INDUSTRIAL SEIGNIORAGE, THE OTHER FACE OF COMPETITION

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INDUSTRIAL SEIGNIORAGE,
THE OTHER FACE OF COMPETITION

Jordan MELMIÈS*

Abstract

This paper tries to develop an original view on industrial practices in competitive capitalist economies. In particular, we question the link between prices, competition and the quality of goods and services. We try to show that it is rational for firms to try to reduce the quality and/or the identity of goods and services while still presenting these goods and services as the same as before, in order to reduce their prices and so to improve their relative position in the competitive struggle and in order to increase their profits. By reducing quality, we mean the practice that consists of mixing inputs at the margin with cheaper ones or with alternative products that give weight. This practice reminds us of the old Seigneurs who used to mix gold with other metals to produce more coins. That’s why we propose to label this practice « industrial seigniorage ». The article first tries to delineate the widespread existence of this practice among French firms, and then explains the fundamental elements of (Post Keynesian) consumers’ behaviour which allow for this practice to exist. We especially insist on the inability of the consumer to evaluate the quality of goods and services, and his inability to distinguish a good which have been modified at the margin. In a third part, we analyze the phenomenon of industrial seigniorage in a Kaleckian model. We show the impact on sectoral profit rates and on prices, as well as the global and macroeconomic consequences on growth, distribution and employment.

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Introduction

Recent events have brought to light several cases of fraudulent meat substitution in food industry, for example in the UK or in South Africa. It began with substitution of horse meet to beef in the UK. Later, several other cases of meet substitution were discovered around the world. Recently, D’Amato et al. (2013) discovered pork, horse, kangaroo and even giraffe meat in place of antelope in 90% of samples they tested. These fraudulent practices raise the question of the possible existence of other non-fraudulent cases of input substitution which affect the quality of goods (and services) consumers buy, and of their possible link with competition among firms in mass-production/mass-consumption economies. In economics, competition among firms is usually seen as beneficial for the society as a whole, as it allows people to benefit from cheaper products, which are also of better quality. This statement can also be found in the background of some heterodox theories, and is of course often accepted by people as a common and evident fact. As a consequence, economic policies often conclude that more competition and liberalization in our economies will raise the well-being of people, as firms will have to cut prices and make significant efforts to improve the quality of their products if they don’t want to loose customers. In this paper we will try to develop the opposite view, arguing that competition between firms in mass production societies can lead to cheaper products that are of worse quality. In that sense, we will show how competition can exploit consumers. More precisely, we will analyze the practice of producing a good by mixing inputs with cheaper substitutes that do not offer the same functionalities, or simply reducing the quantity of inputs, while still presenting the good as the same as before. This practice reminds us of the old Seigneurs who used to mix gold with other metals to produce more coins. That’s why we propose to label this practice « industrial seigniorage ». This practice allow firms for improving their relative position in the competitive struggle, as they can propose cheaper goods that are (marginally) deteriorated while maintaining their profit margins. The article is divided into three parts: it first tries to delineate the widespread existence of this practice among firms. As this work is quite exploratory in this domain, it will be based upon French and Belgian examples, letting other examples for future research. It then explains, in the second part, the fundamental elements of consumers’ behaviour which allow for this practice to exist. In a third part, we analyze the phenomenon of industrial seigniorage in a Stock-flow consistent kaleckian model. We show the impact on sectoral profit rates and on prices, as well as the global and macroeconomic consequences on growth, distribution and employment.
1. The notion of “industrial seigniorage”

a. Origins of the notion

We decided to label the practice of producing goods with a reduced quantity of inputs, or by mixing original inputs with cheaper ones, while still presenting these goods as the same as before “industrial seigniorage”. As we reminded, the origin of this practice can be found in the Middle Ages when Seigneurs could mix gold with other metals in order to produce more coins, and still presenting coins as having the same value as before. Nowadays, industrial seigniorage refers to a firm which would produce a good by reducing the quantity of input incorporated in the production process, or mixing the inputs with cheaper substitutes in order to present the good as if it was exactly the same as before, whereas this is not the case.

From a technical point of view, the principle of industrial seigniorage can be linked to the concept of adulterated goods as analyzed by Donna Wood (1985). Adulteration is the substitution of worthless inputs to original ones in order to reduce unit costs while maintaining the same presentation of the product as before. This phenomenon was at the origin of the 1906 Food and Drug act in the US. At the origin, adulteration means the composition of goods is mixed with toxic products (i.e. fraud). But as Wood recalls, it is also possible to substitute original inputs with cheaper non-toxic ones (for example water), and this seemed to be much widespread than pure “fraud” (ibid.). These non-fraudulent practices, even if not really considered as adulteration, affect the utility that people can reach in buying these goods, as they seemed unable to know exactly what their dollars are buying (ibid.). Wood notices that in 1906 the Pure-Food Investigating Committee reported:

“Cheap yellow sugar flavored with vegetable extracts passed as Vermont maple sugar; colored oleomargarine was sold as butter; fruit jams were often made from peel, cores and glucose; peeper and other spices were sometimes only ground nutshells; lard was substituted for butterfat in candies, condensed milk and ice cream; tomato catsup consisting of pumpkin, saccharin, and coal tar colors was not uncommon. A chemical thickener mixed with one pound of butter and a pint of milk quickly produced two pounds of butter”

(Wood, 1985).
In that sense, adulteration could be seen as the “visible” (because fraudulent) part of wider practices which clearly affects consumers’ well-being.

b. Industrial seigniorage today

At this stage, one could nevertheless argue that these practices are quite ancient. We will here show that they are still contemporary, on the basis of French and Belgian examples in the food industry. In France, the checks made by the “DGCCRF” (the former office in charge of fraud and anticompetitive practices, now called the “Autorité de la concurrence”) reveal a lot of fraudulent substitutions. Table 1 show the details of these controls, where one can discover that on the basis of 6 basic products, with 992 samples controlled, 34% of these samples revealed these kinds of practices. The highest rates of non-conformity concerns merguez sausages, which always incorporate pork without signalling it, or incorporate more pork than said (until 86.7% of non conformed samples).

These examples could nevertheless be criticized as being only fraudulent cases, which would not totally correspond to our definition of industrial seigniorage. To show that the practice of industrials seigniorage is widespread and not only fraudulent, we summarize two studies lead in France and Belgium that underlines several cases of legal practices which correspond to input substitution in tables 2 and 3.

c. Industrial seigniorage in economic policy

We will go further and try to show that industrial seigniorage not only does exist, but can also be found at the heart of some (and even frequent) economic policies, especially in the European Union. We will underline four European directives. Two of them are definitely applied, the others have been temporarily abandoned (but will come back soon).

