ITALY AND TWO DECADES OF ECONOMIC *DECLINE*.

A MODEL-BASED ANALYSIS WITH OUTSOURCING AND OLIGOPOLISTIC MARKETS

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Presentation outline

1. Introduction
2. A simple model of a small open oligopolistic economy (SOOE) with outsourcing
3. Results
4. Conclusions

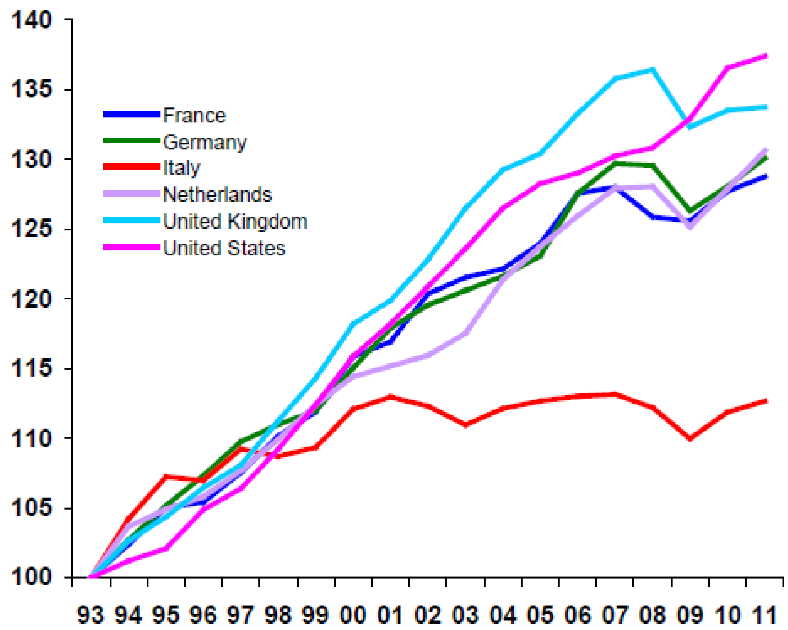
1.

Introduction

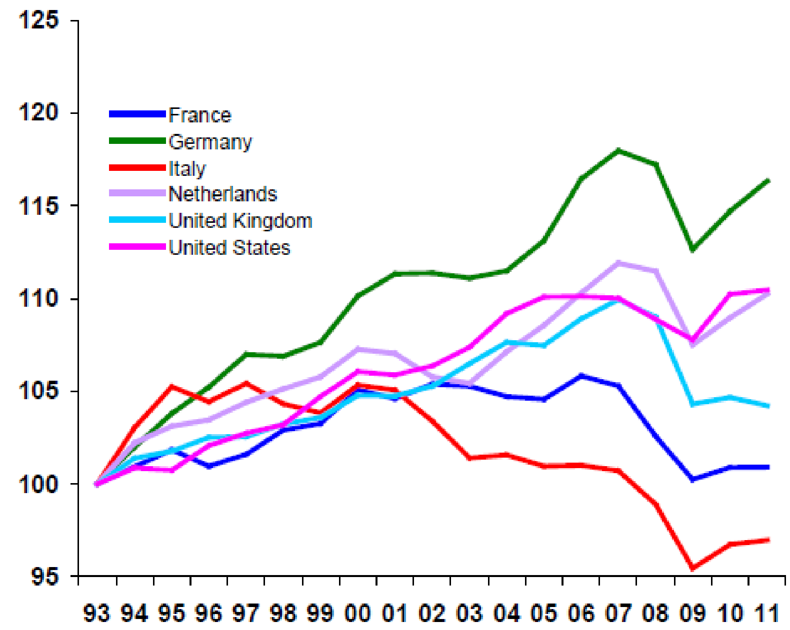
1.1.

Motivation: Italy’s economic decline

GDP per hour worked



Total Factor Productivity



Italy’s economic growth (2000-2010): 2.43%
(source: *El Pais*, 24.10.10 on IMF data)

1.2. The literature on the Italian economic decline: an overview

REFORMS → SUPPLY SIDE

- research & innovation
- firms' dimension
- finance & banking
- infrastructure
- degree of market competition
- …

→ ECONOMIC PERFORMANCE

REFORMS → DEMAND SIDE

- income redistribution
- expectations
  - on future income
  - on future demand
- …

→ ECONOMIC PERFORMANCE

1.2. cont'd

1. The importance of each individual driver

2. The interaction among the single drivers

3. The role of increased participation into the world economy (EMU + globalization)

1.3. A simple model of economic decline

INTENSE
INTERNATIONALISATION OF PRODUCTION
(foreign intermediates-output ratio in line with Germany)

\+

SCARCE
COMPETITION

↓

WELFARE LOSSES

← *POOR* INNOVATION

2.

