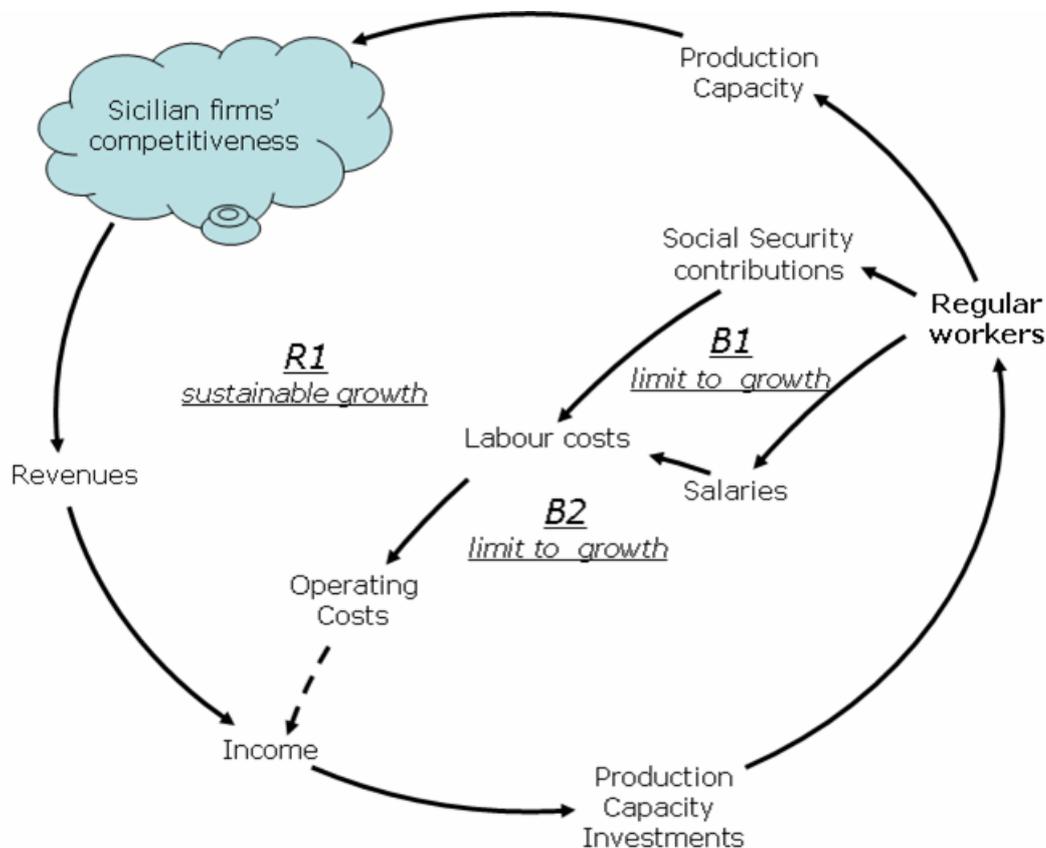
Legend:

⟶ = positive polarity

----▶ = negative polarity

Figure 1 – Reinforcing and balancing loops underlying firms' growth

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[*] *Sicilian firms' competitiveness* is also affected by other factors, such as Globalisations, Competitors pressure, Product Quality/Price ratio offer, and so on. Such variables are not taken into consideration, because they are considered out the boundary of the investigated system.

Investments in personnel may be also oriented towards *irregular workers*, since the related costs are perceived as lower than those of the regular workers. Such decision also contributes to increase firms' *production capacity* and *competitiveness*. As a consequence, firms will get higher *incomes* to be invested in new *irregular workers* hiring (R_2). Although such a policy may determine a reduction in workers' productivity, such a phenomenon is counterbalanced by two main factors:

    a) lower salaries (R_3), and

    b) a reduction in social security contributions (R_4).

However, the hiring of irregular workers implies some side effects (Figure 2).
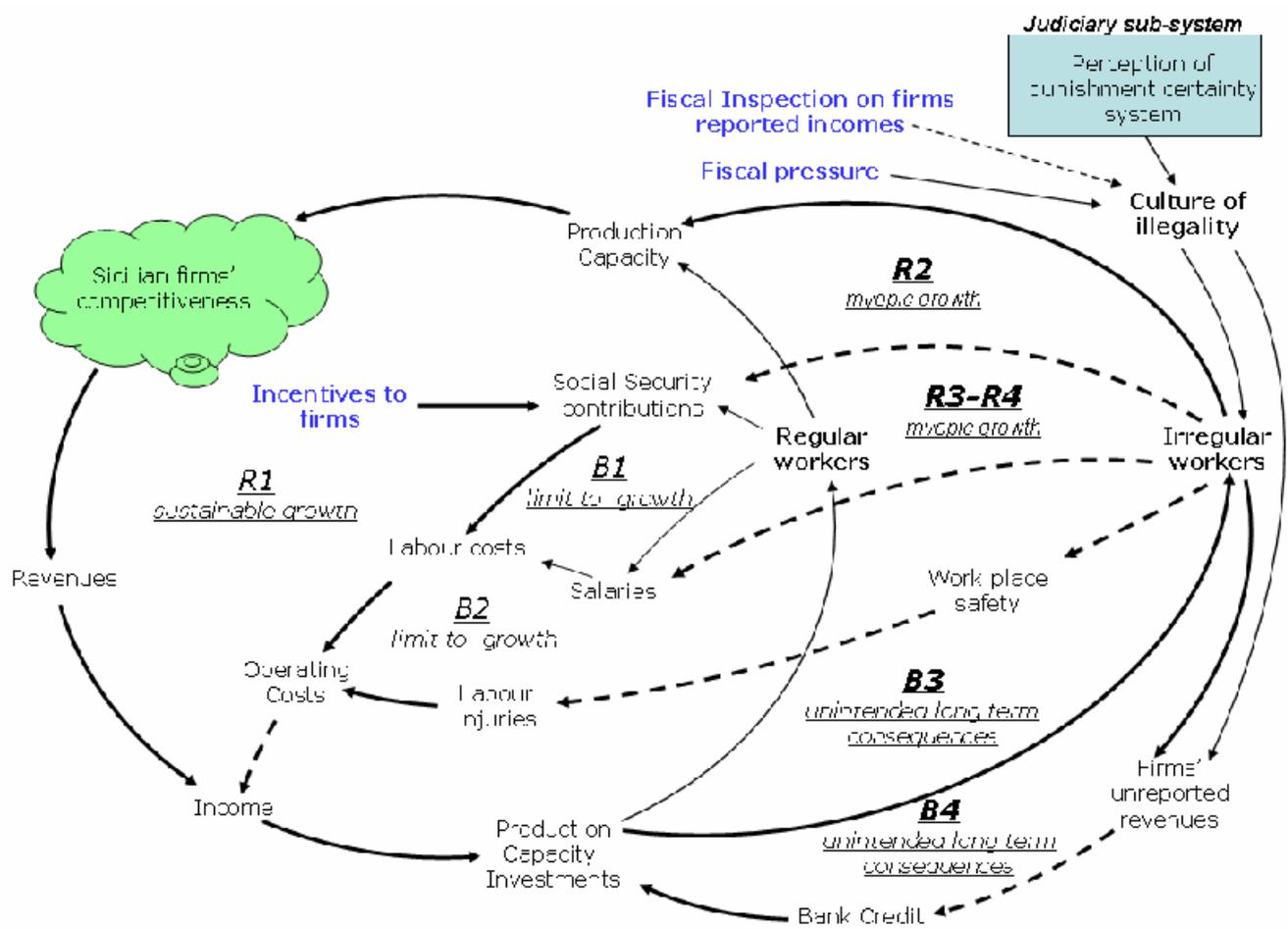
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   →   = positive polarity