- 2000/36/EC directive, “chocolate directive”

This directive (23/06/2000) comes from the fact that in Europe there existed several practices concerning the production of chocolate (or what may be called the “concept of chocolate”). In some countries, the use of vegetable fat was allowed whereas forbidden in some others. This was seen as a problem for the settlement of the common market. As the use of vegetable fat was allowed in some countries until 5%, the directive imposed all countries of the Union to legalize it. This directive thus marginally modified the concept of chocolate in some countries (especially in France) where it was previously forbidden.
The “rosé” directive

In 2009, a project of directive was finally stopped by the European parliament in face of the disappointment of some wine producers (especially French producers). This directive aimed at authorizing the production of rosé wine by mixing up white wine with red wine. This practice seems to us as particularly representative of the concept of industrial seigniorage: mixing white wine with red wine to make rosé wine cheaper and more competitive in face of South-African or Australia (two countries which already make rosé with white and red wines) in order to conquest new markets, especially in China.

Wood shaving wine

The directive 1507/2006 legalized, in 2006, the use of wood shavings in place of barrels in order to make the wine get a woody taste. Again, the origin of this directive is an international practice (South America and South Africa already used wood shavings) that prevents other countries from being competitive on the world markets. This practice has two main consequences: it first allows producers for controlling the taste of wines, so as to make it appealing for the widest people. It then allows to reduce the cost of production (and so the price): €75/hl for barrels, against €5/hl with wood shavings.

Mincemeat patty

On 20th May 2010, the European Parliament rejected a directive which was destined to allow the use of “thrombine” in order to make “Mincemeat Patty”, i.e. make minced beef with offcuts/scrap. This meat would have been really cheaper, and would have been sold under the name “Mincemeat Patty”, although it would have had exactly the same appearance than other meats… This directive was rejected, but producers lobbies immediately announced they would come back with other directives of the same sort.

2. How is this possible? Some elements of a PK consumer theory
One could immediately raise a very relevant question: how is this possible at all? How can these “ersatz” products be successful, and why don’t consumers see the differences of quality between goods? From a rational point of view, consumers should be aware of the fact that these goods may be of worse quality and don’t bring them a total satisfaction for their money. It is thus necessary to come back on the theory of consumer. A general synthesis of a heterodox/postkeynesian theory of consumer is proposed by Lavoie (1992 and 1994). Lavoie presents six fundamental principles of a non-mainstream theory of consumer choice: procedural rationality (first principle); principle of satiable needs (second principle), separability of needs (third principle), subordination of needs (fourth principle); growth of needs (fifth principle) and nonindependence (and heredity) (sixth principle). For our part, we think two effects can explain why industrial seigniorage can develop. We will hereafter detail these two effects, relating them to the principles described by Lavoie (ibid.).

\[ a. \textit{Difficulty to evaluate quality} \]

We first think consumers face difficulty evaluating the quality of goods and services (this refers to procedural rationality, first principle). This is not, however, something new in economic theory: in mainstream economics, one can usually find three kinds of goods: first, there are goods whose quality can be judged before use. Secondly, there are goods that people have to consume before judging the quality. And finally, there are some goods that people are unable to know the real quality even after having consumed it. These goods are usually called “confidence goods”. However, mainstream economics always concentrate its analysis on the first two kinds of goods\(^1\). We think however that the third category is in fact the most widespread. Consumers are not that able to build an objective judgment upon the quality of goods and services. The reason is that quality is relative: one can only evaluate the quality of a good by comparing it with its competitors. Comparing however means consuming several goods at the same time, one immediately after another… which is hardly ever the case, as people often have to choose before consuming. Even when people have the possibility to compare, the order in which they “try” (or taste) goods and services influences the judgment they will have on the relative quality of goods and services. If consumers try several goods at spaced intervals, they are comparing what they feel while consuming a good to what they remember concerning the previous one. Their judgement can thus be influenced by what they felt while consuming the first good: it is what is called an “anchorage bias” in psychology.

\(^1\) Often admitting the third category needs State intervention.
This phenomenon refers to the principle of nonindependence: the order in which people make choice influences the choices they make. This also leads to the conclusion that *choices can influence preferences as well as preferences influence choices*.

Furthermore, facing their inability to make an objective judgment, consumers can try to find ex post reasons to think that they made the good choice: human beings are able to adapt themselves to a lot of situations, and can thus persuade themselves they made the good choice *even if* they made the wrong one: this is what the American social psychologist Leon Festinger (1957) called cognitive dissonance: people can rationalize their choices ex-post, whatever their initial decision. *People can adapt their preferences to their choices.*

At this stage, it is necessary to underline that the practice of industrial seigniorage is not necessary fraudulent nor hidden to consumers, as anybody can try to know what he is buying by reading the labels on products. Whereas examples of table 1 concern fraudulent substitutions, results in tables 2 and 3 were obtained by *simply reading the labels of products*. Industrial seigniorage is thus not a problem of imperfect or asymmetric information. It is most, in our view, a problem of capitalist exploitation: firms can exploit consumers by exploiting a cognitive bias they face in evaluating quality.

**b. Liquidity and revenue constraints**

Consumers are thus human beings, facing a lot of difficulties to ground their own evaluation of quality. But let’s suppose they manage to overcome all these problems and finally get a robust personal evaluation of quality. The problem is then the liquidity and wage constraints that all consumers face while making their choices. Even if they could clearly know that some goods are better than others, the fact that goods remain more expensive compared to others make consumers unable to afford them. People can thus be “forced” to buy “ersatz” goods just because they can’t afford the better goods with their revenue: they can’t get the necessary liquid money to buy the better goods. This means that competition between producers can take place on the basis of a nominal revenue constraint: even if some goods are worse than others, their absolute price level makes them competitive for consumers who try to satisfy growing, subordinated and separable needs (third, fourth and fifth principles). Let’s consider again the example of Bolognese lasagna we underlined below: in that case, consumers can get access to “lasagna” they might not afford the other way. This means what is sold to consumers is before all a “concept”: in our example producers sell to consumers something which looks like lasagna, which has all *visual properties* of lasagna, but which is not really lasagna any more. Industrial seigniorage is thus completely different from
monopolistic competition and/or product differentiation: in monopolistic competition the aim is to sell quite identical products while suggesting to consumers these products are different, whereas industrial seigniorage consists of suggesting goods are strictly identical whereas they are not any more… Firms thus simply exploit the gap between the “formal freedom” of consumers and their “real freedom” to buy and consume what they prefer.