A simple Model of a **S**mall **O**pen **O**ligopolistic **E**conomy with Outsourcing

2.1. The basic structure of the model

Sector X
- perfectly competitive
- primary inputs (K and L) + foreign intermediates
- **DISTORTION: trade costs of intermediates, τ**

Sector Y
- oligopolistic
- primary inputs (K and L)
- **DISTORTION: the number of oligopolists, N**

The second-best theory (Lipsey & Lancaster 1956) applies!

2.2. Households

$$U = X^{\varphi} \cdot Y^{1-\varphi}$$

$$X^{D} = \varphi \cdot \frac{I}{\overline{P}_X} \qquad Y = (1-\varphi) \cdot \frac{I}{P_Y}$$

where: $I = W \cdot \overline{L} + r \cdot P^{K} \overline{K} + \tau \cdot E \cdot \overline{P}_O \cdot O + \Pi^{Y}$

with: $W = \text{wage},\ r = \text{capital rental rate},\ P^{K} = \text{price of capital},$

$\tau = \text{trade costs},\ E = \text{nominal exchange rate},$

$\Pi^{Y} = \text{monetary profits of the oligopolistic sector}$

Firms – Technology and cost functions

Sector *X* (representative firm)	Sector *Y* (oligopolist *i*, *i* = 1,2,… *N*)

$$X^S = A^X \cdot V^{\eta} O^{1-\eta}$$

with $V = A^V \left(K^V\right)^{\alpha} \left(L^V\right)^{1-\alpha}$

$$Y_i = A^Y \left(K_i^Y\right)^{\beta} \left(L_i^Y\right)^{1-\beta}$$

linear cost functions:

$$C^X\left(X^S\right) = P_{P,x} \cdot X^S$$

$$C^Y\left(Y\right) = P_{P,y} \cdot Y$$

2.4.

Firms – Profit maximization

Sector *X*

$$\Pi^X\left(X^S\right)=\left(\bar{P}_X-P_{P,x}\right)\cdot X^S$$

Sector *Y*

$$\Pi_i^Y\left(Y_i\right)=P_Y\left(Y\right)\cdot Y_i-P_{P,y}\cdot Y_i$$

conditions for optimality:

$$P_{P,x}=\bar{P}_X$$

$$\frac{dP_Y}{dY}\frac{dY}{dY_i}\cdot Y_i+P_Y\left(Y\right)=P_{P,y}$$

$$Y=\left(1-\varphi\right)\frac{N-1}{N}\cdot\frac{I}{P_{P,y}}$$

2.5. Market clearing conditions and Walras' Law

Two factor markets:	$L^V + L^Y = \bar{L}$ $K^V + K^Y = \bar{K}$
Two commodity markets:	X Y

Walras' Law

$$\bar{P}_X \cdot \left(X^S - X^D \right) = E\bar{P}_O \cdot O$$

2.6. Model overview

8 variables: $X^S, X^D, Y+O+P_Y+W, rP^K+E$

7 independent equations:

$$\begin{cases} \text{consumer demand for } X^D \\ \text{consumer demand for } Y \\ \text{market clearing condition for } K \\ \text{market clearing condition for } L \\ \text{optimal demand for intermediate } O \\ \text{optimality condition for } X \\ \text{optimality condition for } Y \end{cases}$$

⇓

E = model numéraire

3.

Results

3.1. Welfare as a function of τ and *N*

$$U = \Upsilon \cdot \frac{\left(\frac{N-1}{N}\right)^{1-\varphi}\left[P_{V,x}(\tau)\right]^{\varphi}\cdot \mathrm{T}(\tau)}{\left[\alpha+\beta\frac{N-1}{N}\cdot \mathrm{T}(\tau)\right]^{\varepsilon}\left[(1-\alpha)+(1-\beta)\frac{N-1}{N}\cdot \mathrm{T}(\tau)\right]^{1-\varepsilon}}$$

with: $\Upsilon > 0, \quad \frac{\partial \Upsilon}{\partial \tau} = \frac{\partial \Upsilon}{\partial N} = 0$

and: $P_{V.x}(\tau) = \eta\left[A^X \cdot \bar{P}_X\left(\frac{1-\eta}{\bar{P}_O}\right)^{1-\eta}\right]^{\frac{1}{\eta}}(1+\tau)^{-\frac{1-\eta}{\eta}}$

$$\mathrm{T}(\tau) := (1-\varphi)/\varphi\left[1+(1-\eta)/\eta\cdot\tau/(1+\tau)\right], \varepsilon := \varphi(\alpha-\beta)+\beta$$

3.2.