  - - -▶   = negative polarity

Figure 2 – Reinforcing and balancing loops underlying intended and untended effects of hiring irregular workers

For instance, an increase of *irregular workers* can produce a *work place safety* reduction and, consequently, a raise of *labour injuries*. As a result, a firm may suffer higher costs that reduce incomes and production capacity investments (B_3).

Furthermore, a larger presence of *irregular workers* implies higher firms' unreported revenues, and hence, greater difficulties to obtain bank credit. This may contribute to lead decision makers to decrease irregular workers (B_4).

Even though these two main balancing phenomena may reduce firm's convenience to hiring irregular workers, delays and firm's complexity may contribute to lower the relevance of such side effects in decision makers' mental models.

5.4 The judiciary sub-system

This sub-system focuses on the key-variables describing the processes underlying the fiscal inspection activity carried out to discover the presence of irregular workers in firms. It also analyses the public policies to tackle the irregular work phenomenon, and the related labour judicial system (Figure 3).

According to the conducted analysis, a higher number of *irregular workers* causes an increase in irregular workers' *complaints* to the public authority about their labour treatments. This implies the rising in *labour inspectors' enquiries* that increases the number of *injunctions to pay the evaded social security contributions*. This produces an increase in *payments of the evaded social security contributions*, which enhances *workers' perception of punishment certainty* and, consequently, the number of *irregular workers' complaints* (R_1).

Furthermore, *workers' perception of punishment certainty* is also positively affected by an increase in *labour inspectors' enquiries* (R_2).

However, an increase in *injunctions to pay the evaded social security contributions* determines the rise of *appeals* against such injunctions to the Labour Court. This produces an enhancement of the number of *trials* that augments *injunction suspensions*, and in turns reduces the *payments of the evaded social security contributions*. As a consequence, a lower *workers' perception of punishment certainty* reduces the number of their *complaints* to the public authority. This causes a reduction in the number of *labour inspectors' enquiries* and *injunctions to pay the evaded social security contributions* (B_1).

Furthermore, an increase in *appeals* causes the enhancement of the number of *trials* that, in turns, produces a significant lengthening of the *average time to settle pendent trials*. This leads to a growth in the number of *appeals* to the Labour Court (R_3).

The raise of *trials* also implies a higher number of *judgements* that, in turns, can lead to *company bankruptcy* (due to the relevant cost of the punishment to be paid). Consequently, the amount of *payments of evaded social security contributions* also declines. The *workers' perception of punishment certainty* decreases, as well as the number of *irregular workers' complaints* to the public authority. This causes a reduction in *labour inspectors' enquiries* and in the number of *injunctions* to pay the evaded social security contributions. This produces lower *appeals* against such injunctions to the Labour Court and *trials* (B$_2$).
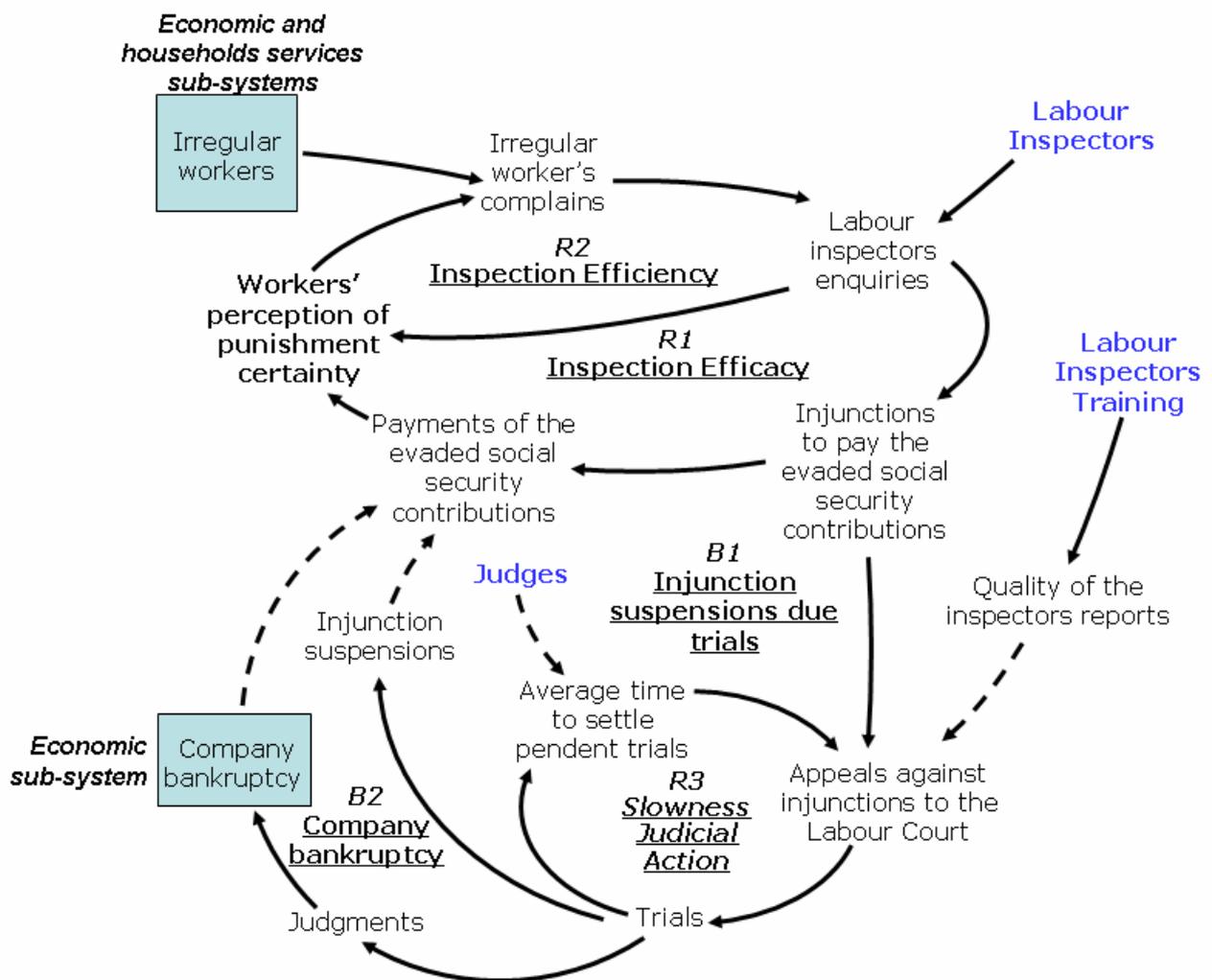
Legend:

