QUANTUM FUNCTION FOR FREAK MARKETS

Ricardo Verges
at University of Montreal

SUMMARY

It is essential to know when sectorial markets lose their *partial* equilibrium and when balance between sectors stop being *optimal* in Marshall and Pareto's sense. The difficulty to be surmounted is that historically market functions have remained restricted to what *it should be* instead of what *it could also be*. This work intends to be a contribution in this sense since it generalizes the neoclassical market function in its recurrent aspect, allowing either equilibrium or disequilibrium to be broadly represented.

After the definition of generalized function (*GFM*) by means of a bisectorial metaphor, this work explores exchange and residential production markets in the USA and in Southern and Western Europe, interpreting their evolution since 1985.

The model of financial derivative market accounting (used in National Accounting) allows production components to be quantified according to their level of equilibrium.

ACKNOWLEDGMENTS

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INTRODUCTION

The fact that all markets are in equilibrium while “up to now it has not been possible to find an accurate indicator for bubbles formation” (Ubide, 2006) is an assumption all agents broadly share. Nevertheless, should this assumption be correct, it should be very difficult to understand why there is so much interest to explain it. The fact is that there are hardly equilibrium observatories and many markets seem to move according to supply, demand, financial aspects and politics. Coase’s principle (1974) is thus contradicted since *“dejan de regularse aquellos mercados que deberían serlo y en cambio acaba regulándose el único que no debería, a saber, el mercado de las ideas"*.

Experience on fixed asset gross formation accounting is an evidence of the existence of equilibrium conditions in several sectors and of the fact that there is not any conceptual frame to describe them, although there is *computable general equilibrium (CGE)* operative models, etc. An essential premise of this article is that such conceptual frame is possible and that it can take advantage of a better articulation between the market neoclassical approach and the macroeconomic accounts system. There is a great interest in it since, if according to Walras, equilibrium tends to maximize demand, according to Pareto and Debreu afterwards, *"el equilibrio solo es óptimo cuando no se puede mejorar la situación de uno de los agentes sin deteriorar la de otros"* (Benassy, 1976).

Another premise is the fact that elemental mathematics allows formulating market laws but also describing their transgression, although not everything can be observed and recorded equally. Thus, primary markets entered in triumph of production accounts, while secondary markets of what already exists need to consolidate their *satellite accounts*. From the vast literature of equilibrium (Bronsard, 2000), the conceptual frame must be universal, that is, in accordance with the economic theory, the basic accounting approach and the empirical observation at the same time. We will try to prove that the neoclassical model of market, *revisited* and enlarged with the help of the current knowledge of agents' behaviour (Riley, 2001) confirms this second premise.

This work is finally supported on the premise of a high incidence of irrationality in market functioning (Kahneman, 2002). This premise is more and more accepted because of the better knowledge of decision making processes. We will see, for example, that one thing is the rational exchange of goods and services in relation to *survival* and another one the motivational exchange in relation to *experience (hedonism)*, which is more subject to abductive reasoning (McClelland, 1960).

2. BASIC MARKET DELIMITATION

The appropriate representation of a perfect market is probably the Marshall's concave demand. But it is appropriate to remember that the term "demand" could have been that of supply if function would have come from Say. And this because of the timeless classical discussion and neoclassical discussion afterwards, on which of them creates the other one when there is not any reasoning. In fact, this function expresses the constancy of optimum turnovers equal to the summatory of the product of quantities by prices swinging on the hyperbolic curves of *indifference* as a place of equilibrium. Indeed, if at a given moment, tension between supply and demand is satisfactorily solved within a sector, this assures a *partial equilibrium* that leaves the rest of the

sectors harmless, thus contributing Pareto's optimum equilibrium. *It must be then observed how at a given moment, volume of transactions loses its constancy*.

Anything is perfect, of course, but this does not impede the market to function. Secondly, it will be necessary to wonder whether the loss of constancy is owing to *innate* or *acquired* causes. In other words, do such causes underlie under the market concept itself or do they depend on the complexity degree of productive and commercial activity? The answer to this question sets a challenge. In fact, the search of *triggering causes* of disequilibrium oblige us to move back towards times and facts previous to any failure of any determinant in Kaldor's concept (1934), to any strategic mistake by any agent in Nash's concept or to any imperfection of the informative and monetary network of modern market according to Stiglitz and others (see Riley, *op.cit.*). A single way to progress is to find out if disequilibrium is common in barter transaction markets (Friedman, 1980).

Thirdly, incidence in technological progress along time in quantity-price relation will have to be cleared up (Fourastié, 1949). For example, is disequilibrium possible if all producers are equally efficient? In order to avoid this question we will choose a happy medium between the *neoclassical moment* and the *R+D* long term. We will then place within a period of *equal and constant efficiency* derived from the *technological discovery* (and consistent qualitative gap of capital and labour force) that we will concentrate at the beginning of the period examined. At the same time, we will relegate any new discovery (and subsequent qualitative gap) at the beginning of the following period. We will thus guarantee lineal (non exponential) growth of production during the period, simplifying its observation in a significant way (Schmookler, 1966).

Fourthly, and after having overcome the historical refusal of what it is *inexplicable* in markets behaviour, to research possible irrational causes of disequilibrium will be necessary (Kahneman, *op.cit.*). An hypothesis is that some disequilibria are caused by *pre-rational* causes that are afterwards developed rationally. This hypothesis is equivalent to abduction in cognitive behavioural psychology: presence of *attributive distortions* without evidence of *reply distortions* (Beck, 1976). Another derivative hypothesis is that for disequilibrium takes possession of a market under *herd* effect, *clearing house* must show inefficient (Benassy, *op.cit*., Abreu y Brunnermeier, 2002). Then, *collective unconscious* is modified according to Karl Jung and *herd* is turned into *herding* (Brunnemeier, 2001). A last hypothesis is that overcoming *herding* implies loss of credibility as for the results obtained. If not, disequilibrium can return again (Shiller, 2000).

In short, the aim of this study is to draw the route of a market both if it remains in equilibrium and if it passes to disequilibrium states and vice versa. In order to achieve it, suitability of *partial equilibrium* function between quantity and prices vectors is proved, provided that it is previously generalized in its periodic variant (that is, with some substitution time-frame between quantities and prices). Once it has been generalized, such function allows the quantification not only of *partial equilibrium*, but also that of *partial disequilibrium* appearing when vectors of market quantities and prices of a particular good, stop opposing each other with same but contrary strength, as we will see further on. The conclusion analyzes some facts causing disequilibrium and their effects when goods guarantee the loan employed to acquire them.

Following the guidelines of the bisectorial analysis in production markets (Dixit-Stiglitz, 1977), this study starts from a metaphor that simplifies an exchange economy towards

two equally efficient complementary sectors. This economy is free from any territorial and structural determining factors, as the Marshall's *paribus ceteris* method requires. The metaphor practically reduces the four Kaldor's market factors that are out of time to a highest common factor. Once the theoretical pattern is defined, the accounting pattern is implemented. Finally, theoretical results are compared with some property market accounts in the United States of America and in the southwest of Europe. Series of such markets as well as a Note about the role some irrational factors play as factors causing disequilibrium are shown in the annexes.

3. AN OASIS IN EQUILIBRIUM

If we change the Von Thünen's self-sufficient city (1826) by an isolated oasis in the desert, what we observe is a tribe. Its basic production is the harvest of dates and melons feeding persons and pets. Life in the oasis will not be possible without the nutrients of both products in the same proportion. A labour force divided into groups having the same number of members and being equally efficient working exclusively either in the palm grove or in the melon plot is fully dedicated to take care for the land and to harvest the fruits. Each person produces two portions of dates if belonging to the first group or two portions of melons if belonging to the second and he/she can exchange them freely by their basic portions of dates (*d*) and melons (*m*) produced and available in a necessary and sufficient quantity.

The oasis does not offer many individual options since everybody has information about all what exists there. Therefore, it is not necessary to previously determine Nash's equilibrium. Indeed, the negotiated exchange of two goods is characterized by the partial equilibrium between quantities and prices because everybody knows there is not a *profit market* at stake. According to Dixit and Stiglitz's approach (*op.cit.*), utility function *U* is supported by two markets *D* and *M* independent but complementary both in absolute quantities *Q* and in relative prices *P*. In order to simplify the explanation, we will assume that a portion *d* is equivalent to a portion *m* and vice versa and that all of them are consumed. If equilibrium was *immobility*, then parity between both sectors would be expressed by a coefficient of constant elasticity of substitution equal to 0.5. Although not completely true, we will suppose in its starting point that added production *U* is simply additive, being $D=M$.

$$(1) \quad D = Qd\,Pd$$

$$(2) \quad M = Qm\,Pm$$

$$(3) \quad U = D + M$$

When stability exists, population maintains itself stationary, because if rationing either *d* or *m* is imposed, then some people and animals will die due to the lack of some nutrient. On the other hand, if surplus of dates ($Qd_1 > Qd_0$) and melons ($Qm_1 > Qm_0$) are distributed at the same time, then the tribe increases its livestock and finally its population. We will then suppose that real growth of quantities *Q* can exist.