c. Industrial seigniorage: an economic strategy

Given the behaviour of consumers we just underlined, industrial seigniorage has all the chances to become a viable and profitable strategy for firms. In modern mass production and mass consumption economies, goods and services are in competition with other similar goods but also with all other goods and services (principle of growing and subordinated needs, fourth and fifth principles). Industrial seigniorage can be a mean, for firms, to reduce the price of a product while maintaining or even increasing profit margins. These firms can thus improve their relative position in the competitive struggle and increase the growth of their sales as they propose consumers to reduce what they pay for one good (because of still presenting the good as the same as before) and so to buy more other goods. In the same time, firms can maintain profit margins, so as to defend the financing of their own growth and capital accumulation (as found in the post-keynesian theory of the determination of the mark-up, for example Eichner (1973, 1976) or Wood (1975)). With the recent evolutions of our economies, (i.e. globalization which increases international market competition, decreasing wage shares in several industrialized countries and growing income inequalities that increases ostentatious consumption), industrial seigniorage entertains the illusion of affluence, and allows for price aggressive commercial strategies to be both successful and financially viable.

3. The macroeconomic effects of industrial seigniorage

We are now going to build a macroeconomic model of the phenomenon we described before. This model aims at analyzing the impact of a lower quality (industrial seigniorage) attack on a market. We will first detail and present the general structure of the model, and then simulate this kind of competitive process. We will especially analyze the relationship between prices, profit margins and consumers’ well-being.
3.1. Presentation of the model

3.1.1. General structure

The artificial economy of our model will be composed of four productive entities. Two of them (A and B) produce consumption goods, the third one (M) produce an input it sells to A and B, and the last one (I) produce investment goods for the whole economy (for itself also). For the sake of simplicity, banks are assumed to afford credit in a passive manner: they afford what is asked by firms. We could have introduced some kind of discrimination between firms, as Melmiès and Dallery (2010) do, but preferred to introduce it as the model will already be quite heavy. There are two types of households: renters who earned distributed profits, and workers, who work for the four productive entities. At the initial stationary state, the two sectors A and B are exactly identical, and have thus each 50 % of the consumption good market. The transactions matrix that comes from this modelisation is given in table 4. The next step is to build the stock matrix. This one is very simple, as we assume away shares, so as to keep the model as simple as possible and underline in the best manner the mechanism we want to detail. The stocks of the economy are presented in table 5. We will make further assumptions:

- There is no state;
- There is no foreign sector (or the economy is a world wide economy);
- There are no equities;
- There is no explicit capital depreciation (more precisely, we only use net flows);
- Banks don’t apply interest rates, don’t make profit and don’t have workers. They are only credit affording entities.

The first thing to do is to list the identities that come from the transaction matrix (all columns and the non-trivial rows (more than two variables rows). We list them hereafter as they stand, and we will detail variables and behaviours later in the paper.

\[
\Pi_a^D + \Pi_b^D + \Pi_m^D + \Pi_i^D = C_a^R + C_b^R + \Delta M_a^R \\
W_a + W_b + W_m + W_i = C_a^w + C_b^w + \Delta M_a^w \\
C_a = W_a + p_m \cdot q_{ma} + \Pi_a \\
\Delta L_a = p_i \cdot I_a - \Pi_a^U
\]
We get 18 identities, and have to choose one of them as hidden equation. We will use equation (r) as hidden equation. These identities are the general structure of the artificial economy. We now have to define behavioural equations.

**Firms**

We will begin by defining the equations concerning the four productive entities, A, B, M and I$_2$. The existing capital stock $K_j$ evolve with the investment expense $I_j$ of the period:

$$K_j = K_{j(-1)} + I_j \quad \forall j = \{a,b,m,i\}$$

Investment expenses are given by the accumulation rate of each sector, itself represented by a kaleckian investment function of the traditional form, i.e. depending on a constant term $\gamma_j^0$ of the rate of capacity utilization of the preceding period $u_{j(-1)}$, and of the rate of undistributed profit of the preceding period $rcf_{j(-1)}$.

---

2 We will use a capital letter for each of the four productive sectors, but use the corresponding small letter to write the equations.
The rate of undistributed profit $rcf_j$ is the ratio between undistributed profit of the period $\Pi^U_j$ and the capital stock evaluated at its replacement cost $p_j K_j$:

$$rcf_j = \frac{\Pi^U_j}{p_j \cdot K_j}$$  \hfill (4)

The rate of profit before distribution $r_j$ is quite the same as the precedent rate but with the total amount of profits $\Pi_j$:

$$r_j = \frac{\Pi_j}{p_j \cdot K_j}$$  \hfill (5)

The rate of capacity utilization $u_j$ is for its part defined, as usual, as the ratio of actual output $q_j$ and the output of full capacity utilization or potential output $q^{FC}_j$:

$$u_j = \frac{q_j}{q^{FC}_j}$$  \hfill (6)

Full capacity output is the ratio between the capital stock and the capital coefficient $\sigma_j$ which is assumed to be constant:

$$q^{FC}_j = \frac{K_j}{\sigma_j}$$  \hfill (7)

Concerning now the determination of sectoral actual outputs, we will assume, in a very traditional Keynesian way, that they are determined by current corresponding demand. For the consumption goods sector (A and B), it means that output of the period $q_a$ is equal to the amount of consumption of all households (workers and renters) in this good $C_a$ divided by its price $p_a$ (consumption being defined in monetary terms and output in real terms):

$$q_a = \frac{C_a}{p_a}$$  \hfill (8)

We get the same thing for the consumption in the good produced by B:

$$q_b = \frac{C_b}{p_b}$$  \hfill (9)
The total amount of consumption in each consumption good is equal to the sum of the consumption in this good by each group of households:

\[ C_a = C_a^R + C_a^w \]  \hspace{1cm} (l-10)  
\[ C_b = C_b^R + C_b^w \]  \hspace{1cm} (m-11)  

Concerning the output of the intermediate sector (M), we assume that sectors A and B buy a fixed share of their respective output to this sector, i.e. we assume fixed technical coefficients \( \alpha_a^m \) et \( \alpha_b^m \):

\[ q_m = q_{ma} + q_{mb} = \alpha_a^m \cdot q_a + \alpha_b^m \cdot q_b \]  \hspace{1cm} (12)  