⟶ = positive polarity

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Figure 3 – Reinforcing and balancing loops underlying labour inspections and trials on payments of the evaded social security contributions

5.5 Households services and public subsidies sub-system

This sub-system focuses on investments of public resources to support households through incentives and subsidies (Figure 4).

From the analysis of the adopted public policies, it emerges that *public resources* can fuel *funds for struggling tax evasion*, which are necessary to increase the number of fiscal inspections on *family reported incomes*. The more fiscal inspections the higher family reported incomes and, hence, the *tax income* that increases *public resources* (R_1).

An increase in *funds for struggling tax evasion* produces higher *family reported incomes*, which enhance a reduction in *irregular workers for family services* and, consequently, reduce the opportunity of further investments in *funds for struggling tax evasion* (B_1).

In order to guarantee *economic assistance to low income households*, *public resources* can be used to increase *welfare funds*. However, a higher welfare expenditure implies a reduction in *public resources* (B_2). Furthermore, given a *desired households income*, an increase in *economic assistance expenditures* decreases the *family assistance gap*, which reduces the necessity of further investments in *welfare funds* (B_2).
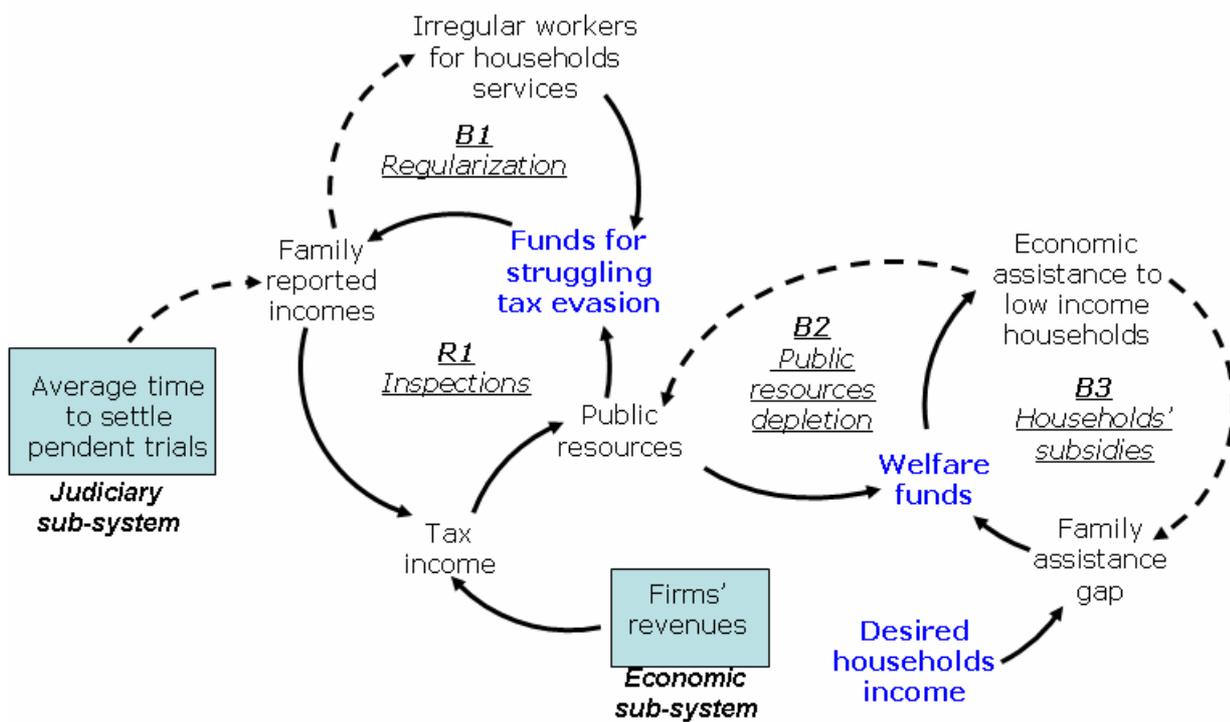
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Figure 4 – Reinforcing and balancing loops underlying subsidies and incentives effects on irregular workers for household services

6. Building the System Dynamics model

On the base of the previously described qualitative analysis and of the further information gathered during the workshop that has been held to validate the identified cause-and-effect relationships, it has been possible to translate the above CLDs into a SD model.

Likewise to the qualitative analysis, also in the SD model have been distinguished the three different sub-systems previously described: the economic sub-system, the judiciary sub-system, and the households services and public subsidies sub-system.

