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Empirical rejection of mainstream economics' core postulates – on prices, firms' profits and markets structure

Joaquim Vergés-Jaime [Universitat Autònoma de Barcelona, Spain]

Abstract
Mainstream economic theory relies largely on deductions from assumptions, rather than from assertions based on a previous systematic gathering of observations on the basic elements of a market economy and its dynamics. This is the case for assumptions on: the general pattern of behaviour of firms' average costs in relation to the volume of units (returns to scale); prices determination (price theory); firms' size relative to market demand (market power); prevailing market structure regarding the competition/monopoly axis; people's economic behaviour (use of the "homo economicus" paradigm); socio-economic conditions (assumption of equality in income distribution, etc.); economically relevant information flows in technology, financial channels, etc. (perfect information); etc. All of this underpins the "standard model" core paradigm of the general equilibrium of competitive markets.

The present paper is devoted to presenting the results of confronting two of these core assumptions with the extensive empirical evidence available regarding them. First, the assumption on "price determination – in relation to the respective average costs" – (price theory), and therefore on the relative relevance of firms' profits. Second, the one on "the prevailing market structure regarding the competition / monopoly" axis; or, in other words, on the overall pattern regarding firms' size relative to the respective market demand, for any product or service.

As a result of this confrontation with observational evidence (hypothesis testing) it is argued here that these two "standard model" core assumptions cannot actually be sustained. As hypotheses on the economic world, they must be rejected. Therefore the economic theory built upon them is not a valid theory (from the perspective of the scientific method) to explain the workings of our market economies, to teach economics to newcomers at university class rooms, etc.

1. Putting *standard model* assumptions to the test

Economic theory, like any theory, is supposed to be mainly a descriptive, explanatory, outline of a specific part of reality – of the workings of our market's economies, in the case of economics or economic theory.

The present article is the result of testing – by confronting them with empirical evidence – two related core pieces of the mainstream economics theoretical *standard model*: on the one hand, the assumption (or explanatory theory) on how the prices of goods (products or services) applied by enterprises relate to their respective unit costs, and consequently on the enterprises' relative level of profits. On the other hand, the assumption (theory) on the type of markets – vin the competition / monopoly axis – that is supposed to characterise these economies. These topics correspond to what, in orthodox economics textbooks, used to come under the entries *Price theory* and *Market equilibrium theory*. These, in turn, are linked with the usual entries *Theory of the firm*, *supply curve,* and *market equilibrium*. All of them key pieces of the theoretical model of the "*general equilibrium of efficient & competitive markets"*.

As a result of this testing, it is shown here that the explanation implicitly given by mainstream economics (*standard model*) of the workings of a market economy – regarding price/cost relationship, companies' market-power, and market dynamics and structure – cannot be sustained in the face of the overwhelming empirical evidence available.

In a recent article, Salim Rashid[1] argued that "today's economic theory is unverifiable" because:

> "economic theory makes predictions about equilibrium positions. To verify such predictions, we need equilibrium data. Since, hitherto, we have no way of knowing if the data we use in empirical work is equilibrium data, all tests that have hitherto been conducted to verify economic theory are non sequitur".

It is difficult not to agree with this statement.

Certainly, we cannot find real-world data to check the assumptions of the *standard model*, mainly because they refer to an imagined economic world (perfect competition, perfect information, no entry barriers, ...).That is, the problem is not the frequent one of lacking data to test assumptions (theories, hypotheses) which are based on simplifications of a given reality. The actual problem is that the *standard model* assumptions do are based on simplifications but of an imagined economic world.

However, if we look at the conventional economics *standard model* (henceforth, ESM) from outside its internal logics, we are able to test the *postulates* on which it is based, for example price determination, business profits, and business behaviour regarding market operation. That is, it is possible to confront and to put to the test these postulates – usually stated in just an axiomatic way in mainstream textbooks – with the vast observational evidence available in this regard.