The output of the investment good sector \( q_i \) is equal to the investment goods sold to all sectors (including investment goods the sector I produces for itself):

\[ p_i \cdot q_i = p_i \cdot (I_a + I_b + I_m + I_i) \] ou \( q_i = (I_a + I_b + I_m + I_i) \)  \hspace{1cm} (13)  

We also have to define the total amount of profit realized by each sector \( \Pi_j \) by subtracting sectoral costs to sales turnovers. For the consumption sector, the profit is equal to the difference between sales (ie households’ consumption) and wages and intermediates expenses:

\[ \Pi_a = p_a \cdot q_a - W_a - \alpha_a^m \cdot q_a \]  \hspace{1cm} (c-14)  
\[ \Pi_b = p_b \cdot q_b - W_b - \alpha_b^m \cdot q_b \]  \hspace{1cm} (e-15)  

The other sectors have only wage costs:

\[ \Pi_m = p_m \cdot q_m - W_m \]  \hspace{1cm} (g-16)  
\[ \Pi_i = p_i \cdot q_i - W_i \]  \hspace{1cm} (i-17)  

We will assume that firms distribute profit \( \Pi_j^D \) as a fixed share of their profit, meaning that they have a fixed and exogenous retention rate \( sf_j \):

\[ \Pi_j^D = (1 - sf_j) \cdot \Pi_j \]  \hspace{1cm} (18)  

Undistributed profits \( \Pi_j^U \) are thus what remain of this process:

\[ \Pi_j^U = \Pi_j - \Pi_j^U \]  \hspace{1cm} (n, o, p, q-19)
Concerning the price of intermediate (M) and investment (I) goods, they are supposed to be determined by a usual simple mark-up over unit costs $UC_j$. We will detail the determination of the price of consumption goods hereafter.

$$p_m = (1 + \theta_m) \cdot UC_m$$  \hspace{1cm} (20)

$$p_i = (1 + \theta_i) \cdot UC_i$$  \hspace{1cm} (21)

Unit costs of sectors are:

$$UC_a = \frac{W_a + (p_m \cdot \alpha^m_a \cdot q_a)}{q_a}$$  \hspace{1cm} (22)

$$UC_b = \frac{W_b + (p_m \cdot \alpha^m_b \cdot q_b)}{q_b}$$  \hspace{1cm} (23)

$$UC_m = \frac{W_m}{q_m}$$  \hspace{1cm} (24)

$$UC_i = \frac{W_i}{q_i}$$  \hspace{1cm} (25)

Equations (22) et (23) will allow us to see the evolution of profit margins of sectors A and B.

- **Wages and employment**

Let’s turn now to the determination of wages and employment. There are four productive entities in our artificial economy. We thus have potentially four wage rates $w_j$:

$$W_j = w_j \cdot N_j$$  \hspace{1cm} (26)

Wage rates are subject to a conflict between firms and workers:

$$w_j = \rho_j \cdot \tilde{w}_j^f + (1 - \rho_j) \cdot \tilde{w}_j^w$$  \hspace{1cm} (27)

With $\rho_j$ the relative bargaining power of firms of each sector $j$, $\tilde{w}_j^f$ their targeted wage rate and $\tilde{w}_j^w$ the targeted wage rate of workers.

The number of workers actually employed in each sector $N_j$, we assume that it is equal to the ratio of actual output $q_j$ and the actual average labor productivity $\mu_j$:

$$N_j = \frac{q_j}{\mu_j}$$  \hspace{1cm} (28)
This gives us, by addition, the total number of people employed in this artificial economy \( N^{\text{tot}} \):

\[
N^{\text{tot}} = \sum_{j=a,b,c,d,j} N_j
\]  

(29)

In our model, labour productivity \( \mu_j \) depends of its precedent value and on the evolution of the rate of utilization of capacity, as in Melmiès and Dallery (2010):

\[
\mu_j = \mu_{j(-1)} + \eta_j \cdot (u_j - u_{j(-1)})
\]  

(30)

The idea is here to consider that firms try to transfer some of capacity utilization rates on the back of workers instead of hiring or firing immediately. We will assign an exogenous value to the parameter \( \eta_j \).

We finally obtain the rate of growth of employment \( \hat{e} \):

\[
\hat{e} = \frac{N^{\text{tot}} - N^{\text{tot}}_{(-1)}}{N^{\text{tot}}_{(-1)}}
\]  

(31)

- **Banks**

We choose in this article to adopt a very simple banking behaviour, purely horitontalist. This choice comes from the necessity not to complexify too much the model, so as to underline as precisely as possible the competitive mechanism of industrial seigniorage we want to underline. We assume banks afford credit in the lines demanded by firms of the four productive sector for the external financing of their investment projects. They thus afford a total amount of credit money \( \Delta L_j \), which is based on the difference between the total amount of (sectoral) investment in monetary terms \( (p_i I_j) \) of each sector and the amount of undistributed profits \( \Pi_j^U \) that firms use to self-finance part of these investment projects:

\[
\Delta L_j = (p_i I_j) - \Pi_j^U
\]  

(\( d, f, h, j \)-32)

We assume banks don’t apply interest rates. The outstanding credits are equal to money supply \( M^S \):

\[
L_a + L_b + L_c + L_i = M^S
\]  

(\( k \)-33)
- **Households**

Here comes the most important part of our modelisation. Households are workers or renters but also consumers. As soon as competition offers them the choice between two goods, the question of the shares of each good is asked.