At this regard, it is opportune to specify that these subsystems are singularly described for sake of simplicity. Indeed, as it will be better explained in the follows, they are strictly connected by several causal relationships.

In figure 5, it is depicted the economic sub-system where it has been highlighted the effects of the causal relationships between the economic system variables, such as number of firms and labour costs, and those of the company system, such as revenue and total costs, on the decision to hire more personnel or to use more overtime from the regular or irregular labour market.
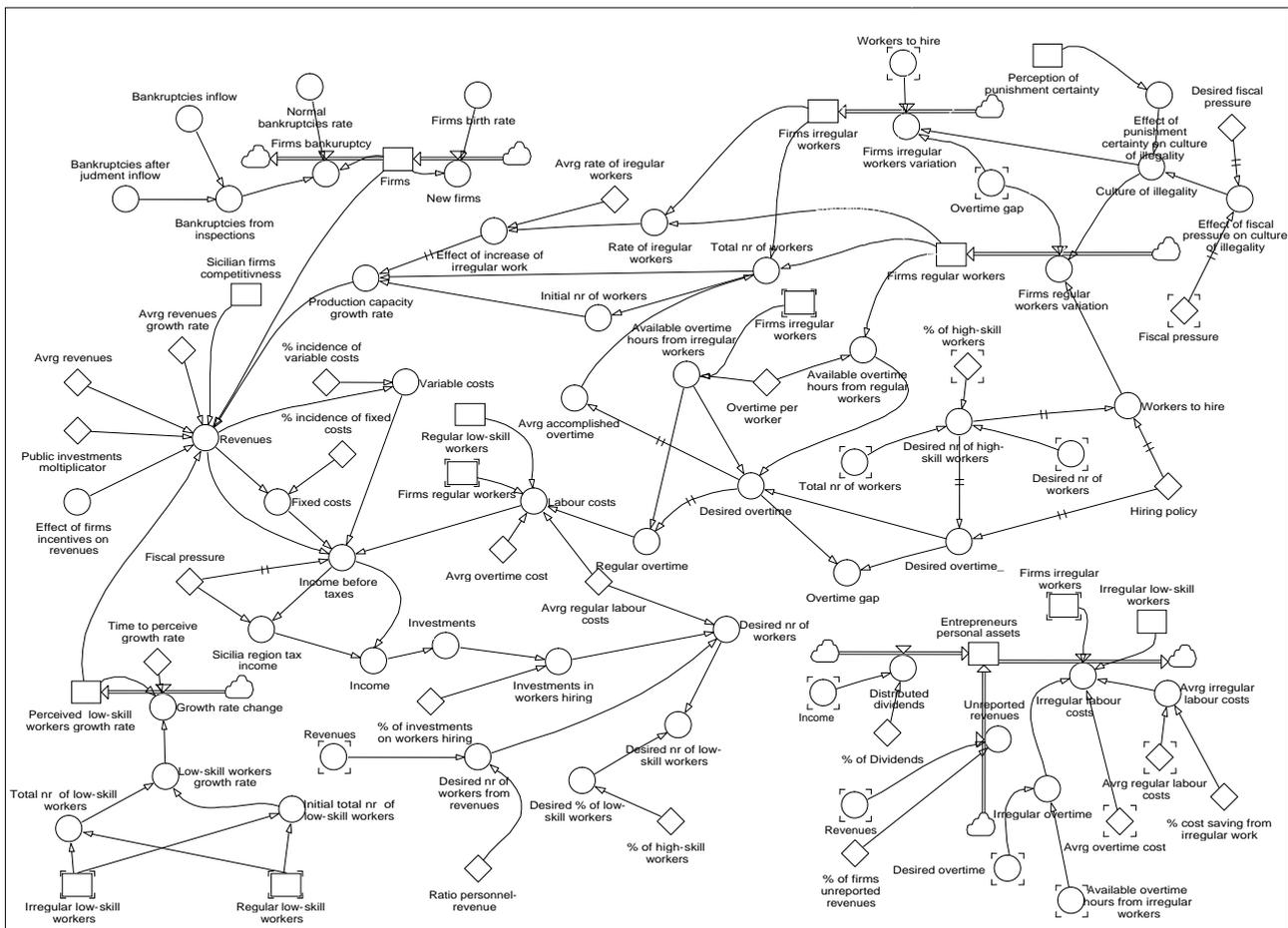
Figure 5 – The stock and flow structure describing the economic sub-system

Figure 6 shows the judiciary sub-system where it is examined the irregular workers' complaints to the labour courts lead to the effective application of the sanction for the evasion of social security contributions and taxes.