Real growth of prices *P* can also exist if discoveries in agricultural technology appear, improving quality to a part of the production. Thus, either offers of basic products (or products of origin) or improved ones able to increase the quality of consumers' life do coexist. According to Hall (1968), a duality of prices *Pd'* then appears because improved dates are more expensive than the basic ones ($Pd'_1 > Pd_0$) and more

expensive than the basic melons ($Pd'_1 > Pm_0$) and vice versa ($Pm'_1 > Pm_0$). Prices concerning basic rations allow us to always distinguish products according to their quality.

On the other hand, market information can be given orally or in writing. For example, if three rations of *improved* dates are exchanged with four rations of *basic* melons, then transaction is registered on a block or a papyrus with a column on the left with three downstrokes having a point on them (i) and a column on the right with four small circles, without any point on them (o). The accountant compiles this information and creates indexes. Adding the coexistent submarkets of basic and improved dates ($Pd_1 > Pd_0$) and melons ($Pm_1 > Pm_0$), *hedonic* average prices P can be obtained.

Growth in each sector is the geometric average of the increasing of quantities and prices in such a way that, according to Sraffa (1966), it can be possible to create the index IU of the gross internal product with market prices within a period 1 based on a previous period 0:

$$(4) \qquad IU_1 = IU_0[(Qd_1\, Pd_1 + Qm_1\, Pm_1)/(Qd_0\, Pd_0 + Qm_0\, Pm_0)]$$

There is also certain *elasticity of substitution* in consumption. Although dates and melons are irreplaceable as nutrients, the tribe tends to consume one of them when there is shortage of the other one. Then, according to the concave function, prices of any of those products tend to increase or decrease when the quantity offered increases or decreases and vice versa (see Ezekiel, 1938). Thus, if the fact that each market has a hyperbolic configuration can be proved, then constancy of volume of transactions in a market without affecting the other is assured and the above mentioned optimal equilibrium of the utility function is guaranteed.

It is necessary to emphasize that external trade hardly exist in this barter society. If a caravan goes off course to supply itself with food and water, the chief exchanges heads of collective cattle against salt and some money that he uses afterwards to prevent endogamy, to maintain peace and to acquire knowledge. But the accountant does not keep count of these incomes.

4. TEMPORARY FUNCTION OF EQUILIBRIUM

Temporary development of equilibrium in each market does not suppose any mathematical formalism in particular, because in each moment it is only necessary the opposition of quantities and prices vectors in a rational action shaped along History because of the need of survival. But, without formalisms it is not possible to go further on, so we propose the market as a phenomenon of flux thermodynamics expressed by an elemental periodical function.

In Nature, when two regulated fluxes react between them, they produce periodical events. It is then said that equilibrium exists. Two fluxes also react in market: one is the supply and the other one is the demand. Note that in activation terms, concepts can be crossed: supply can be employment demand and demand acquisition supply (this is very common in labour and stock markets). Because these concepts are produced previously to the transaction, they are not observed. This is the reason why in market surveys fluxes derived from transactions, that is quantities and prices, are commonly used.

Let us suppose that there are lengthy cycles *C* that fluctuate around an equilibrium axe as growth vector at a long term (4). Fluctuations start in a "node" E^o placed in a point $t=0$ and finish in another node $E'=E^o+C$ in $t=2p$ after having crossed in an intermediate node $L^c=(E'-E^o)/2$ placed in $t=p$. Thus, having into account a constant growth of each market according to index I and the width α of cyclic oscillations, considered identical for all the aggregates at the moment, we will write the following system of prices *P* and quantities *Q* equations for each product, *d* or *m*, for any of the two markets:

(5) $Q_t=I_t\,Q_{t-1}[1+a\ sine(t)]$

(6) $P_t=I_t\,P_{t-1}/[1+a\ sine(t)]$

with $t=2t'p/C$, where $t'\in\{0, C\}$.

Let us take as an example an 8-periods cycle in which quantities and prices of both products start at 100 at the end of $t=0$ and finish at 108 at the end of $t=8$. The quantity of dates increases up to a 5% in period 2, crosses the growth axe at 104 at the end of period 4 and decreases up to a 5% at the end of period 6 before arriving at the final 108. In the meanwhile, its price varies proportionally in the opposite direction of that of its quantities. Concerning melons, the same happens but in the contrary direction, since the few quantity of more expensive dates, the more quantity of cheaper melons or vice versa. Chart 1 shows the gross internal product *(GIP)*, at the end of the most significant periods of the cycle:

Chart 1. Global market in centred equilibrium

period	*Qd*	*Pd*	*Qm*	*Pm*	*D: QdPd*	*M: QmPm*	*GIP*	Index *IU*
0	100,0	100,0	100,0	100,0	10.000	10.000	20.000	100,0
2	107,2	97,1	97,1	107,2	10.409	10.409	20.818	104,1
4	104,0	104,0	104,0	104,0	10.816	10.816	21.632	108,2
6	100,4	111,9	111,9	100,4	11.235	11.235	22.470	112,3
8	108,0	108,0	108,0	108,0	11.664	11.664	23.328	116,6

General market remains in equilibrium when the different production sectors maintain its partial equilibrium, that is when in each sector the supply vector composed of allocated prices and the demand vector composed of acquired quantities opposed each other with the same and opposite strength or vice versa.

Functions like (5) and (6) are common in the didactic literature of market. However, even in its current form, they only represent *centred* cycles, that is, those cycles whose first half has the same length as the second one (in the above chart: 4+4 periods). Experience shows, nevertheless, that cycles can be *decentred* without damaging the state of equilibrium of the market itself. Equations (5) and (6) must be thus generalized to describe that intermediate node *L* of the cycle can be possibly at a certain positive or negative distance *l* of the centred position L^c. New equations are

reduced to (5) and (6) when l=0. If not, a second term relates the trigonometric function with the origin of the coordinates of the system:

(7) $Qd_t = Id_t\ [1 + a\ sine(t - l/2)] + a\ Qd_{t-1}\ sine(l/2)$

(8) $Pd_t = Id_t\ Pd_{t-1}/[1 + a\ sine(t - l/2)] + a\ Pd_{t-1}\ sine(l/2)$

(9) $Qm_t = Im_t\ Qm_{t-1}/[1 + a\ sine(t - l/2)] + a\ Qm_{t-1}\ sine(l/2)$

(10) $Pm_t = Im_t\ Pm_{t-1}[1 + a\ sine(t - l/2)] + a\ Pm_{t-1}\ sine(l/2)$

with $l \in \{0,\ \pm p\}$ and with $a = a'[1 - sine(t/2))^b$ where a' is the width and b its concavity coefficient (maximal asyntotic around 10).

In order to explain decentering, we will suppose a cycle of 3+5 periods in which $L = E^o + 3C/8$, that is, with I equal to $-p/4$. In chart 2, periods observed are *sui generis* to evidence the maximum and minimum that does not coincide now with $kp/2$ as in chart 1. But global volume of production of the cycle in each sector remains unchanged.

Chart 2. Global market in decentred equilibrium

period	*Qd*	*Pd*	*Qm*	*Pm*	*D: QdPd*	*M: QmPm*	*GDP*	Index *IU*
0	100,0	100,0	100,0	100,0	10.000	10.000	20.000	100,0
1,5	104,7	98,5	98,5	104,7	10.313	10.313	20.626	103,1
3	103,0	103,0	103,0	103,0	10.609	10.609	21.218	106,1
5,5	97,8	113,5	113,5	97,8	11.100	11.100	22.201	111,0
8	108,0	108,0	108,0	108,0	11.664	11.664	23.328	116,6

Charts 1 and 2 explain the *partial equilibrium* rule of markets *D* and *M*, either centred or decentred, in a growth context of its respective volume of transactions that allows them to pass from a point E^o at the beginning to another point E' at the end of the cycle without damaging its respective state of partial equilibrium.

Gráfico 1. Mercado *D* en equilibrio

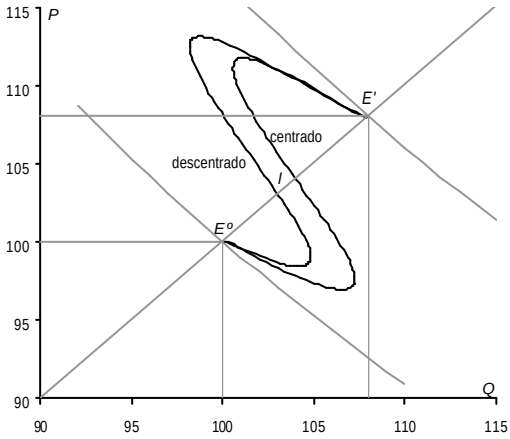
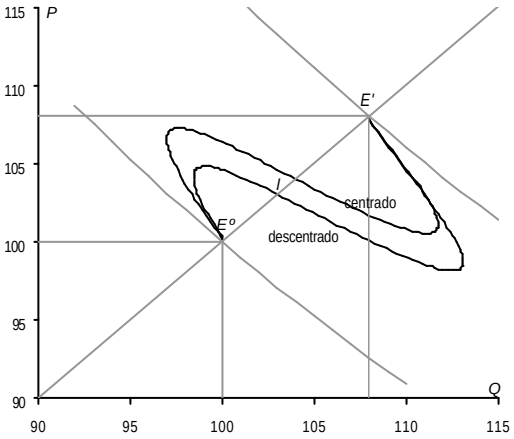


Gráfico 2. Mercado *M* en equilibrio



We have thus a generalized function of market *(GFM)* able to represent equilibrium markets, either centred or decentred, in the time. But there is more.