The monetary amount $C^w$ that workers of each sector $j=\{a,b,m,i\}$ consume is determined simply as a proportion $\alpha^w$ of their wage revenue and a proportion $\alpha_m^w$ of their monetary wealth stock:

$$C^w = \sum_{j=a,b,m,i} C^w_j = \sum_{j=a,b,m,i} \alpha^w \cdot W_j + \sum_{j=a,b,m,i} \alpha_m^w \cdot M^w_d$$

(34)

For the renters, the equation gives us:

$$C^R = \alpha^R \cdot \sum_{j=a,b,m,i} \Pi^D_j + \alpha_m^R \cdot M^R_d$$

(35)

We thus have to define the repartition of these global amount of consumption between two goods, A and B. At the beginning of simulations, households are assumed to consume half of their consumption expenditure in good A and another half in good B. We assume the percentage of good A in total expenditure of households is residual: households first determine their consumption in good B ($C^w_b$), and then realize the rest of their buyings in good A ($C^w_a$).

$$C^w_a = C^w - C^w_b$$

(36)

Amounts that households spend in goods A are thus residual. But that doesn’t mean that they are small compared to goods B, we only assume that they are not subject to a direct decision. $C^w_b$ is defined as a share of the global amount of households’ consumption.

$$C^w_b = \Omega^b \cdot C^w$$

(37)

In this equation, $\Omega^b_j$ only represents a consumption coefficient. All the difficulty lies in the choice of its value. We choose a simple equation to describe this coefficient: it depends positively on the relative price of the good A and good B, and negatively on the wage rate.

$$\Omega^b_j = \frac{\left(\frac{P_j}{P_0}\right)^{\beta_j}}{w_j}$$

(38)
Equation (6.38) states that a fall in the price of good B compared to the price of good A leads to a rise of this good in consumers’ basket. As a consequence, a fall in wage rates will decrease this share of good B. \( \psi \) is here a constant term, to which we assign a value that allows \( \Omega^b_j = 0.5 \) at the beginning of the process. Equation (6.38) is chosen so as to simulate specific shocks we want to make. It wouldn’t be adapted to other shocks. *However, for the scenario we will simulate, it describes the evolution of \( \Omega^b_j \) in a satisfying and intuitive way.*

We have only defined coefficients for the workers, and not for the renters. We will assume that renters always spend half of their consumption expense in goods A and half in goods B. This is a way to neutralize the impact of renters’ choices, so as to concentrate on workers’ decisions.

We finally have to define saving behaviours of households, which will be very simple as we will assume that people save by holding liquid money \( \Delta M^w_d \) and \( \Delta M^R_d \):

\[
\Delta M^w_d = W_a + W_b + W_m + W^t - C^w
\]

\[
\Delta M^R_d = \Pi^{D^m} - C^R
\]

**2.1.2. The competitive process**

In the model, we will assume that firms have a double goal: they first seek growth and market shares, and so always try to reduce their price as much as possible, but they also have to invest to meet demand growth and they need to self-finance part of their investment expenses. In what follows, the initial stationary state is characterized by an equal repartition between firms A and firms B. This is a situation of given degree of competition between them. This is logical since these firms are strictly identical at the beginning. Let’s suppose now that firms B tries to increase its market share and reduces its price. This represents for it a decrease in its profit margin \( \theta_b \). However, in a Postkeynesian/woodian perspective, this is not endurable, since it will decrease its “required” or “necessary” self-financing rate. In order to meet a price decrease and a stable self-financing rate, firms will reduce the quality of the goods they produce, by decreasing the input coefficient \( \alpha^m_b \), incorporated in the productive process. They will do it so as to restore their self-financing rate \( TAF_b \) to its “required” or necessary” value \( T\tilde{A}F_b \).

\[
\alpha^m_b = \alpha^m_{b(-1)} + \beta \cdot (TAF_b - T\tilde{A}F_b)
\]
We will furthermore assume $\beta$ is non-zero only for values of the self-financing-rate which are less than the required rate. This means that firms B will reduce the quality of products only when their effective self-financing rate is below the required value. Firms A are assumed to react exactly the same way to a deterioration of their self-financing rate:

$$\alpha^m_a = \alpha^m_{a(-1)} + \beta \cdot (TAF_a - \bar{T}AF_a)$$  \hspace{1cm} (42)

Both equations (6.41) et (6.42) are subject to the constraint:

$$\beta = c > 0 \text{ if } TAF_{a,b} < T\bar{F}_{a,b}$$
$$\beta = 0 \text{ otherwise.}$$

For simplicity, the sensibility of reaction in each firm $\beta$ will be the same everywhere. $c$ will thus be an exogenous variable.

A question immediately arises: what happens when the self-financing rates are above their necessary value? We decided not to make our mechanism of adjustment on the quality of goods and services symmetric (as it seems to us unrealistic that firms increase the quality of their product when their self-financing rate is above the target). We think that in a woodian perspective, this situation must lead to a price decrease. This is the spirit of competition in the perspective of our model: firms decrease the quality of goods when they need to increase their self-financing rate, and decrease their price when they can decrease their self-financing rate, so as to improve their situation in the competitive struggle.

$$p_a = p_{a(-1)} + \lambda \cdot (T\bar{F}_a - TAF_a)$$ \hspace{1cm} (43)
$$p_b = p_{b(-1)} + \lambda \cdot (T\bar{F}_b - TAF_b)$$ \hspace{1cm} (44)

With the constraint:

$$\lambda = c > 0 \text{ if } T\bar{F}_a < TAF_a,$$
$$\lambda = 0 \text{ otherwise.}$$

### 2.2. Simulations

We are now going to run simulations of our artificial economy in its initial stationery state and with a shock on the price of the good of firm B\(^3\), who seeks to raise its market share (and so its growth of sales). Table 4 shows the values of parameters we chose, and the values

\(^3\) From a technical point of view, the price of good B being endogenous (equation (44)), we will, for the first periods of the model, make it exogenous so as to make an arbitrary initial shock, and then make the equation (44) run immediately after the shock.
of main endogenous variables that come from these parameters. We decided, in our model, to assign the same coefficients in investment functions for all four productive sectors A, B, M and I. It is the same for the output/capital ratio of each sector, and for wage rates. However, firms of the consumption sector are supposed to distribute a higher share of their profit in the form of dividend payments. The parameters we chose make firms A and B strictly identical at the beginning: they pay the same wage rate, the same price for the input good, and the same unit price for their investment expenses. We could almost say that factor markets are perfect in our model. Finally, firms A and B incorporate the same ratio of input in their production at the initial stationary state (goods A and B are identical). Furthermore, workers’ propensity to consume wages is greater than renters’ propensity to consume out of distributed profits, itself greater than households’ propensity to consume out of money stock.