How it is possible to note from this figure, the efficacy of the judiciary action is one of the most important factor of the punishment certainty and, in turn, of the culture of illegality that leads employers to hire irregular workers.
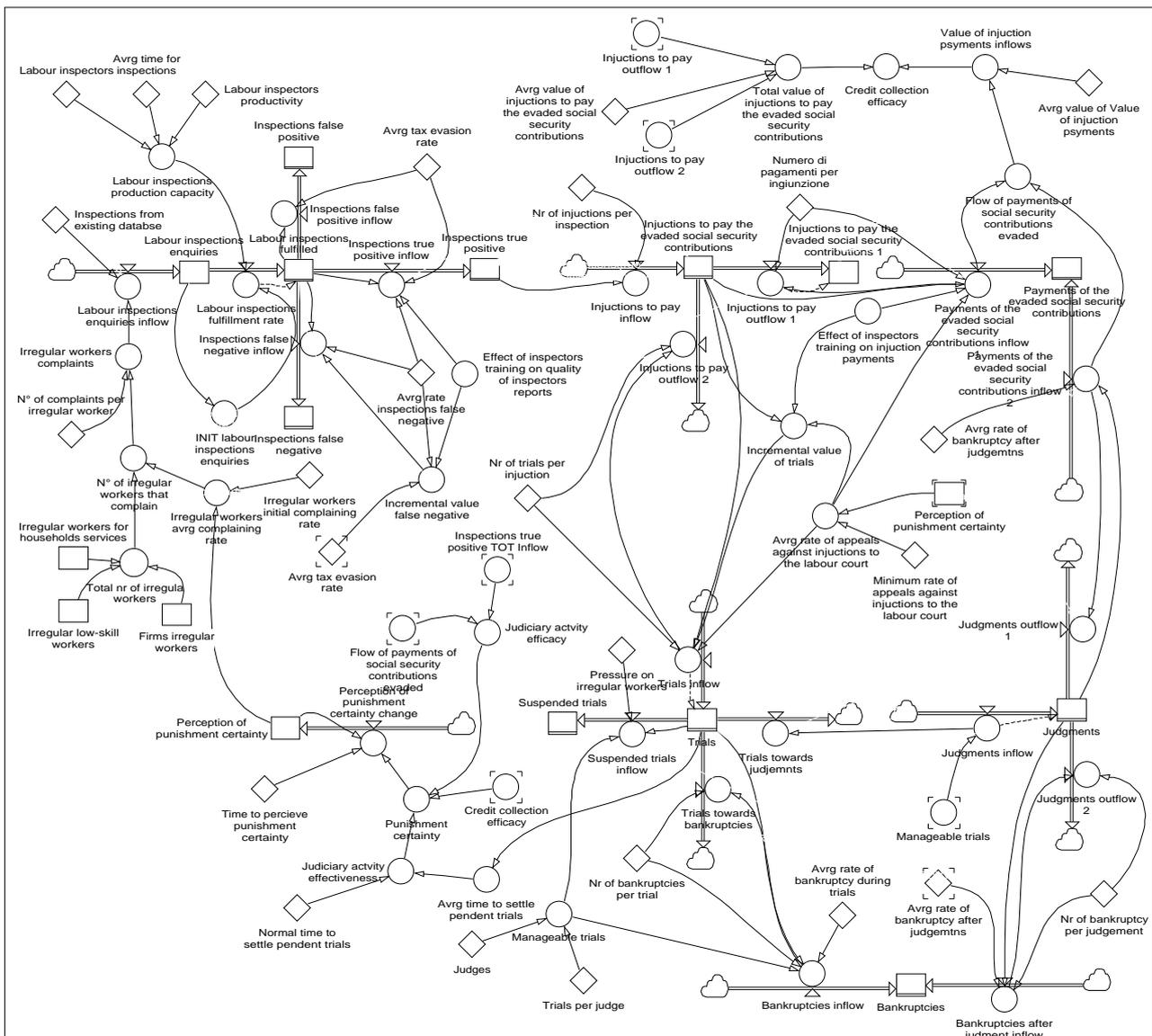
Figure 6 – The stock and flow structure describing the judiciary sub-system

In figure 7 it is described the households services and public subsidies sub-system. This sub-system it has been further organized in three different sectors:
- the sector of the allocation of public funds;
- the sector of the services to households;
- the sector of public subsidies to unemployed people.

In the first sector are examined the tax inflows that increase public funds and the outflows deriving from the implementation of public policies. In particular, these expenditures are represented by the administrative costs of the State apparatus, by the costs of the policies to tackle the fiscal evasion, by the incentives to firms for the development of the private sector and by the subsidies to unemployed workers and low income families.
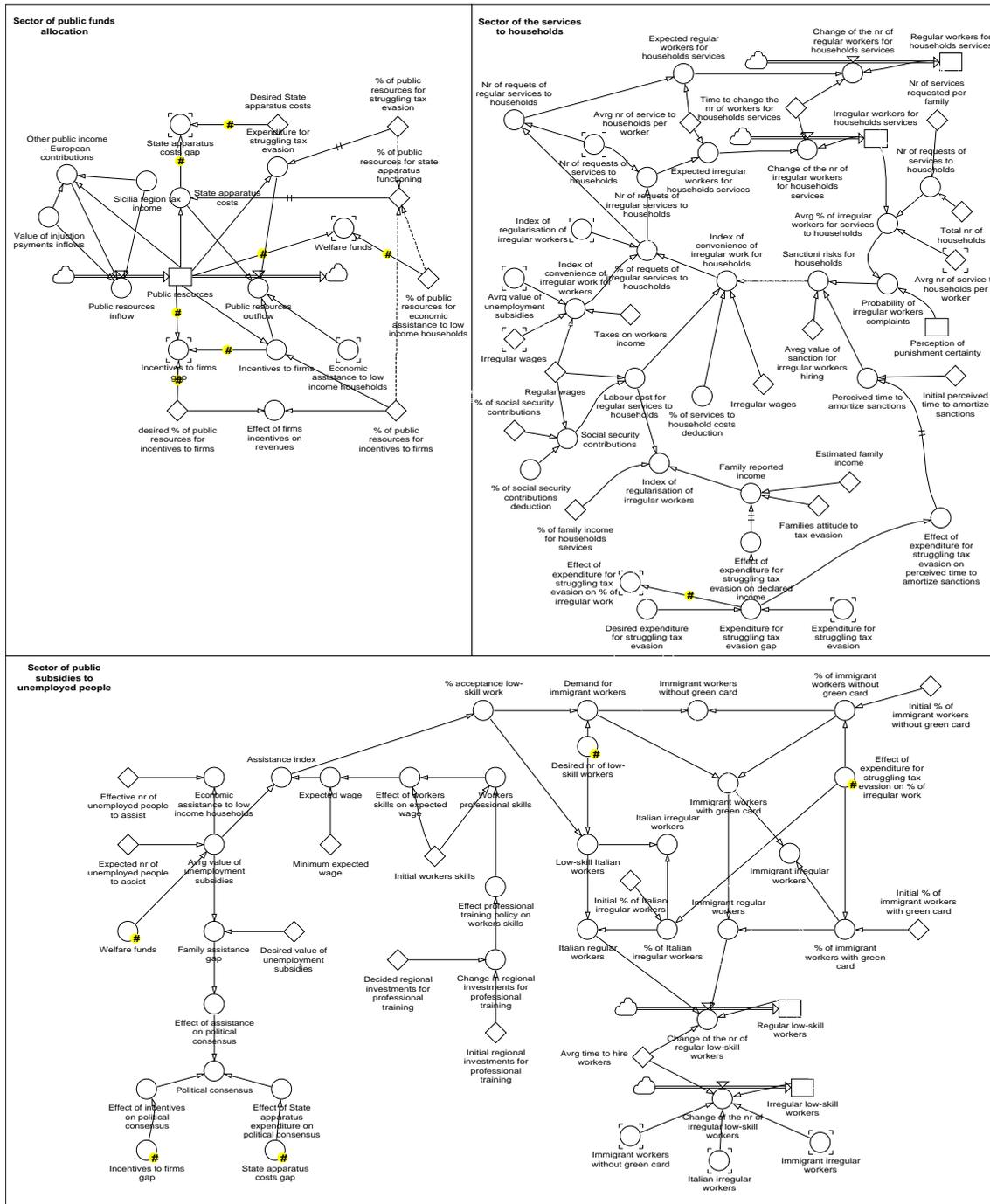
Figure 7 – The stock and flow structure describing the households services and public subsidies sub-system

In the sector of the services to households are examined the causal relationships between the main variables that affect the decision of the households to hire people with regular or irregular contracts. With this regard, a crucial role is played by the amount of taxes and social security costs that determines the convenience for the key-actors to offer or receive hidden work.