5. THE OASIS IN DISEQUILIBRIUM

In spite of its apparent fragility, markets in equilibrium have resisted centuries because experience leads to survival: what functions survives and what does not function disappear. Markets exist because in the economic activity there is also natural selection and because exchange equilibrium is more efficient than predation one. However, to maintain equilibrium in human activities, including the economic one, is a very hard task and not always successful because in all of them there are triggering causes that are very difficult to stop (see Note in annex). Let us see it in the oasis.

There is a holiday in which it is allowed to have a pleasant date liqueur *socially exhilarated* the chief of the tribe distils for this occasion in his hut. The day after the success of the social competition some would wish to perpetuate are recalled. It is then when everybody wants to distil in the back courtyards, but it is necessary to have more dates. Hiding motivations that could deviate from ancestral beliefs, some of those interested limit themselves to proposing objectives that are apparently reasonable, such as to pass labour force employed in the maintenance of the melon plot to the palm grove, on the pretext of making the most of the good season of dates. To solve the dilemma, the chief prefers to maintain his power instead of his authority (*Exodus* 32, 21-24). The accountant only warns about the fact that if melon plot is not looked after, then harvest will be reduced and cattle could be lost.

Thus, there is an additional increasing of supply of dates, since there are more pickers, what, for little time and for fear to stocks, reduces prices to levels even lower than those seasonal. But the so long-awaited increase of the demand is very soon turned into a disproportional avalanche having the only nutritious consumption of dates. It is obvious that *rumours have going around* and that *a lot of people* associate alcohol consumption with social success, a way to boast about purchasing power. Thus, profits appear that pickers of dates know how to use, so the higher price, the higher demand. As Hendry suggests (1984), some stock up with goods, *investing* today so as not to pay more or even to resell tomorrow in a secondary market suddenly appeared and in which it is abduced that prices always go up but never go down.

Revaluation of dates affects the exchange currency which is the melon, whose harvest, as the accountant foresaw, is smaller that expected. Its prices should go up more than expected due to the fact that there is less quantity but, because it does not have distilling attributes, it is supposed that they will never exceed the limits of its own equilibrium.

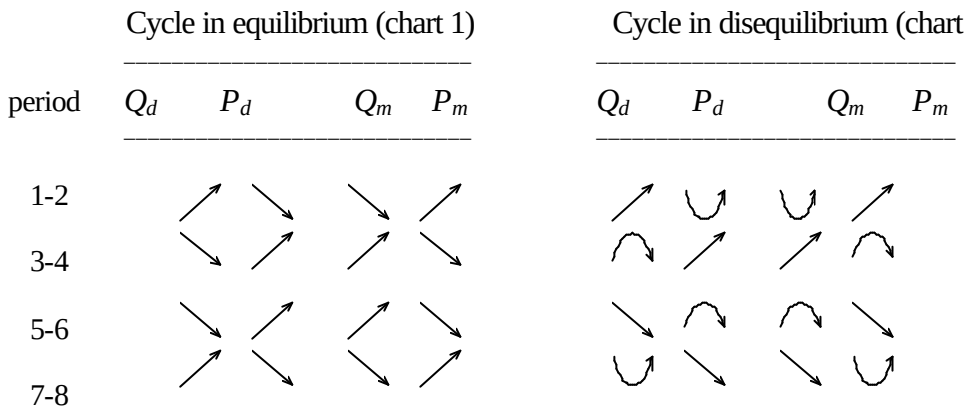
The spiral of dates continues growing until domestic economies are weakened.... On the other hand, to resell the dates previously acquired is useless because in order to substitute them it is necessary to pay more, so the demand of dates stop raising and the supply peaks before beginning to drop. Also prices peak although they do it very late: in the last period of the cycle and the demand being very low, prices wobble and slump. Finally, market turns to its starting point or, as Comby (1999) says, "la boucle et bouclée". As there are not either sons of Levi to pay (*Exodus*, 32, 25-29) or authority to maintain families together, the chief torments himself only because the money lent to some households victims of the bubble were apparently in a small case that set off with the last caravan.

In the meanwhile, the accountant has been noticing the behaviour of prices and quantities in each of the goods during the periods in equilibrium (graph 1) or in

disequilibrium (graph 3). Nevertheless, he does not manage to explain what has happened since he is not an expert on human behaviour. But he notices that the reaction of each vector to the stimulus of the opposite, either concerning prices or quantities, is simultaneous when equilibrium exists but not when there is disequilibrium. He, then, thinks that he has found a method to measure its consequences, if not the main cause.

Simultaneousness is taking place for him when the vector of prices is opposed instantaneously to that of quantities and vice versa with the same and opposite strength in the sense of the arrows, either going up or down during the whole period. He defines asynchrony as the fact that before the stimulus, each vector speeds or slows its *opposition*, either at the beginning or at the end of the period, depending on the phase of the cycle the vector is. He, then, makes the pictogram reproduced in figure 1 indicating the differences between quantities and prices registered in papyrus and boards with regard to the previous period. The symbol  means that the vector, either concerning quantities or prices, tends to go down and to go up afterwards in the same period. The opposite happens when symbol  appears.

Figure 1. Fluctuation of vectors in markets *D* and *M*



6. DIAGNOSIS OF DISEQUILIBRIUM

When a market is deregulated, characteristic forms of disequilibrium appear, emphasizing among them desynchronization, predominances, abductions or even chaos. Also elasticity, that is the relation between amplitudes a of the components of each market, can vary. Let us see now if our *GFM* is able to represent disequilibrium through the differential analysis of its components, being they quantities or prices. Charts in figure 1 suggest that such analysis must be made sequentially, because of the circularity of desynchronization between stimulus and responses. Sequentiality is possible because of the transitive property of periodic functions that make possible to transpose time gaps in differentials. Thus, market maintains its concavity when keeps its equilibrium and adopts circular configurations when it loses it: that is the so called *bubble* effect.

In algebraic terms, desynchronization is expressed by algebraic sums between parameter l_Q of quantities and parameter l_P of prices. The system of equations from (7) to (10) is then turned into:

(11) $Qd_t = Id_t\, Qd_{t-1}[1 + a_{Qd}\, sine(t - l_{Qd}/2)] + a_{Qd}\, Qd_{t-1}\, sine(l_{Qd}/2)$

(12) $Pd_t = Id_t\, Pd_{t-1}/[1 + a_{Pd}\, sine(t - l_{Pd}/2)] + a_{Pd}\, Pd_{t-1}\, sine(l_{Pd}/2)$

(13) $Qm_t = Im_t\, Qm_{t-1}/[1 + a_{Qm}\, sine(t - l_{Qm}/2)] + a_{Qm}\, Qm_{t-1}\, sine(l_{Qm}/2)$

(14) $Pm_t = Im_t\, Pm_{t-1}[1 + a_{Pm}\, sine(t - l_{Pm}/2)] + a_{Pm}\, Pm_{t-1}\, sine(l_{Pm}/2)$

with $l_{Pd} \neq l_{Qd}$ and other specifications relating to l and a..

Let us then suppose a centred cycle in which $l_Q = -p/4$, $l_P = p/4$ and all amplitudes a are identical for both markets. Let us suppose, at the same time, that at the end of the cycle, index I_E reaches 110 for the market of dates and 106 for that of melons. This difference is explained by the fact of the major or minor production as consequence of the change of labour force from the melon plot to the palm grove. The implementation of the new system of equations allows the estimation of the GDP in the same terms as in chart 1.