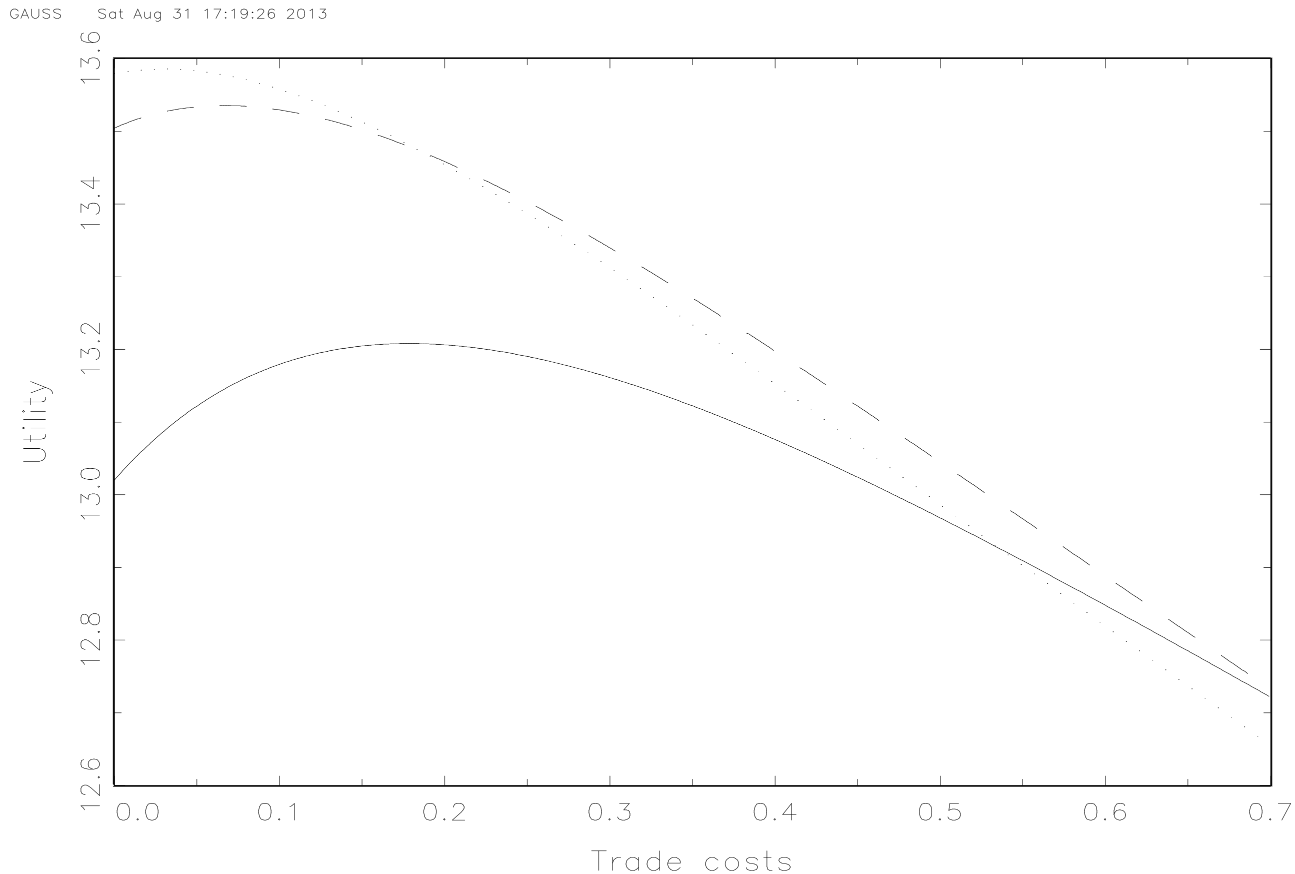
Proposition 1: Sub-optimality of outsourcing in oligopoly

If N > 0 is finite,
the optimal level of trade costs is unique and strictly positive.

bold: $N = 2$

broken: $N = 4$

dotted: $N = 8$



3.3. Intuition (basic mechanism)

"Multiple (τ, N)-pairs lead to the efficient allocation."