Finally, the sector of public subsidies to unemployed people underlies how this financial aid may determine the convenience for workers to search for irregular work in order to continue to get the economic benefits reserved to jobless persons.

7. Outlining Public Policies to cope with the Underground Economy

The previous analysis of the different sub-systems related to the underground economy phenomenon outlines the main levers on which a public policy maker can act. In particular, in the next pages this study will present the results of different scenarios based on the following policies:

- Increase of firms' incentives;
- Reduction of firms' labour and income taxes;
- Increase of labour inspections;
- Increase of the number of labour judges;
- Increase of funds allocated to cope with the underground economy;
- Increase of funds to support low income families.

The SD model covers a period of 5 years (from 2006 to 2010). The initial values have been taken from national official sources such as the Italian Institute of Statistic (ISTAT), Italian National Bank an two other public organisations working on the labour field (INAIL and INPS).

One of the main issues that involved the research team for a long period of time is the acquisition of reliable data. This is also due to the fact that a peculiarity of the underground phenomenon is the absence of official data. In fact, very often its dimension is assessed on the base of other official data, such as the number of workers or the Gross National Profit.

In our study we assume a number of 400.000 irregular workers in the Sicilian Region. Such a value represents the 21% of the official workers. The "culture of legality" index initially is equal to 0.6, and it ranges from a minimum value of 0 to a maximum of 1. The "perception of the punishment certainty system" by the workers assumes an initial value of 0.44. Also in this case such index ranges from a minimum value of 0 to a maximum of 1. These last two indexes stem from the data gathered from anonymous interviews conducted by phone on a sample of 500 citizens of 5 different Sicilian Provinces. Based on such initial values, it is possible to observe that, due to the long average time to settle a trial, there is a low worker's perception of the efficacy of the judicial

system. As a consequence, small entrepreneurs with a low "culture of legality" are encouraged to keep in their firms irregular workers.

Figure 8 depicts main results of a base run scenario. The base run outlines a lack of labour inspectors with reference to the number of firms in Sicily and, as a consequence, an increasing number of labour inspections to be done.

This scenario assumes a slightly growth (+ 1.5%) in the number of irregular workers in a period of 5 years. This also means a latent effect of the public policies oriented to tackle the investigated phenomenon.

Finally, in order to take into account a recurrent practice adopted by firms revealed by the interviews, the model allows to also set the percent of workers' overtime. It has been assumed that, initially, decision makers allocate the overtime in the same percent between regular and irregular workers.

However, during the simulation, the overtime covered by regular workers tends to zero, while the "irregular overtime" tends to cover the amount required. Such a result is due to the higher tax pressure applied on the overtime. As a consequence, both entrepreneurs and workers are encouraged to recur to only irregular workers to cover the overtime needed.
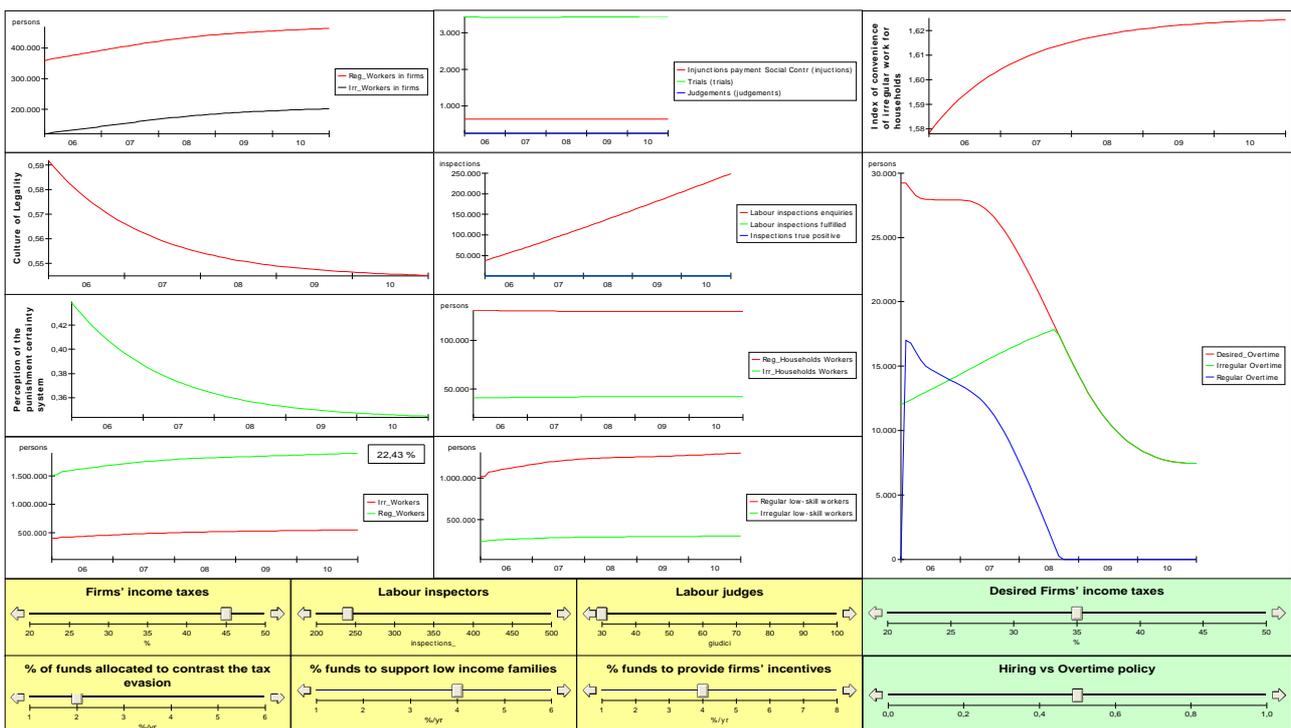
Figura 8 – Scenario 1 results (*base run*)