3. Global market in disequilibrium centred to nominal prices of market

período	*Qd*	*Pd*	*Qm*	*Pm*	*D=Qd Pd*	*M=Qm Pm*	*PIB*	Indice *IU*
0	100,0	100,0	100,0	100,0	10.000	10.000	20.000	100,0
2	119,3	96,1	86,0	114,6	11.465	9.856	21.320	106,6
4	114,8	115,0	93,5	103,0	13.202	9.631	22.833	114,2
6	99,3	126,5	113,9	91,0	12.561	10.365	22.926	114,6
8	110,0	110,0	106,0	106,0	12.100	11.236	23.336	116,7

To make a representation, we will link two centred cycles: the first one in equilibrium as shown in chart 1 and the second one in disequilibrium as shown in chart 3. In the last one, it will be necessary to take into account that its starting point will be the ending point of the previous cycle. Thus, it will also be necessary to link indexes in such a way that in the following graphs nodes turn into E^o=100, E'=108, E''_d=118 and E''_m=114. As it can be seen, both markets show disequilibrium, one due to excess and the other one to shortage. Both are clearly out of the band limited by its indifference curves. *A market between complementary sectors enters in disequilibrium when a sector loses its partial equilibrium affecting the other sectors.*

Gráfico 3. Mercado *D* en desequilibrio

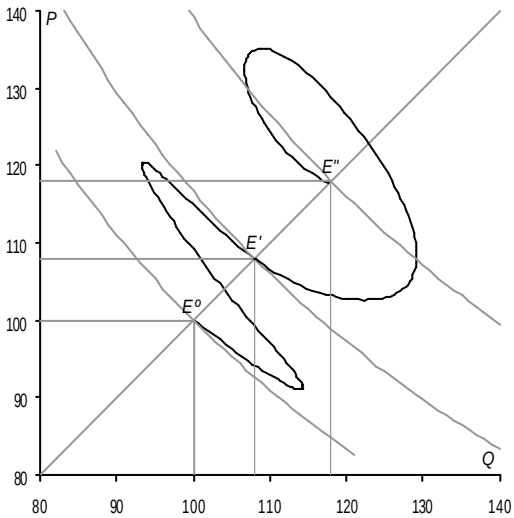
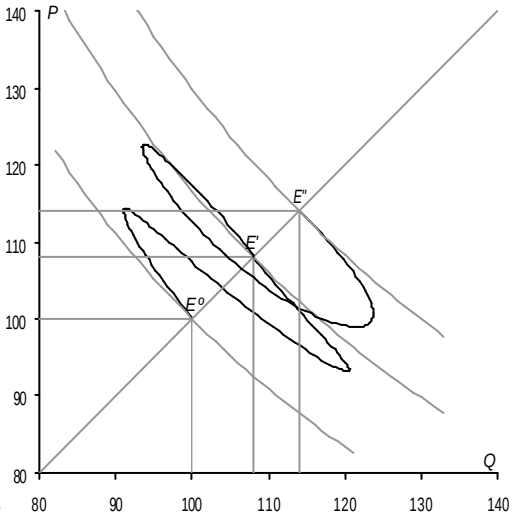


Gráfico 4. Mercado *M* en desequilibrio



7. TYPOLOGY OF DISEQUILIBRIUM

Synchrony condition implies equilibrium only when the difference between l_Q and l_P is null. If not, then *bubbles* appear. Asimmetry due to a gap l different in each pair of equations (11-12) and (13-14) implies that the algebraic sum of functions with regard to the axis is not null, so, when the absolute value of the difference between l_Q and l_P more approaches $2p$, then more disequilibrium is created.

U	l_Q	l_P	$\lvert l_Q - l_P \rvert$
02	0	0	0
12	$p/4$	$-p/4$	$p/2$
22	$p/2$	$-p/2$	p
32	$3p/4$	$-3p/4$	$3p/2$
42	p	$-p$	$2p$

Graph 5 shows five centred cycles between E^o=100 and E'=104 with l equal with opposite sign. Furthermore, if values of l with a fixed sum (i.e. equal to p) are matched for a specific syncronization, then decentred markets are obtained (graph 6).

U	l_Q	l_P	$\lvert l_Q - l_P \rvert$
20	$-p$	0	p
21	$-3p/4$	$p/4$	p
22	$-p/2$	$p/2$	p
23	$-p/4$	$3p/4$	p
24	0	p	p

The number of configurations can be infinite and depends on the level of excellence of the analysis. The more desyncronization, the more disequilibrium in a centred bubble: *helix* in equilibrium in U_{02}, *squashed* in U_{12}, *circular* in U_{22}, *oblong* in U_{32} and *antimarket* or extreme disequilibrium (*chaos*) in U_{42} (graph 5). In the same way, the more decentralization, the more asymmetry in the bubble with regard to the bisectrix of the quadrant quantities-prices: *prices>>quantities* in U_{20}, *prices>quantities* in U_{21}, *prices=quantities* in U_{22}, *prices<quantities* in U_{23} and *prices<<quantities* in U_{24} (graph 6).

Gráfico 5. Mercados centrados en desequilibrio

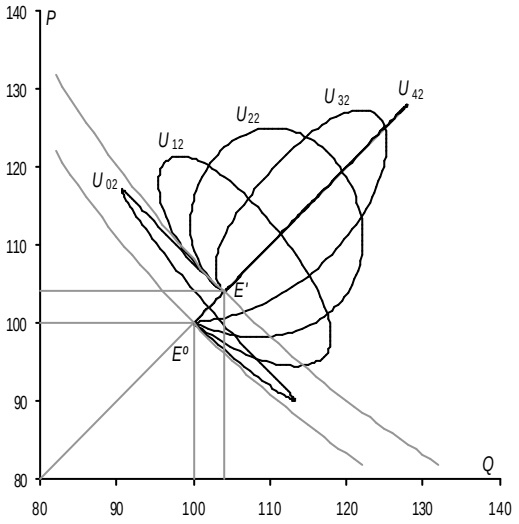
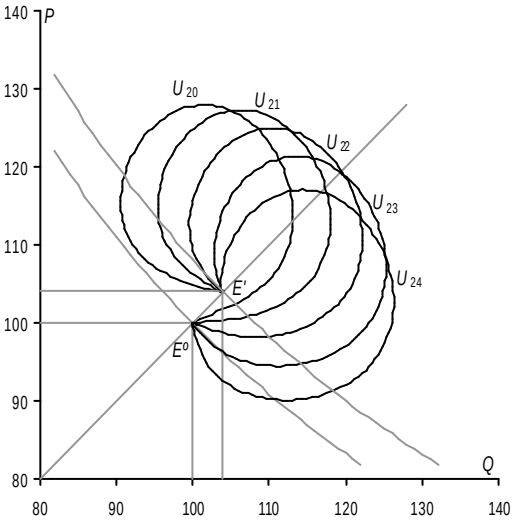


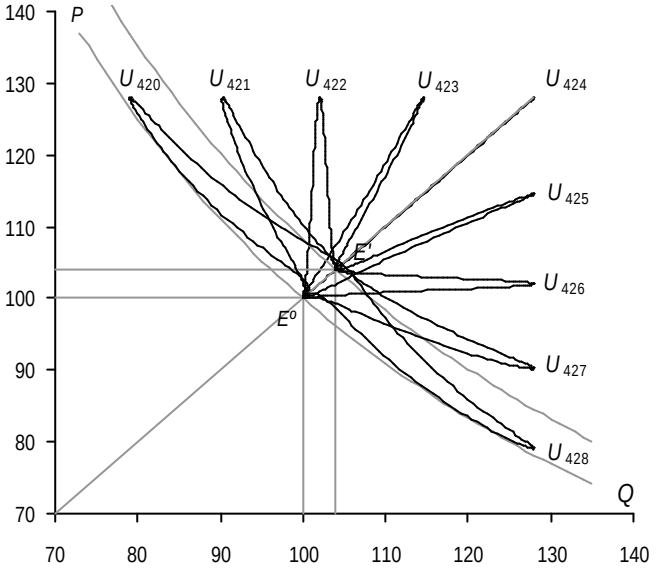
Gráfico 6. Mercados descentrados en desequilibrio



Furthermore, inelasticities of prices *versus* quantities and vice versa, translated into differences in amplitudes $a_Q \neq a_P$, specially in antimarkets of type U_{42}.

U	a_P/a_Q	U	a_Q/a_P
420	-1	424	1
421	-½	425	½
422	0	426	0
423	½	427	-½
424	1	428	-1

Gráfico 7. Antimercados inelásticos



Equations (11) to (14) automatically apply the variable of inelasticity, although, except if opposite evidence, the opposite strength of vectors is maintained[1]. We have then a tridimensional pattern whose digits for classification in conventional order are: 1st, synchrony; 2nd, centricity; 3rd, elasticity. We can then make an abacus-matrix with a dimension that will depend on the number of arches or sections in which p is divided. The pattern of four sections presented offers 225 configurations and allows a first diagnosis, establishing axis of equilibrium and cyclic length from the time analysis (see § 10). But we must examine price inflation first.

8. PRICE INFLATION

We notice that GDP in chart 3, although starts and finishes at the same levels of that in chart 1, is inflated in central periods. Quantities whose total has not varied are not the cause. Therefore, it can only be due to prices and more precisely, to price *d* of the destabilizing sector, since price *m* has remained in equilibrium according to the drop of its quantities. But the history of the oasis suggests that, although due to distorting and counterproductive reasons, price *d* only increased when the demand started to grow excessively. And because the usual would have been the opposite, we are before a circular phenomenon (Fujita *et. al.*, 1999) that *GFM* is completely able to reflect but not always to solve.

[1] Function can be even more generalized when growth index does not go through the origin (markets with prices and/or quantities points) or when a vector is, in fact, the addition of another two vectors, etc.