+

"A slight decrease in one distortion may <u>reduce</u> welfare."

distortions → reallocation of resources among sectors → welfare effects

Case A: The effect of one single distortion (e.g. oligopoly)

oligopoly in one sector (e.g. sector *Y*)

↓

Y underproduces and *X* overproduces
(with reference to the efficient allocation)

↓

marginal utility of *Y* (*X*): "high" ("low")

↓

a reallocation of resources from *X* to *Y* $\Rightarrow$ HIGHER UTILITY

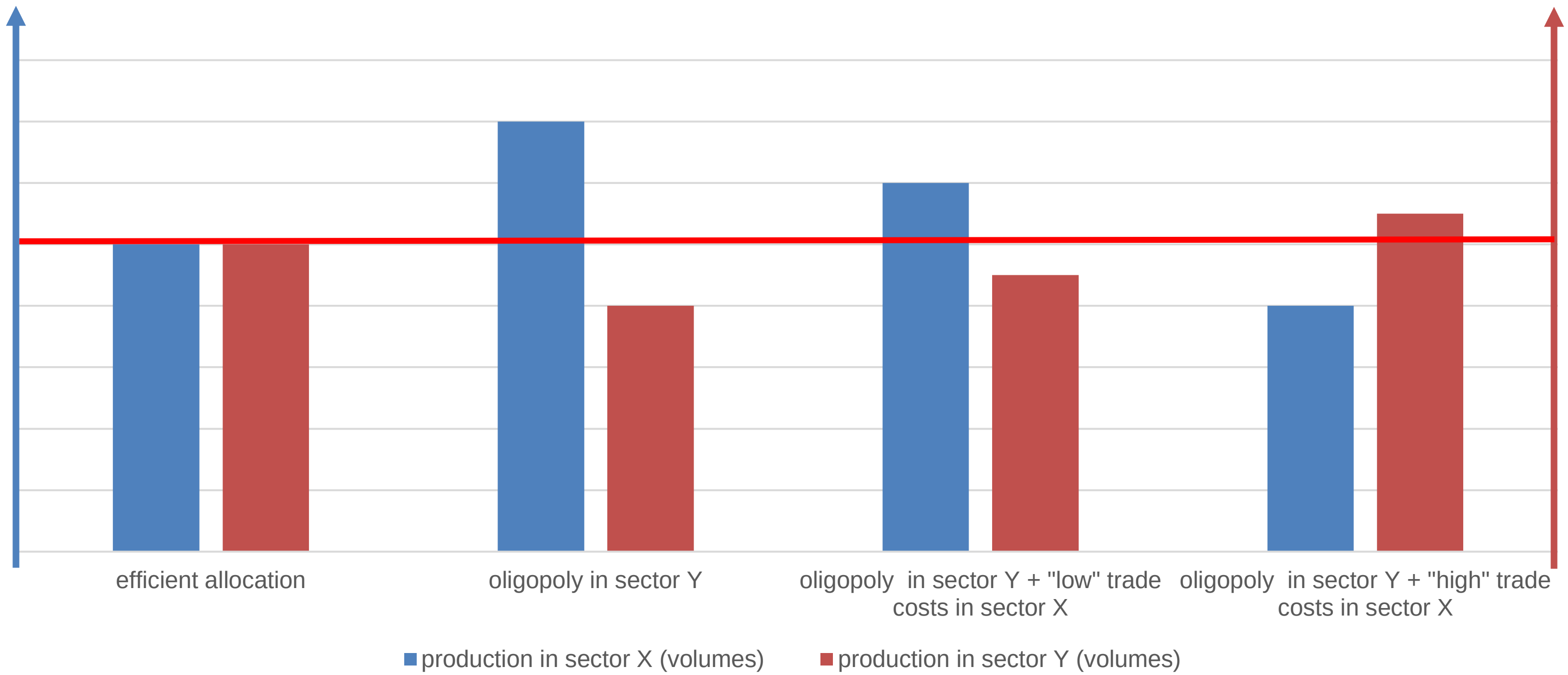
↓

more (**less!**) competition in sector *Y* (***X***)

3.5.