Policy levers \ Scenarios	Scenario 1 (base run)	Scenario 2	Scenario 3	Scenario 4
Firms' income taxes	45%	40%	40%	40%
Number of labour inspectors	240	500	500	500
Number of labour judges	30	100	100	100
% of funds allocated to contrast the tax evasion (underground economy)	2%	2%	1%	4%
% funds to support low income families	4%	4%	1%	3%
% funds to provide firms' incentives	4%	4%	8%	3%
Desired Firms' income taxes	35%	35%	35%	35%
Hiring vs Overtime policy	0,5	0,5	0,5	0,5

Table 1 – Scenarios tested through the use of the SD model
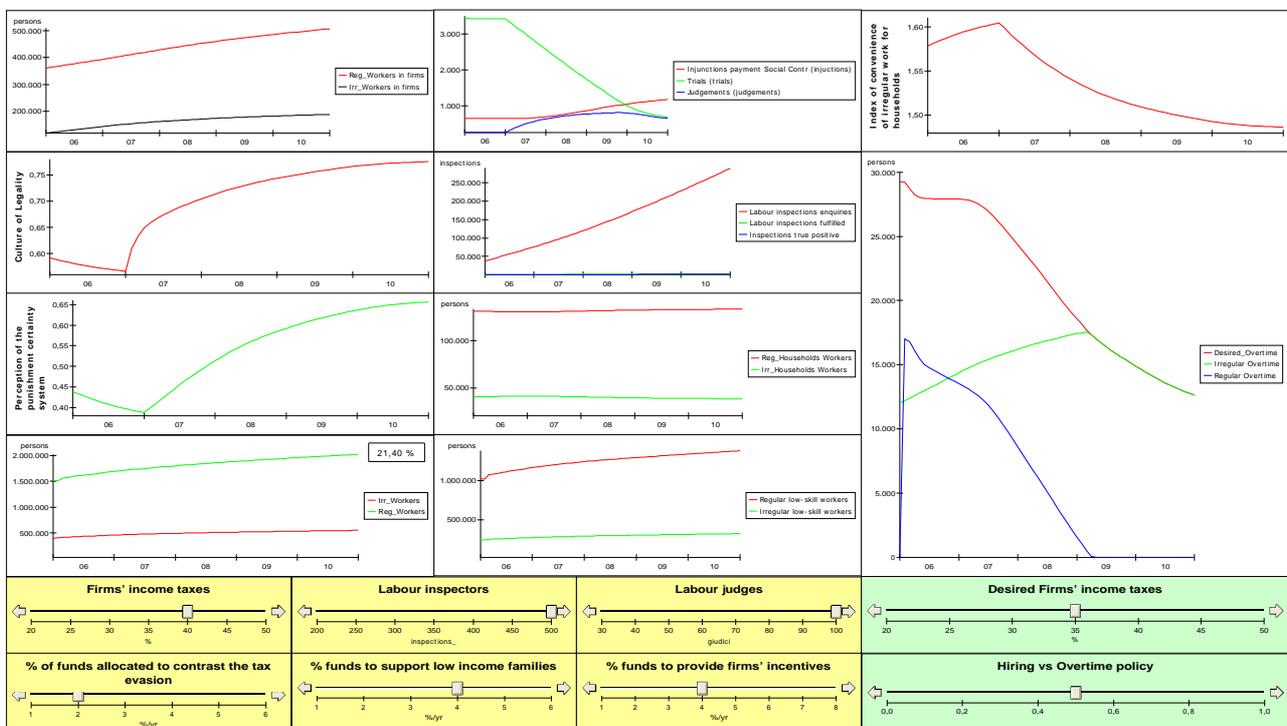
Figure 9 – Results taken from the SD model and related to the Scenario 2 (*Reduction of the fiscal pressure and increase in the number of labour inspectors and judges*)
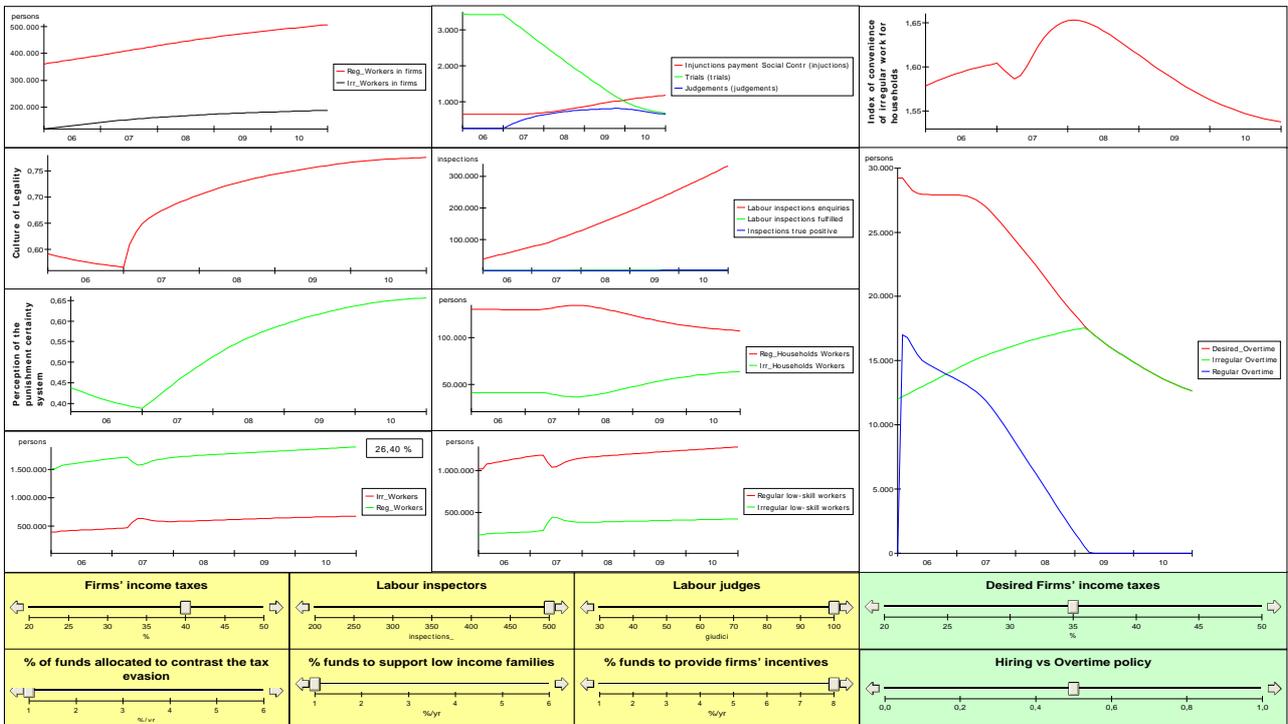
Figure 10 – Results taken from the SD model and related to the Scenario 3 (*Reduction of the fiscal pressure, increase in the number of labour inspectors and judges, raise in the % of funds designated to firms' incentives and corresponding decline in the % of funds to contrast the underground economy and to support low income families*)
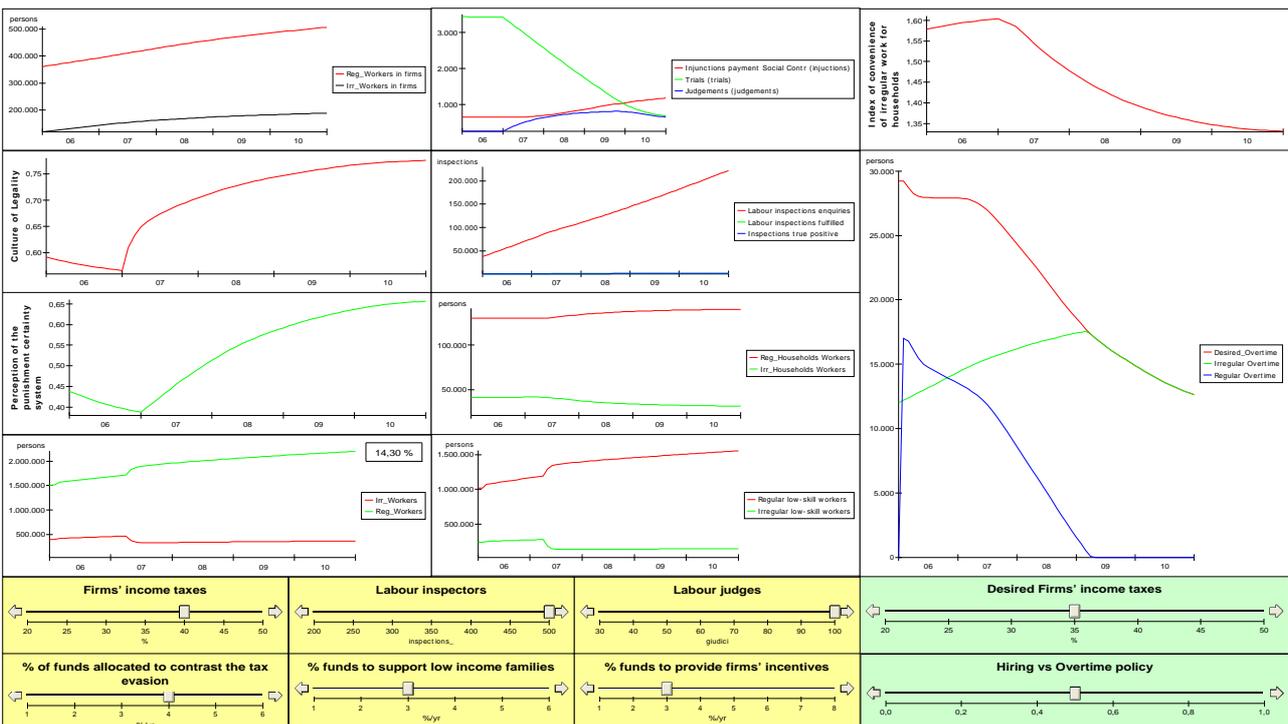
Figure 11 – Results taken from the SD model and related to the Scenario 4 (*Reduction of the fiscal pressure, increase in the number of labour inspectors and judges, raise in the % of funds to contrast the underground economy and corresponding decline in the % of funds designated to firms' incentives and to support low income families*)