Which would have real production been if prices would have evolved within the equilibrium criteria? In other words, which is the *GDP* to prices called constant? Variation of prices of goods can be due to three factors: 1st., variation in the quality of goods, 2nd , opposite variation of quantities and 3rd , the disequilibrium itself. In our case, the first factor is rejected because, according to the hypothesis, the quality of seasonal production and that of the stocks is identical. As for the third one, the fact is to determine which its equilibrium should be. We still have to examine the behaviour of prices opposite an unbalanced variation of the demand. The problem is to determine whether the increasing of dates harvest is due to acceptable rational causes or to unacceptable irrational ones. If they are rational what varies in equations (5) and (6) is the growth index ($I'_t > I_t$) and, consequently, prices must increase. If causes are irrational, then what varies is amplitude ($\alpha'_t > \alpha_t$) and prices must decrease because the variable is in the denominator of the equation (6).

In view of the difficulty of solving this question before reaching the end of the cycle, is commonly admitted that the best is to *share options* and consider that the underlying price is that matching the function of equilibrium without an extraordinary increase of the demand, as pickers of melons made and as "pickers of dates" would have also made in the oasis. A very common practice is to estimate the underlying price applying to the unitary price a more general index as the *per capita* income or the household income, for example. What happens is that general indexes, as the *CPI*, are not usually hedonic and do not distinguish between pure inflation and the market *breathing* expressed by the system of equations (5) and (6) when opposite direction variations are balanced. So, if the problem goes on, the best way to proceed is to study it and to try to regulate the market.

4. Global market in disequilibrium centred to real prices

período	*Qd*	*Pd*	*Qm*	*Pm*	*D=Qd Pd*	*M=Qm Pm*	*PIB*	Indice *IU*
0	100,0	100,0	100,0	100,0	10.000	10.000	20.000	100,0
2	119,3	97,1	86,0	114,6	11.584	9.856	21.440	107,2
4	114,8	104,0	93,5	103,0	11.939	9.631	21.570	107,8
6	99,3	111,9	113,9	91,0	11.112	10.365	21.477	107,4
8	110,0	110,0	106,0	106,0	12.100	11.236	23.336	116,7

9. ACCOUNTING MODEL

As it is observed, production is higher in the first half of the cycle (period 2) but, as in the bubbles, recession appears in the second half (period 6). When rationing the provision of market *M*, consumption decreases. But instead, production surplus (or *overproduction*) of market *D* is devoted to *hedonic* consumption, then resulting in the decrease in the quality of life in the long term. We will call this disequilibrium *market-up*, having its volume of transaction counterpart in goods and services at real but not nominal prices. On the other hand, prices *P* of sector *D* are much higher in chart 4 than in chart 1 and because those of sector *M* are equal in both charts, this means that a surcharge has been paid to supply it. We will call this disequilibrium *hold-up*, that is, that part of volume of transaction with no counterpart in goods and real services.

The change of a sector in partial equilibrium U^o into another one in partial disequilibrium *U'* implies an overproduction of goods $Q'–Q^o$ and a surcharge $P'–P^o$. So, production *U'* in disequilibrium must be compared with production U^o that the sector

will have in a state of equilibrium. All the time *t* of the accounting year four concepts are represented in graph 8 as delimited areas by points E^o in equilibrium and *E'* in disequilibrium. For a better understanding, these points are placed in the bisectrix of function *U* of the market.

(15) $U^o = Q^o P^o$ production on equilibrium prices (*true-market*)

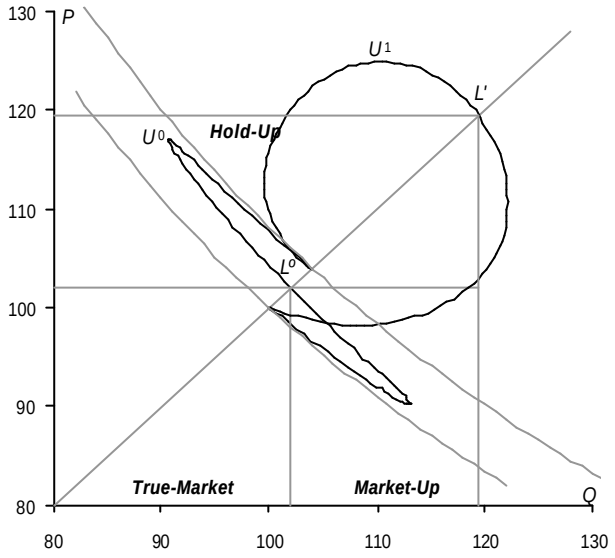
(16) $U^{o\prime} = P^o (Q' - Q^o)$ overproduction on equilibrium prices (*market-up*)

(17) $U''^o = Q^o (P' - P^o)$ production on overprices (*hold-up on true market*)

(18) $U'' = (Q' - Q^o)(P' - P^o)$ overproduction on overprices (*hold-up on market-up*)

(19) $U' = U^o + U^{o\prime} + U''^o + U''$ total production on market prices

Gráfico 8. Modelo contable de desequilibrio



This graph shows two superimposed 02 and 22 type cycles. In a time *t* markets go through points L^o and *L'* in which the concepts for equations (15) to (19) are compared.

The final result of cycle C is obtained returning *t* in real time and adding disequilibrium costs at the end *E'* of cycle *C*, updating them with a deflator *r* that will depend on the user's accounting criteria:

(20) $TM_C = S^t U^o (1+r)^{E'-t}$ *true-market* on equilibrium prices

(21) $MU_C = S^t U^{o\prime} (1+r)^{E'-t}$ *market-up* with counterpart on equilibrium prices

(22) $HU_C = S^t (U''^o + U'') (1+r)^{E'-t}$ global *hold-up* without counterpart on market prices

(23) $TU_C = TM_C + MU_C + HU_C$ *total market* on market prices

The participation of the different production factors for each case, both in the *market-up* and in the *hold-up* is still to be estimated. This can be a difficult task since the market of certain property factors as land can bring with it its own disequilibrium. Once sectorial disequilibrium has been registered, but not before, its effects on the rest of the economy can be determined by a Leontief table integrated into any *SMA*.

10. SECONDARY RESIDENTIAL MARKETS. PARIS

What we have previously expressed proves that it is possible to account a single exchange market of goods in order to know its equilibrium state and its transition to disequilibrium and vice versa. In the analysis of modern markets, it will be, of course, necessary to consider many more variables, but empirical observation suggests that also in these markets equilibrium can be analyzed through the behaviour of market fundamental variables. The following examples only refer to the USA, France and Spain because there are very few countries having enough historical information both concerning prices and quantities. Nevertheless, the selection covers broadly speaking the casuistry of the disequilibrium in the residential sector in which the highest growth (and in all probability the highest disequilibrium) of the economic activity is centred.

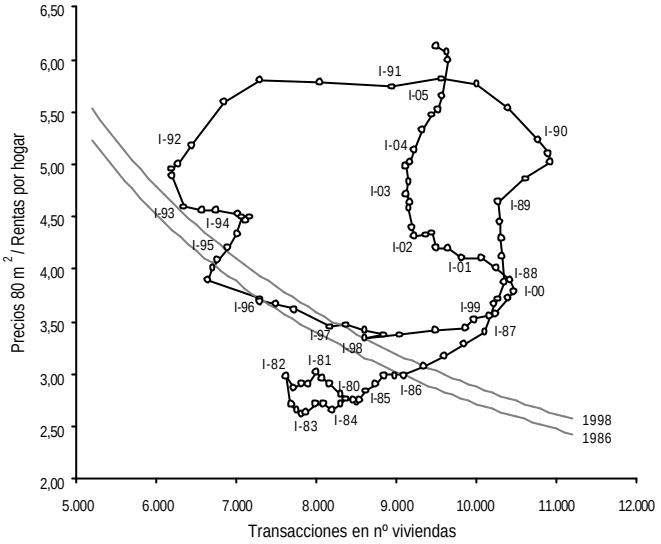
We will study two types of real estate markets: that already existing and that of first acquisition. Direct effect of the first one on the economic activity is quite reduced since it is a secondary market exchanging goods produced some time ago. Nevertheless, real estates existing market seems to develop interesting circularities. Let us suppose a fix number of real estates without new construction, demolition or significant migratory balance, in which housing are identical and benefit, at the same time as its built environment, from continuous maintenance and improvement, so its actual value rises at the same increasing rate as household incomes. Market price can increase above true value, of course.

Let us suppose then a triangular play of purchase and sale: *A* sales his/her house to *B*, *B* to *C* and *C* to *A.* If processes of purchase and sale and removal are made at the same time, then price is also the same and there is obviously no relevance except with regard to taxes and commissions. However, if purchase and sale are not simultaneous, then it is necessary *somewhere* to accommodate *A* while he/she sells to *B* and purchases to *C*. Those who have sold and purchased at the same time remain in the same conditions as those who have not moved. That who has purchased before selling has more money in the pocket; this is the same amount of money that who has sold before the purchase is missing. Furthermore, because he/she has two houses, the first one can rent one of them to the second one while waiting for selling. Consequently, apart from these last costs and assuming that players have not changed in the meantime, there is not, theoretically, any impact, but it is pernicious for the *filtering* process (Ratcliff, 1946).