Case B: The effect of a double distortion (oligopoly + trade costs)

oligopoly in one sector (*Y*) and trade costs in the other (*X*)



3.6. Proposition 2: Optimal competition policy under costly outsourcing

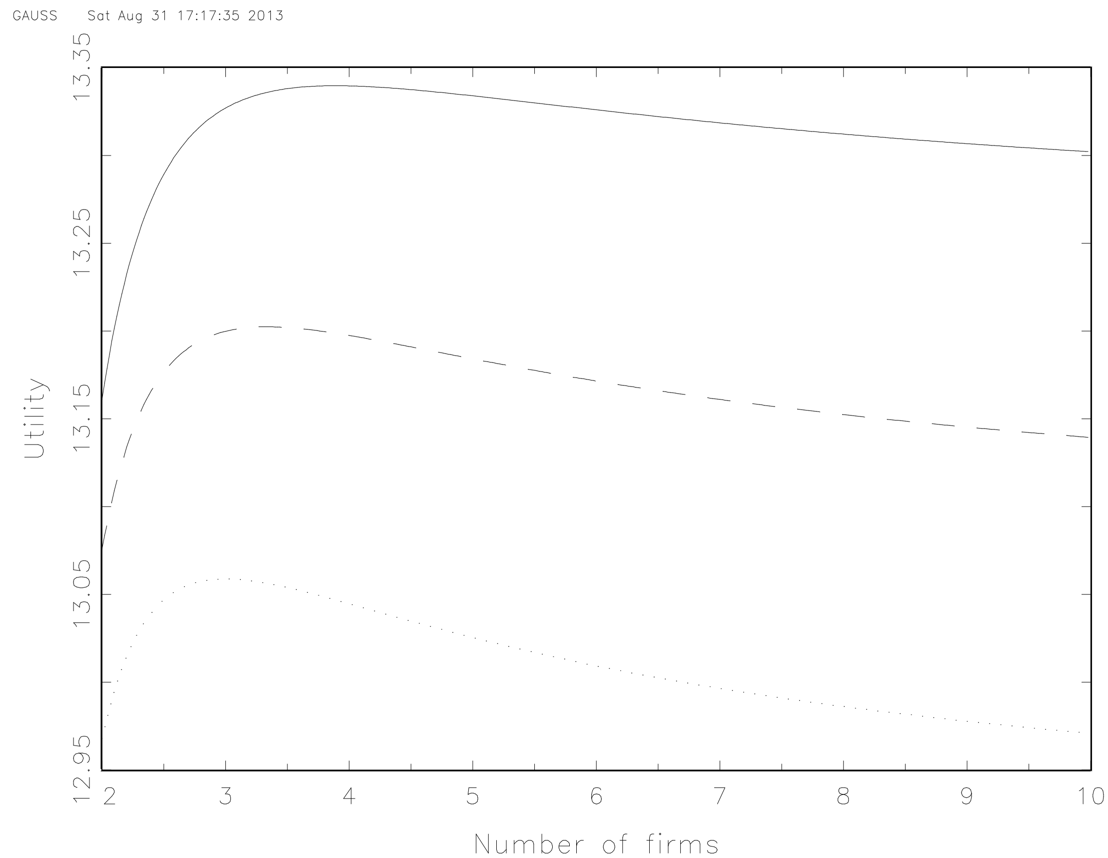
If $\tau > 0$ is finite ($\tau = 0$), the optimal number of firms is unique and finite (infinite).