### Values of main parameters

<table>
<thead>
<tr>
<th>Investment functions</th>
<th>Capital/output coefficients</th>
<th>Firms’ retention rates</th>
<th>Target wage rates</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\gamma_j^0 = 0.0325$</td>
<td>$\sigma_j = 2.3$</td>
<td>$sf_a = sf_b = 0.55$</td>
<td>$\tilde{w}_j^a = 6$ $\tilde{w}_j^w = 10$</td>
</tr>
<tr>
<td>$\gamma_j^w = 0.03$</td>
<td>$sf_m = sf_i = 0.7$</td>
<td>$T\overline{AF}_a = 0.66$</td>
<td></td>
</tr>
<tr>
<td>$\gamma_j^{rf} = 0.1$</td>
<td>$T\overline{AF}_b = 0.66$</td>
<td>$\alpha_a^m = \alpha_b^m = 0.39$</td>
<td></td>
</tr>
</tbody>
</table>

| Propensities to consume | |
|-------------------------| |
| $\alpha_m^u = 0.04$ | $\alpha_m^r = 0.04$ | $\alpha_w^u = 0.95$ | $\alpha_w^r = 0.6$ |

### Values of endogenous variables (initial stationary state)

<table>
<thead>
<tr>
<th>Indebtedness ratios</th>
<th>Utilization rates</th>
<th>Accumulation rates</th>
<th>Profit rates (after distribution)</th>
<th>Real and monetary market shares</th>
</tr>
</thead>
<tbody>
<tr>
<td>$lev_a = lev_b = 0.3246$</td>
<td>$u_a = u_b = 0.83$</td>
<td>$g_j = 0.0613$</td>
<td>$r_a^{cf} = r_b^{cf} = 0.039$</td>
<td>$PdMr_a = PdMr_b = 0.5$</td>
</tr>
<tr>
<td>$lev_m = 0.159$</td>
<td>$u_m = 0.798$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$lev_i = 0.159$</td>
<td>$u_i = 0.798$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$TAF_a = TAF_b = 0.675$</td>
<td>$TAF_m = TAF_i = 0.841$</td>
<td>$\dot{e} = 0.0613$</td>
<td>$r_m^{cf} = r_i^{cf} = 0.049$</td>
<td>$PdMm_a = PdMm_b = 0.5$</td>
</tr>
</tbody>
</table>

---

These coefficients are in reality endogenous: 0.39 is in fact the initial value we introduce in the model.
Figure 1 shows the hidden equation of the model (equation (r) rewritten under the form $(M^t - M^R_d - M^*_d)/M^t$). This equation is equal to zero, so we can deduce that our model is coherent from a Stocks-Flows perspective.

2.2.1. Effects of a competitive shock

The simulation we decided to run is simple: an exogenous cut in the price of good B. Figure 2 shows the first effect of this shock: in cutting its price, the firm B attracts some consumers from the firm A, and thus increases its market share. Consumers are slightly sensible to this new price differential and substitute their consumption expenses. The share of monetary expenses in good B in workers’ expenses raise from 50 % to 52,7 %. Its market share in terms of quantities raise from 50 to 53,4 %. This difference is due to two phenomena. First, renters keep on consuming goods A and B equally. Secondly, real market shares are a quantities ratio, whereas monetary market shares are a ratio of monetary values. Since prices are now different, a difference between the two ratios appears. This difference is not important: firm B improves its situation vis-à-vis firm A in the competitive struggle for market shares (figure 2). One can see that the share of good B in the basket of consumers rises up and then slightly diminishes before stabilizing. Firm A follows exactly the opposite way: this effect is due to price competition. Firm B reduces its price, but firm A do it as well (figure 3).

---

5 The price of good B goes from 6,9 to 6,6 at a time $t$ arbitrarily chosen.
The price cut of firm B reduces, other things equal, the self-financing rate of this firm, but also reduces the self-financing rate of firm A. The price of firm B is reduced by the shock, which immediately reduces firm B’s profit margin, ad so its profit rate (for only one period, see figure 4) and thus its self-financing rate (figure 5), but faces more consumers which represents a raise in its utilization rate (figure 4). This rise in utilization rate leads to a recovery in its profit rate (figure 4), which however does not offset the effect of the reduction in the unit profit margin upon the rate of self-financing rate. Furthermore, the rate of accumulation of firm B slightly increases, explaining the decrease in the rate of self-financing. The firm A, for its part, see its utilization rate decrease, which initially reduces its profit rate (figure 4), and thus a reduction in its self-financing rate (although this effect is weaker than the one of the firm B) (figure 5). Both firms A and B undergo a decline in their self-financing rate, for different reasons: firm B because its price has been reduced, and firm A because its profit rate has declined.
Figure 3. Evolution of consumption goods prices

![Graph of consumption goods prices]

Figure 4. Evolution of productive situations of firms A and B

![Graph of productive situations for firms A and B]
This decline in self-financing rates immediately activates a process of quality reduction, for both firms A and B (figure 6). Firm A reduces its input coefficient but no as much as firm B, because firm B is more directly affected by its initial price cut. Each firm reduces the quality of its product so as to come back to its initial self-financing rate. In this process, firm A ends up by exceeding its target self-financing rate\(^6\), which leads it to reduce its price (but only after the price cut in the good B) (figures 3 and 6).

The quality of both goods A and B has been (figure 6). Our simulation seems to reproduce a stylized fact that appears in appendixes: 1 and 2: the fact that industrial seigniorage is not only a practice of “low-price” firms. Even big brands are concerned.

\(^6\) Nous détaillons ci-après les conséquences de ce phénomène.
At the macroeconomic level, falls in prices stimulate quantities that households consume (This is however a price effect, as households spend a fixed share of their revenue) and make the economy stabilize at slightly higher rates of capacity utilization: 83,5 % against 83 % initially (figure 4). Accumulation rates rise up from 6,13 % to 6,15 %, which is a minor change, but however positive. Concerning the rate of growth of employment, after a peak due to price/quantities effect, it stabilizes at a slightly higher level than before: 6,15 % instead of 6,13 % (figure 7). The effect of the competitive shock on the economy is thus quite weak if at the same time firms are adapting the quality of their products to the desired/required rate of self-financing.

If we have a look now to the evolution of unit profit margins, defined by the ratio of price over unit costs \( \theta_j = (p_j - UC_j)/UC_j \), one can see two things (figure 8). First the profit margin of firm A, after a small initial decrease and then an increase, ends up by stabilizing at the same level as before: 16,59 % instead of 16,54 %. However, the profit margin of firm B, after a huge decrease due to price cut, is progressively restored (via the decline in the percentage of input incorporated in the production process of good B) and stabilizes at a higher level than initially: 17,34 % against 16,54 %. This difference is due to several causes: first to the small rise in accumulation rates which make a rise in profit margins necessary, and then the reduction of costs which rises up the share of profit in total costs. The competitive shock did not decrease firm B’s profit margin but to the contrary increased it. The final stationary state is characterized by lower prices and higher profit margins. Firms have transferred the constraint of price competition on consumers themselves. These consumers...
can now buy more goods, but the quality of these goods has been reduced. Competition has taken place at the expense of consumers themselves.