Due to their economic *sterility*, secondary residential bubbles close around themselves although they can repeat. This is so because both who have purchased at high prices and see how they go down and those who have sold at low prices and see them go up, are waiting for the following bubble to resell or repurchase. This is what seems to happen in the more spectacular and better documented existing housing market: the Paris *boucle*[2].

[2] This information is quarterly. It exists since the beginning of the 80's thanks to the registro notarial and it covers prices per m2 and volumes of transactions (*INSEE-Notaries* series). Series are completed with an estimation of household incomes in the Region of Paris. The ordinate reflects the number of household incomes necessary to equal the average price of a house having 80 m2 of usable space. This variable does not need a deflator and it is homogeneous with the ratios *DTI (debt to income)* and *LTV (loan to value)* used in the estimation of mortgage risk. It also facilitates comparative analysis.

Gráfico 9. Mercado de vivienda existente.
París. 1980-2005



Cycle starts as an anti-market, since concavity and centricity at the beginning of the cycle can be only represented with a configuration type U_{425}. But in the middle of 1989, demands starts to react and closes as a type U_{21} bubble trying to recover its equilibrium which it approaches to from 1993 and reaches at the end of 1997. Consequently, for the first cycle 86-87 and through spectral analysis of chronologic vectors, the following parameters allowing the creation of models by a convergent *GLS* algorithm (Vergés and Ordaz, 1994) can be approached.

Function type: U_{21}	C :	48 quarters		
Nodes:	E^o :	I-86	E':	IV-97
Desynchronization:	l_P:	24 quarters	l_Q :	-4 quarters
Equilibrium axis:	I^o in E^o : 100		I_t :	1,00225 I_{t-1} (per quarter)

This first bubble that started in 1987 only existed in Paris and its suburbs but not in the rest of the country, not even in the suburbs of Ile-de-France (Morlet, 2001) as we will see below. It is observed that the index of household income is appropriate as proxy of growth between E^o (1st quarter of 1998) and E' (4th quarter). From 1998 on, another cycle started evolving very quickly towards a type U_{12} squashed and centred bubble. However, at the beginning of 2002 and after the euro came in force, cycle turned into a type U_{422} anti-market that only peaked at the beginning of 2006. In the meanwhile, quantities have recovered their level (from 9 to 10 sales for quarter) while in terms of household income, prices got to be twice higher that in the equilibrium points of 1986 and 1997, both determined by spectral or simply visual analysis of temporal series.

11. DOMESTIC MARKETS OF EXISTING HOUSING. USA AND FRANCE

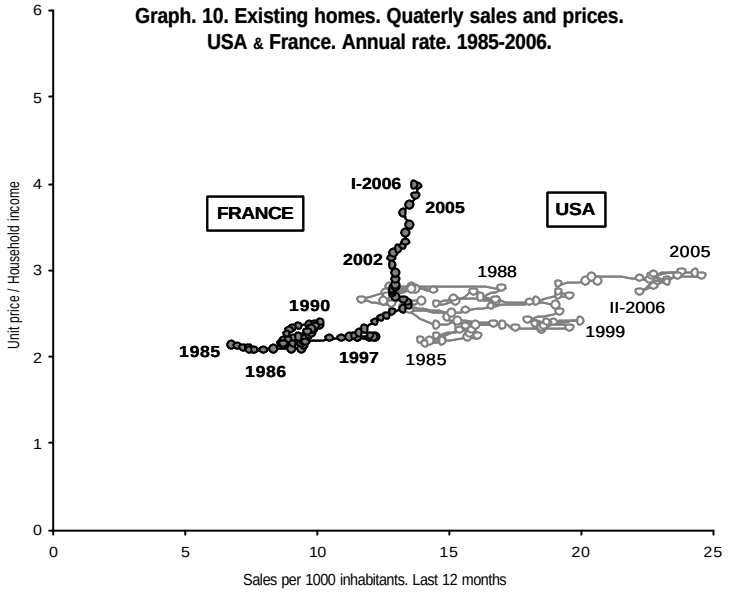
It is very likely that bubbles such as those of Paris have already existed in some American cities or in southwest cities of Europe. However and according to the data consolidated since mid 80's, secondary markets aggregated to national level have remained relatively steady from 1985 to 2001, before being disturbed by real estate bubbles starting to peak at the beginning of 2006.

In graph 10, quarterly data of prices and quantities from the USA come from the NAR (National Association of Realtors), the abcise representing the number of housings sold during the last 12 months (annual series is then that of the fourth quarters). Similar information for France comes from the INSEE-Notaires (Friggit, 2001...) and surveys of

residential selling from the Ministère de l'Équipement (MEL) [3]. Demo-economic information comes from official figures[4].

We can see that in the USA volatility of sales is high while that of prices is poor. Until 11-S the intensity average of the annual exchanges of housing was 17 per 1,000 inhabitants but it reached up to 25 in 2005 before starting to go down again. However, prices remain much steadier, exceeding 2.5 household incomes only since 2003 (2.9 in 2005). So and besides the *boom* in the last three years, it seems that there is not purchase and sale disequilibrium but only continuous ups and downs of volume of transactions that resemble recurrent type U_{426} superimposed *horizontal* markets.

Graph. 10. Existing homes. Quaterly sales and prices. USA & France. Annual rate. 1985-2006.



It is obvious that volatility of existing housing sale in France is smallest, partly due perhaps to the inevitable data treatment. In the medium term, less intensity of transactions is due to less labour mobility typical of a centralized poli-central territorial model against the decentralized mono-central American model[5]. Stability has been

[3] Spain is not included because there is not enough information about transactions.

[4] The abcise of the number of houses per 1,000 inhabitants is the most used in comparative analysis. Its denominator is preferable to the no. of houses because it avoids the problem of the evolutive size of households, although it can lose significance should important deficits exist. It is obvious that it is not the case of any of the countries considered here. The ordinate is that of graph 8, unless the price is that of the total house and not that of the product m2 per spaces.

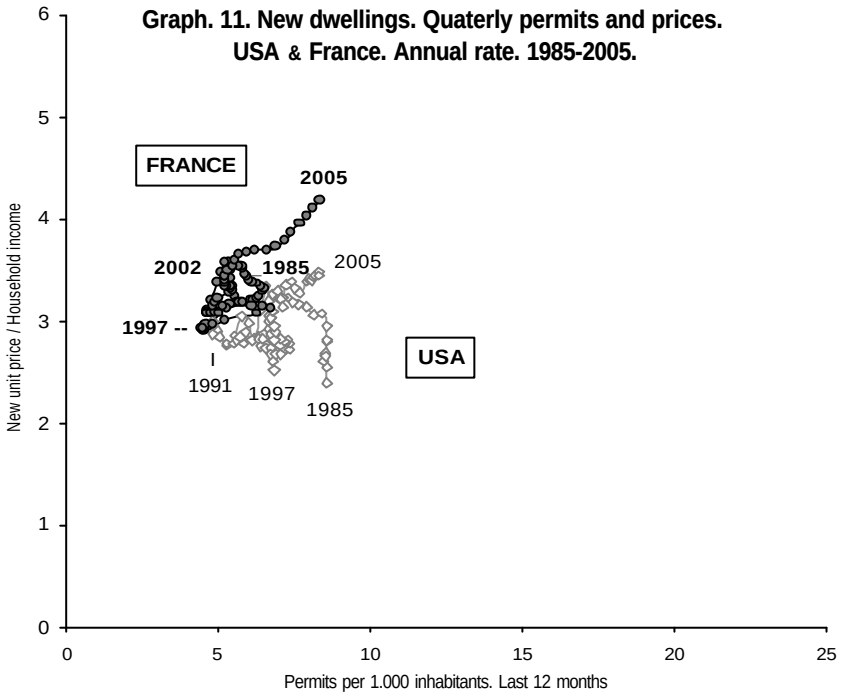
[5] The United States is worried about the increasing volume of financing, which is much higher than the difference between the purchase price and the sale product. It could be explained by the difference of the consumption credit cost in relation to the credit to purchase a real good. The first one is more onerous because it is guaranteed by future working yield, while the second one is guaranteed by the good itself and, consequently, is less risky. This hidden form of *trade mortgage* has extended in the USA under the stability of prices, terms and types (apart from the boom of the 70's) and it has reached the summit after the 11-S, in a moment marked by the thirst for assets. The problem is that what defines risk is the real purpose of the loan so a mayor risk than that determined by the premium paid is being assumed. So, in an unfavourable moment, to move house without any labour mobility reasons, can increase the stock of insolvency creating a mayor volume of mortgages lacking enough real guarantee. Thus, anti-market that started in 2003 and that reverts from 2006 seems to depend on the moment and it explains the covering nature of the existing housing market.

significant until the end of the 90's, although the incidence of the 1986-1997 Paris bubble is noticed. Finally, the extraordinary price increase since the euro's arrival has been general all over France and only starts to change in 2006 (provisional data) before the total insensibility of the demand. So, market adopts a type U_{422} configuration.