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From the analysis of scenario 2 (*Reduction of the fiscal pressure and increase in the number of labour inspectors and judges*) becomes apparent the inefficacy of the public policies aimed to tackle the underground economy. This behaviour also results in spite of the increase in the number of labour inspectors and judges and a slightly growth of the "culture of illegality" and the "perception of the punishment certainty system" indexes.

Scenario 3 (*Reduction of the fiscal pressure, increase in the number of labour inspectors and judges, raise in the % of funds designated to firms' incentives and corresponding decline in the % of funds to contrast the underground economy and to support low income families*) depicts how a policy, which is mainly oriented to increase the incentives to firms to support businesses growth to the detriment of the funds to contrast the underground economy and to support low income families, doesn't make evidence of a relevant contribution to contrast the underground economy. It is possible to observe from figure 10 that the number of irregular workers that provide low skill works or households' service increases, compared to scenario 2, from 21 to 26%.

On the contrary, scenario 4 (*Reduction of the fiscal pressure, increase in the number of labour inspectors and judges, raise in the % of funds to contrast the underground economy and corresponding decline in the % of funds designated to firms' incentives and to support low income families*) outlines how by a more systemic policy oriented to balance the resources allocates both to tackle the irregular work phenomenon and to support firms and low income families, it is possible to attain relevant results in terms of number of irregular workers. This also happens because there is lower economic convenience for both entrepreneurs and employees to operate in the underground economy.

8. Conclusions

The above analysis has pointed out how the set of policies adopted by the national Government in the past in the labour market (i.e. subsidies to the unemployed) contributed to encourage the phenomenon of irregular workers.

The research project conducted in Sicily allowed the authors to identify and analyse the main causal relationships between the key-variables of the socio-economic system underlying underground economy and irregular workers dynamics.

On the base of this study, a SD model was built to support public decision-makers in better understanding short and long terms effects and policy resistance phenomena that may prevent the desired outcomes of the implemented strategies.

In particular, the above scenario analysis is aimed to contribute to foster debating and sharing alternative decisions to struggle the irregular workers phenomenon.

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