Figure 8. Effect on unit profit margins

It is necessary, at this stage, to detail a little bit equations (41) and (44). These mechanisms are asymmetric. The magnitude of variations of prices and qualities of goods and services that we get from simulations are thus dependent of the magnitude of the initial shock on $P_b$ but also of both parameters $\lambda$ and $\beta$. These coefficients affect the speed and magnitude of adjustment of prices and qualities to discrepancies between effective and required rates of self-financing. If their value is high, discrepancies between desired and effective rates of self-financing will lead to a huge reaction in prices and/or quality of goods and services. These variations in prices and quality will be effective and will never be offset. To choose a high value for these two parameters thus leads to important falls in prices and in quality of goods and services. It is thus impossible, per se, to comment the final values of input coefficients, nor the final level of prices. However, in our model, whatever the values of these parameters, the evolutions we have just describe are always the same: there is a decline of average quality of both goods A and B, and a fall in prices of both goods A and B. The more firms react rapidly and intensively to self-financing rates disequilibria, the greater these evolutions will be. In our simulations however, we assigned a small value to these two parameters both are equal to 0.25. This is a quite small value, which prevents the model to go from an extreme point to another. Although small, these values don’t prevent prices and quality to decline.\footnote{Even with a value of 0.01 for $\beta$ and $\lambda$ our model leads to this result, even if the absolute level of prices and quality changes are small.}
Furthermore, whatever the value of this parameter, we always have a decline of quality which is bigger than the rise in buying power.

Figure 9 shows the evolution of firms M and I. Firm M, producing inputs, see its situation weakened from all points of view (utilization rates, accumulation rates and profit rates) because of firms A and B reducing their input coefficient, before stabilizing at a slightly higher value than before due to the stimulation of the economy due to the quantity effect after price cuts. This quantity effect offset the initial negative impact on this firm.

We finally get an ambiguous effect: a competitive shock allows the consumer to buy more goods, but the average quality of these goods has been reduced. It is difficult to say at this stage whether the situation of consumers has been improved or not. Without being really able to conclude definitely, we can get some answers to this question. If one has a look to the evolution of workers’ buying power, one can see the following thing: it has been increased in terms of good A by 0,69 %, and in terms of goods B by 4,54 %. Taking into account their final consumption coefficients, their buying power has been increased by 2,72 %. However, the quality of goods produced by firm A has been reduced by 2,01 % and the one of goods...
produced by firm B by 15.02%. The average quality of consumers’ basket at the final stationary state has thus been reduced by 8.97%. The conclusion is thus that the average quality of goods and services is more reduced than the buying power is increased. Our simulations show that price competitive pressures have not improved the situation of workers.

**Conclusion**

Our model shows how competition can take place at the expense of consumers themselves, by transferring the constraint of price cuts upon the quality of goods and services, what we have called “industrial seigniorage” as it often takes the form of reducing the quantity of inputs incorporated into the production process or mixing up original inputs with cheaper ones. This practice has all the reasons to be successful, as consumers are quite unable to judge the quality of goods and services and as they often face a monetary constraint which make them prefer cheaper goods. The main conclusion of the paper is that it cannot be said that this process is however good for the entire society, as in our simulations the quality of goods and services has been reduced much more than the price of products.

**References**

8 Calculated as the average of inputs coefficient of each good and weighed by the real market share of each firm.


### APPENDIXES

**Table 1. Fraudulent practices found by the French DGCCRF**

<table>
<thead>
<tr>
<th>Product</th>
<th>Year</th>
<th>Number of controls</th>
<th>Samples</th>
<th>Original composition</th>
<th>Non compliance rate</th>
<th>Noticeable details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Merguez</td>
<td>2005</td>
<td>71 firms in 1 region (Lorraine)</td>
<td>55</td>
<td>Beef and/or mutton (as explicitly stated by the French code of delicatessen trade). The use of lean meat is allowed if explicitly mentioned (for example: veal merguez, poultry merguez...).</td>
<td>78.2% (43/55)</td>
<td>Presence of pork without signaling it</td>
</tr>
<tr>
<td></td>
<td>2006</td>
<td>39 firms in 1 region (Lorraine)</td>
<td>30</td>
<td></td>
<td>86.7% (26/30)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>83 firms in the whole country</td>
<td>56</td>
<td>71.4% (40/56)</td>
<td>25% of samples contained more than 6% of pork without mentioning it.</td>
</tr>
<tr>
<td></td>
<td>2007</td>
<td>206 firms in the whole country</td>
<td>181</td>
<td></td>
<td>53.0% (96/181)</td>
<td>30.7% of samples contained more than 6% of pork without mentioning it.</td>
</tr>
<tr>
<td>Crab small spring rolls</td>
<td>2008</td>
<td>1</td>
<td>1</td>
<td>Pure crab stuffing</td>
<td>100,0%</td>
<td>Revealed composition: 19.5% of pork, then surimi, only 4.8% of crab meat.</td>
</tr>
<tr>
<td>Olive oil</td>
<td>2006</td>
<td>220 firms in the whole country</td>
<td>211</td>
<td></td>
<td>23.0% (+ 21.0 % to be controlled again)</td>
<td>Presence of refined oil (until more than 50% of sunflower oil added, wrong varieties or wrong labels of origin.</td>
</tr>
<tr>
<td>Hazelnuts</td>
<td>2006</td>
<td>N.A; (1 region Aquitaine)</td>
<td>25</td>
<td></td>
<td>64% (16/25)</td>
<td>Wrong varieties and labels of origins, non-compliant quality or caliber.</td>
</tr>
<tr>
<td>Potatoes</td>
<td>2008</td>
<td>834 controls in the whole country</td>
<td>375</td>
<td></td>
<td>17.6% (66/375)</td>
<td>Wrong labels of origins, mixing-up of varieties with cheaper ones.</td>
</tr>
<tr>
<td>Raisin</td>
<td>2007</td>
<td>N.A; 10 regions</td>
<td>58</td>
<td></td>
<td>6.8% (4/58).</td>
<td>Wrong varieties names.</td>
</tr>
</tbody>
</table>