$$N^* = \frac{1}{1-\eta} \cdot \left(1 + \frac{\eta}{\tau}\right)$$

bold: $\tau = 0.3$

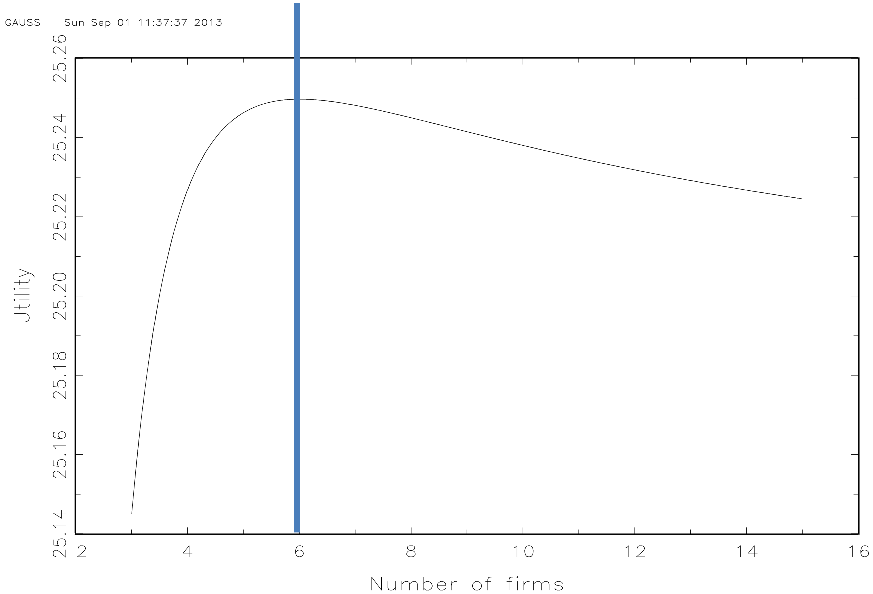
broken: $\tau = 0.4$

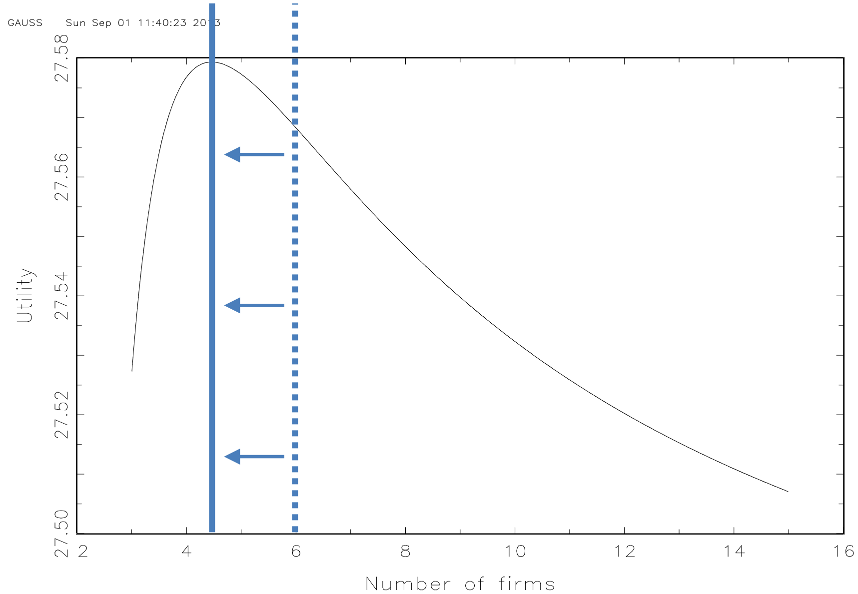
dotted: $\tau = 0.5$



Proposition 3: Innovation policy as a substitute for competition policy

If $\tau > 0$ and finite,
the optimal number of firms in the oligopolistic sector is inversely related to the productivity level in the competitive





$$A^X = 0.9$$

$$A^X = 1.1$$

3.7. cont'd

$$X^S = A^X \left[a \cdot V^\eta + (1-a) O^\eta \right]^{\frac{1}{\eta}}$$

⇓

$$N^* = \left[1 - \frac{1-\varphi}{\varphi} \frac{1}{\mathrm{T}(A^X)} \right]^{-1}$$

with:

$$\mathrm{T}(A^X) := \frac{1-\varphi}{\varphi} \cdot \left[1 + \left(\frac{1}{\bar{P}_O} \right)^\eta \left(\frac{1-a}{a} \cdot \frac{\tau^{1-\eta}}{1+\tau} \right)^{\frac{1}{1-\eta}} \left(P_{V,x} \right)^{\frac{\eta}{1-\eta}} \right]$$

and:

$$P_{V,x} = a^{\frac{1}{\eta}} \left\{ \left(\frac{1}{A^X \cdot \bar{P}_X} \right)^{\frac{\eta}{1-\eta}} - (1-a)^{\frac{1}{1-\eta}} \left[\frac{1}{(1+\tau)\bar{P}_O} \right]^{\frac{\eta}{1-\eta}} \right\}^{-\frac{1-\eta}{\eta}}$$

4.

Conclusions

4.1. Main results

1. A simple general equilibrium model of a SOOE with outsourcing
2. If one or more sectors of the economy are Cournot oligopoly,
   a) outsourcing may be sub-optimal;
   b) for a given level of trade costs, the welfare-optimal degree of competition is less than perfect competition;
   c) innovation policy in the competitive sector may act as a substitute for competition policy in the oligopolistic
3. The model offers an alternative approach for explaining possible reasons for the Italian economic decline

4.2. Indications for future research

1. Calibration and validation of the model
2. Extension to a multisectoral structure (CGE)
3. Introduction of additional drivers of crisis
4. Investigation of the role of the different drivers and of their interactions
5. Formulation of model-based policy advice to mitigate the observed downturn