1.2. RESIDENTIAL PRODUCTION MARKETS. THE USA AND THE SOUTH-WEST EUROPE

Sources in the USA are building permits and NAR sale prices. In France the same information comes from MEL surveys. In the absence of information about Portugal, the information about the south-west of Europe is provided by Spain[6]. In both countries the information about primary market is a bit slower than that of the secondary real estate market so we will only consider the period 1985-1995.

Graph. 11. New dwellings. Quaterly permits and prices. USA & France. Annual rate. 1985-2005.



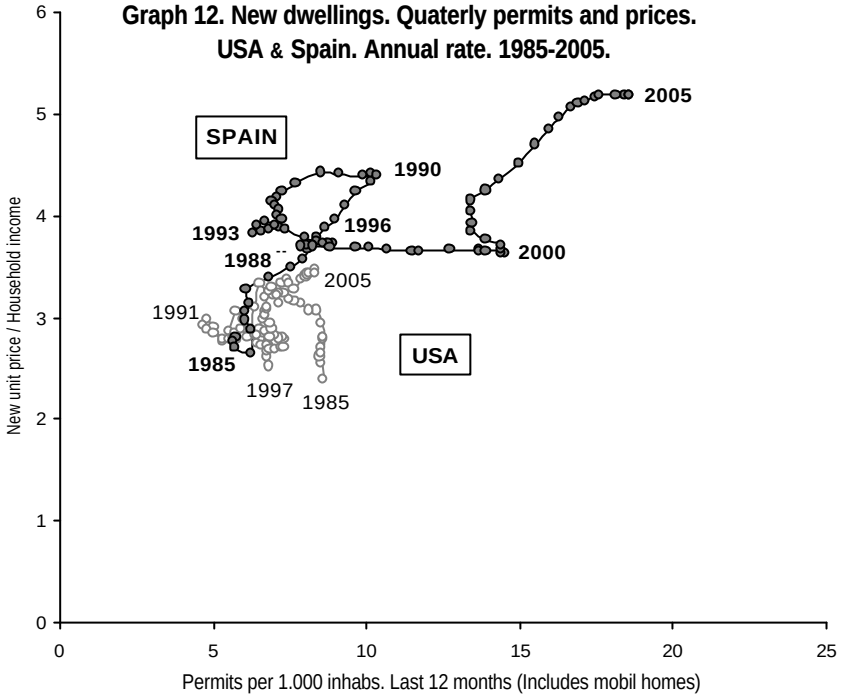
Although gaps between production process and acquisition process have not been considered (Kydland and Prescott, 1992), limited price dispersion is observed in both countries. This is due to the fact that supply factors are closely linked with construction labour force while demand factors depend mainly on the adjustment of stock (Muth, 1967), that is, the family needs. The result is that variations of primary market are "type 0" (see graphs 1 and 2) and they are superimposed cycle by cycle creating compact *clouds* that can be synonymous of equilibrium.

However, and how it already happened in Japan 15 years before, anti-markets can also appear in residential production. This is the case of France since the euro's arrival in 2002, with a type U_{423} anti-market. It is expected that, as it is happening in its own secondary market, 2006 marks the return to the basic equilibrium that, in fact, prevailed before 1985. It has to be highlighted that production excess has undoubtedly promoted the tendency to secondary residence, despite the high rate of apparent

[6] The information available suggests that since 1997 Portugal went through a significant increase of residential and civil work production, before the interruption suffered by the 2000 economic crisis.

ownership of French households (12%). Let us now study residential production in Spain. The data presented are approximately those used for the National Accounting of Residential Production, base 2000 (Vergés, *2007*).

Graph 12. New dwellings. Quaterly permits and prices. USA & Spain. Annual rate. 1985-2005.



Until 1986 construction recovered from a long crisis created by the 1973 and 1978 *oil-shock* when prices were below construction value. However, quantities were comparable with those from France. In 1987 recovering linked with a type U_2 bubble that after reaching the summit in 1990, goes down in 1996. Then, a period of strong investment demand started after the exchange rate peseta-euro[7] fixing. Obvious U_{426} type anti-market seemed to have finished in 2000, but in 2002 it shot up again in the form of a powerful U_{424} type characterized at the same time by the quick increase of prices and the increase of production that surpassed 820,000 housings in 2005 (as many as those existing in France, Germany and England together)[8].

13. IMPLEMENTATION OF THE PRODUCTION ACCOUNTING MODEL

It is time to finish this empirical study evaluating the main economic effects of disequilibrium on residential markets in the three countries observed. The problem is, as always, to determine when the last period of equilibrium took place and how the market would have evolved should it have been maintained. If we suppose that the problem is solved, implementation of equations (15) to (21) would be enough to conclude evaluation. But the problem is that until this does not happen, there are

[7] During this period capital evaded before 1996 and turned back after *Maastricht* is placed, as well as the foreign investment that has not been reinvested in Latin America (Vergés, 2002, 2003). Later on, investment is fed by *turn-over* and by inter-bank market that if it runs out results in monetary issue.

[8] Since the euro's arrival, money source and huge land investment by financial and real estate entities fed the supply. Demand repurchases promoter's investment at the moment of *subrogation* by indebtedness at variable and very long-lasting type. Financing is not guaranteed and the estimated risk is only statistical: few entities know and practice prevention of contextual risk and even less prevention of risk-price (market price lower than asset value) or prevention of risk-quantities (bids without bidders due to market saturation).

different solutions, as we have proved in point 8 (see also graphs 1 and 2). So, it is necessary to express either retrospective or comparative based opinions, taking into account the specificities either evolutive or territorial.

Generalized neoclassical analysis makes this task easy. Let us consider, for example, the quarter in which the last residential production bubble started in each of the three countries taken into account, starting from the evolution of quantities and prices. Using or not spectral analysis (thanks to the study on a large scale of the series of graphs 11 and 12), it can be determined that in the United States and also in France, the last disequilibrium started in the third quarter of 2002. Therefore, the period from III-2001 quarter to II-2002 quarter can be used as a reference.

On the other hand, in Spain the first anti-market was that of *quantities*, lasting from II-1997 quarter to the end of 2000. Immediately afterwards it linked with the extraordinary U_{424} of quantities and prices in graph 12. So, in Spain, the reference period covers from II-1996 to I-1997. To use different reference periods does not affect results of (20) and (21) because between 1996 and 2002 both *market-up* and *hold-up* were almost irrelevant in France and in the United States, as was also *hold-up* in Spain before 2001. All these results are in chart 5, where *r* is the household income variable.

In this chart, *true-market*, *market-up* and *hold-up* by quarter in million dollars or euros are also included, as well as the percentage of each of them with regard to its available current household income. These aggregates can be accumulated along the time to represent the *effort* consented by households since the market entry in a disequilibrium state. If the aim is to analyze production then it is necessary to work on constant value. But if the aim is to make a financial analysis then par value can be used to reach homogeneity with the concept of *outstanding loan*.

Chart 5. Residential production. USA and France (2002-2005). Spain (1997-2005). In million $ or € and in the % of household available income.

Producción residencial		True-Market	Market-up	Hold-up	Total	True-Market	Market-up	Hold-up	Total	True-Market	Market-up	Hold-up	Total
		anual en millones de $ o €				acumulado en millones de $ o€				acumulado en % de la RDH de 2005			
USA	2002	249.026	13.479	11.775	**274.280**	249.026	13.479	11.775	**274.280**	1,4%	0,1%	0,1%	**1,6%**
	2003	510.397	52.903	33.798	**597.097**	759.422	66.382	45.573	**871.377**	5,4%	0,4%	0,3%	**6,1%**
	2004	541.535	99.077	51.911	**692.523**	1.300.958	165.459	97.484	**1.563.901**	10,9%	1,2%	0,7%	**12,9%**
	2005	568.730	123.886	74.102	**766.717**	1.869.688	289.345	171.586	**2.330.618**	16,5%	2,3%	1,4%	**20,2%**
Francia	2002	21.349	746	775	**22.870**	21.349	746	775	**22.870**	2,1%	0,1%	0,1%	**2,2%**
	2003	42.996	5.206	3.596	**51.798**	64.346	5.951	4.372	**74.669**	6,2%	0,6%	0,4%	**7,2%**
	2004	43.907	15.297	7.412	**66.616**	108.253	21.248	11.783	**141.285**	10,3%	2,0%	1,1%	**13,4%**
	2005	45.186	24.219	13.957	**83.362**	153.439	45.468	25.740	**224.646**	14,4%	4,2%	2,4%	**21,1%**
España	1997	23.512	2.081	0	**25.592**	23.512	2.081	0	**25.592**	5,6%	0,5%	0,0%	**6,0%**
	1998	32.352	11.070	0	**43.423**	55.864	13.151	0	**69.015**	13,0%	3,0%	0,0%	**16,0%**
	1999	33.678	21.761	0	**55.439**	89.542	34.912	0	**124.454**	20,5%	7,8%	0,0%	**28,3%**
	2000	35.524	26.936	0	**62.461**	125.066	61.848	0	**186.914**	28,0%	13,5%	0,0%	**41,5%**
	2001	36.917	24.016	2.847	**63.780**	161.984	85.864	2.847	**250.694**	35,5%	18,4%	0,6%	**54,5%**
	2002	38.202	27.747	10.707	**76.655**	200.185	113.611	13.554	**327.349**	43,1%	24,0%	2,7%	**69,8%**
	2003	38.369	37.068	23.943	**99.380**	238.554	150.678	37.497	**426.729**	50,7%	31,3%	7,4%	**89,4%**
	2004	41.406	45.828	33.545	**120.779**	279.960	196.506	71.041	**547.508**	58,6%	40,1%	13,9%	**112,6%**
	2005	43.344	54.153	38.591	**136.087**	323.304	250.659	109.632	**683.595**	66,7%	50,1%	21,0%	**137,9%**