*Source: DGCCRF*
Table 2. Industrial seigniorage every day

<table>
<thead>
<tr>
<th>Product</th>
<th>Number of products controlled (NB,</th>
<th>Noticeable revealed practice</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pound cake</td>
<td>20 (10, 8, 2)</td>
<td>The cheapest products use colza oil instead of butter, glucose-fructose instead of sugar.</td>
</tr>
<tr>
<td>Breakfast cereals</td>
<td>18 (9, 7, 2)</td>
<td>Palma oil used as vegetable fat, glucose instead of sugar. Share of cereals is lower in cheaper products (but also a problem of missing labeling for some national brands).</td>
</tr>
<tr>
<td>Strawberry jam</td>
<td>20 (11, 7, 2)</td>
<td>The study reveals a clear link between price and quantity of fruit.</td>
</tr>
<tr>
<td>Cottage pie</td>
<td>17 (5, 9, 3)</td>
<td>There is a huge gap in the share of meat incorporated, however not directly linked to price differentials. But differences in the use of the word “meat” occur: with or without fat, with or without vegetables (some producers take the percentage of meat including the quantity of vegetables...).</td>
</tr>
<tr>
<td>Ham</td>
<td>25 (11, 10, 4)</td>
<td>Differences in protein contents: one of the cheapest product only contains 17,5% of proteins (as jam is often reconstituted with different pieces of pork meat).</td>
</tr>
<tr>
<td>Type of beef sausage</td>
<td>17 (8, 8, 1)</td>
<td>5 discount products have lower meat content, but there is no direct link between quantity of meat and price. Use of “mechanically collected meat” (scraped and grindinged meat collected on used carcasses) in three discount products. This kind of meat is of lower quality. “Discount sausages tend to contain less meat and use more frequently lower quality meat than their competitors” the study reports.</td>
</tr>
<tr>
<td>Duck mousse</td>
<td>15 (7, 7, 1)</td>
<td>Several producers mention a global percentage including liver but also fat and duck lean meat.</td>
</tr>
<tr>
<td>Chicken nuggets</td>
<td>13 (5, 7, 1)</td>
<td>Meat content varies from 27 to 72%. There is no direct link between meat content and price. However, 1 MDD and 3 discounts producers use chicken skin and chicken fat to produce their nuggets. For one of the cheapest products, the first component is...water!</td>
</tr>
<tr>
<td>Product</td>
<td>Identification</td>
<td>Link between chocolate content and price, however nor strict. Chocolate content can dissimulate different cacao contents, the study reports (and mentioning the cacao content is not obliged for producers). Most expensive products use butter more frequently. However all producers use vegetable fats. Only most expensive products use eggs for coating. Pizza 13 (5, 7, 1) Differences in components percentages (from 45% to 62%). No difference in the use of ham. Two discount products replace cheese by a mix of water, fat, cheese and milk proteins. The two most expensive pizzas are the only ones to incorporate olives and mushrooms. Poisson pané 20 (9, 9, 2) No direct link between brand, price and fish content. Two discount products replace fish by “squid flesh”. The most expensive (MDD) product is the only one to content a mix of whiting, surimi and hake. The cheapest products contain fish flesh instead of fillet for the most expensive products. Ravioli 18 (8, 8, 2) The five cheapest products only have 4% of meat against 7.5% for others. Two discount products replace beef meat by pork meat. Vegetable soup 17 (8, 7, 2) Small differences in vegetable content: from 45% to 50%. However, the study reports producers incorporate potatoes into vegetable content, whereas it should be excluded as it belongs to starchy food. Fruit yoghurt 19 (9, 8, 2) Products which content less fruits are cheaper products, even if the converse is not true. One of the national brand products, the most expensive, only contains 5.95% of fruits. Natural yoghurt 19 (10, 8, 1) Only very small differences in the quality of milk. Chocolate bar 19 (9, 9, 1) No link between brand, price and cacao content. Surprisingly, discount products contain less fat. But the study reports this low fat content could hide reduced content of eggs and flour in order to reduce production costs.</td>
</tr>
</tbody>
</table>

### Table 3. Study of CRIOC institute for Belgian products

<table>
<thead>
<tr>
<th>Product</th>
<th>Revealed noticeable practices</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vanilla cream-filled cookies</td>
<td>No significative content differences. <strong>Crioc</strong> However precise visual analysis show huge quality and quantity differences in the filling.</td>
</tr>
<tr>
<td>Ham</td>
<td>Crioc reports a link between price and quality of meat.</td>
</tr>
<tr>
<td>Milk chocolate</td>
<td>One product (the cheapest one) use concentrated butter mixed with cacao butter.</td>
</tr>
<tr>
<td>Strawberry jam</td>
<td>Only one low-price product contents fewer strawberries than others: 35% against 50 to 55%.</td>
</tr>
</tbody>
</table>
| Viennese sausage        | Meat content varies from 58% to 75%. Only two products have a compliant list of original contents: veal and pork. **Other products only content pork, or pork and turkey (cheaper than veal) for the most expensive one!** 4 products MDD or discounts content high percentage of poultry “mechanically separated meat”.
| Pancakes                | Use of soya flour, milk proteins and additives is a sign of using less milk in cheaper products, Crioc reports. |
| Low fat strawberry “fromage blanc” | Fat content as high as normal products, whereas it should be low-fat. **Differences in strawberry content (8 to 14%).** Use of thickeners indicates high content in water (which is not mentioned). **Crioc wonders: “would one try to sell water at the price of “fromage blanc”?”** |
| Bolognese Lasagnas      | Meat content varies from 4,8% for a discount product to 24,8% for a MDD. The national brand product is the only one to content beef: 3,5%. **Crioc doesn’t seem to be aware of the fact that lasagnas are supposed to be cooked only with beef, and not with pork, as it says the MDD is the better one (it contents 24.8% of pork but no beef at all).** |
| Chocolate spread        | One low-price product doesn’t content any milk product. Two other products only content 2% of hazelnuts instead of 13% for others. |
| Bolognese pizza         | Meat content varies from 2% to 15%. Differences in cheese content.                                |

<table>
<thead>
<tr>
<th></th>
<th>Rentiers</th>
<th>Ménages</th>
<th>Firme A</th>
<th>Firme B</th>
<th>Firme M</th>
<th>Firme I</th>
<th>Banques</th>
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<td>a</td>
<td>+ $W_a$</td>
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<td>b</td>
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<td>+ $W_i$</td>
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<td>a</td>
<td></td>
<td>$-p_i \cdot I_{a}$</td>
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<td>+ $p_i \cdot I_{a}$</td>
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<tr>
<td>m</td>
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