These longitudinal accumulations are not gathered transversely among them (in its 35th quarter of disequilibrium, for example, total market in Spain is the sum of the

three components amounting to 138% of its Household Available Income in 2005). This happens to facilitate estimation of the different risks each aggregate implies as mortgage loan warranty, because in consumer durables longitudinal prices-quantities equilibrium market is followed by the longitudinal equilibrium of a finance nature post-market. This equilibrium has to be maintained during all the amortization period of outside resources with which productive investment and acquisition of goods have been afterwards carried on. We will then include mortgage warrantee in the frame of such equilibrium.

14. CONCLUSION

Let us summarize some doctrines of the oasis metaphor. Disequilibrium appears mainly but not exclusively in *hedonic* goods and services markets. Not only are understood as such markets those that are not necessary but add *satisfaction*, but also those that subtract *dissatisfaction* to what is necessary. One of the main but not exclusive causes of disequilibrium is the *mutation* of the demand. We have seen what it means in the barter economy, that is, in a single link market. Let us see what happens in a market with exchange currency, that is, with several links, in which the first one does not have information about the last one and vice versa.

Disequilibrium law assumes that the person *asking for* what he/she needs do it *hiding its availabilities*, while producer *offers* what he/she produces *hiding its costs*. It is then proved that production costs are the points from which demand tends to minimize its *availability margin* and supply tends to maximize its *productivity margin* (Kauder, 1965). Indeed, markets having prices lower than costs do not have any future. Consequently, equilibrium is got when both margins are at the same level, that is, when symmetry exists between *utility-value* (or sum of costs plus availability margin) and *labour-value* (or sum of costs plus productivity margin). This is, more or less, the variation derived from the prices-quantities equilibrium of market itself, previously studied.

However, in affluent economy, symmetry in prices allocation tends to be disorganized because the bearish pressure imposed by *availabilities rationing* is smallest. This bearish pressure leaves more and more space to irrational behaviours like *ostentatious demand* that consists of issuing purchasing power *signals* to social competitors. It is obvious that when the supplier captures such signals, then he/she increases prices. That is what happens, for example, in the upward bids on scarce luxurious goods.

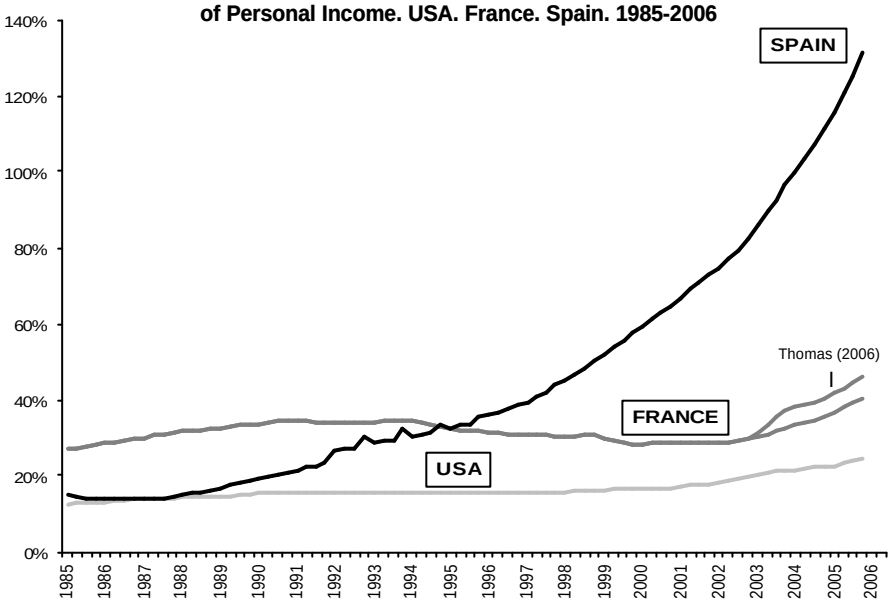
Bubbles do appear because upward bids behaviours manage to prevail in contexts with no supply rationing and even over supplied. These behaviours are different with regard to content and intensity and their degree of irrationality depends on personality both individual and collective (Dufrenne, 1953). If demanding agents share such motivations then *herding* appears (Brunnermeier, *op.cit.*), bubble swells and sectorial equilibrium function changes. That is, the more demand, the higher prices. Then, logic of unbalanced market is set, depending on its own characteristics of periodicity, centricity or elasticity. Its asymmetry and desynchronization slacken when resources use up or when results are counterproductive[9].
The oasis metaphor also confirms Pareto's principle relevance: disequilibrium results in predation, not only between supply and demand within the sector but also between

[9] According to Maddox (1999), psychobiology is progressing very fast towards motivational knowledge with the help of brain functions researches.

complementary sectors. Predation then grows at the same time as bubble inflates and vice versa when bubble goes down. In order to create artificial gains market, the abductor doctrine Stiglitz names as *market fundamentalism* has been developed. According to this doctrine everything is possible if demand absorbs it. But the price to be paid for it is the *settlings of scores*, ignored in the oasis metaphor although they have always existed, as the *Exodus* Levi episode above mentioned proves. In modern societies, settlings of scores are regulated by law, although what has been predated is very seldom returned (i.e. *a posteriori* contractual revision)[10].

It has to be also mentioned that the majority of new consumer's durables are acquired with resources that are not returned in the form of *capital and interests* with the help of future labour incomes. Consequently, for a purchase year *t,* the global invoice paid by users will be higher than *U°+U'°+U"* (equations 20-22), being the difference the *financing cost* postponed along the length of the loan. But, what can happen if 1st, goods are excessive and unproductive; 2nd, prices are inflated; 3rd, purchase is almost totally financed and 4th, credits are not duly secured? Let us see the situation in the three countries studied.

Graph. 13. Residential Mortgage Oustanding Loans as % of Personal Income. USA. France. Spain. 1985-2006



This graph shows that if disequilibrium is excessive, then its effect can be transferred to future generations since it is obvious that the purchaser can be unable to fulfil his/her loan obligations within his/her own life cycle. In fact, in Spain the answers to the last questions are not very optimistic: 1st, excessive demand has an abductive origin; 2nd, prices allocation could be fraudulent ("*lemon*" effect, according to Akerlof); 3rd, the amount of money used exceeds by far the own saving availability or that of other people; 4th, banking experience considers the statistical risk but not that related to the situation, the market-up or the risk-price (Merton's principle)[11].

[10] Shiller (*op.cit.*) shows the social consequences that stock market bubbles can provoke for pension funds and other derivatives. Anyway, an action over productive goods used to keep their productive value. And this because that way they can continue giving yields and even recovering their value later on.

[11] All the information used in graph 13 comes from the official figures of the three countries both concerning outstanding and household income. Some of these figures have been estimated on a three months basis from an annual series. As we have seen, in France and particularly in the United States of America the tendency of purchasing a second-hand house is bigger than that of purchasing a new one. In Spain mortgages on trade buildings are included

It is then within this unfavourable perspective that we have to keep components *U°*, *U°'* and *U'°+U"* separated from the market, not only as countable *deflactors*, but also because of its different level of strength as mortgage security. This level can be described as *real* in the *true-market*, *probable* in the *market-up* or simply *virtual* in the *hold-up*. To sum up, real estate expansion turning into an insecure guarantee deposit that families would have to feed generation after generation must not be allowed.

although they are not very important on the subject. On the other hand, there is not very quantitative and clear information about purchase and sale of already existing houses. So, tributary debt is due to a great extent to new construction, so, part of the real estate credit utilised is in hands of the promoter while he/she has not sold. Supposing that the components of production quantities and prices revert immediately to their original course according to a pattern type *U423* (graph 7), total debt due to bubble will reach one billion and a half € to which it will be necessary to add nearly another billion in interests. In short, concerned users will have to give back *approximately* the equivalent to four times and a half the current disposable income of the households existing in all the country (540,000 million € in 2005) from their labour incomes.

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