Let us underline these postulates. The explanatory idea, about the abovementioned elements of economic reality, that mainstream economics conveys – through textbooks and academic teaching – to readers or students can be summarised as follows:

> "…the free market rule means that, spontaneously, in the market *for any good*, in the end there are a great deal of (private) producer/supplier companies. All of them operate with the same technology, the same size (that of the *optimal efficient scale*, *oes*), and the same efficiency. Therefore, each one produces the same quantity of output, q^{oes}units, at the same average cost (the minimum possible, which will then coincide with the corresponding *marginal cost*). Since there are a 'multitude' of identical producer/supplier firms competing in the market, none of them has market power. Thus, all of them sell to clients/consumers at the same price, which - due to such *perfect competition* - is equal to their (common) average cost. Therefore, all producer/supplier undertakings operate without any profit (sic)[2]. This situation defines a *market equilibrium*, Demand=Supply=*Q* units, characterised by:

[1] Rashid, Salim (2019) "The fiction of verifiability in economic 'science'." *Real-World Economics Review*, n. 88 (p. 14).
[2] "…If all firms, active and potential, take prices as unaffected by their own actions, this implies that active firms must earn exactly zero profits in any long-run equilibrium..." (Mas-Colell et al., 1995, p. 335).

> *Price=Average cost* (=*marginal cost*); where $Q=q^{oes}$ x (number of producer/supplier firms). This is thus the case for any product or service in the economy – with some rare exceptions (natural monopoly). Overall, this leads to a *general equilibrium* of *competitive & efficient markets* in the economy; a *general equilibrium* which – under the additional assumptions of full employment (of work and the other factors), equality in income distribution, and perfect information, and on people's behaviour as consumers – has the properties of a *social optimum* in terms of economic well-being."

Expressed in a more compact way,

> "… 'competition': the common sense meaning is one of struggle with others, of fight, of attempting to go ahead, or at least to hold one's place (...). In current equilibrium theory there is nothing of this true kind of competition; there are only individuals, firms or consumers, facing *given* prices, *fixed* conditions, each firm or consumer for convenience *insignificantly* small and having *no influence* whatsoever upon the exiting conditions of the market (…) and therefore solely concerned with maximizing *sure* utility or profit –the latter then being exactly zero. The contrast with reality is streaking" (Oskar Morgenstern, 1972: 1164).

Some of us have observed that the above neoclassical framework of postulates (private businesses selling their products at cost price, etc.) used to be shocking at first for a new student on an economics course. Certainly, the standard student does not usually have direct business experience. However, at least she is aware that businesses (companies and individual entrepreneurs) obviously seem to exist and operate with the aim of profit-making, and that apparently they usually succeed. Overall, they obtain profits on a regular basis, quite high profits in the case of some well-known companies.

At first the contrast between, on the one hand, her *common knowledge* about the economic world and, on the other hand, the theoretical explanations on the workings of a market economy that she receives from teaching and textbooks, generates for her some sort of a schizophrenic situation (which could possibly lead her to self-blame for perhaps having lost some key issue of economics in the classes or readings). However, the assigned textbook talks about the above-mentioned framework of postulates as, implicitly, just simplifications of reality, and her instructors seem to be competent academics. On the other hand, if you attend classes and work on the assigned readings – thus getting into the mathematical-drawing language and the inner logics of what is being taught on the course – it is not really difficult to pass the examinations, and even obtain high grades. Thus, the student ends up by endeavouring not to relate the explanations of the economics course with the flow of her personal perceptions from real economic life, but rather to keep both in mind as two alien compartments.

From this outlook, the aim of this paper is to answer the following question: in the face of the abovementioned *standard model*'s theoretical explanations (postulates) of the workings of our market economies, what does the observational evidence of the real economic world tell us about the overall patterns of firms' behaviour? This is discussed specifically in relation to: a) price determination at firm level and, therefore, the relative importance of profits; and b) the

actual degree of "competition", or of its opposite, firms' market power, in the markets really existing in our economies.

The guiding idea when making this confrontation of ESM postulates with empirical evidence has been just to apply the scientific method, in the sense that a given theory is more or less good (useful) to the extent that it explains well the observed reality or phenomena that it is intended to describe in a simplified manner. Therefore, if a theory does not explain reasonably well the reality that it is supposed to describe, then it should be either changed or rejected and replaced by another one which gives a better, more useful, account of how that part of the real world under analysis is configured (what its essential elements are) and works (links between elements, and overall dynamics).

(I) Selling prices, and observed firms' behaviour

2. Generic-evidence statement 1: *Companies generally do not sell at cost price*

The above stands as a self-evident empirical statement: in a market economy, capitalist in the sense of being based on private business, companies do not normally sell at cost price, as the standard model in economics assumes,[3] but rather obtain profits. Some businesses obtain proportionally more than others. They generally make their decisions under the criteria of maximising their profits in the medium-long term.

We can observe, indeed, that sometimes, for short periods of time, because of an unexpected drop in demand, a company sells at cost price, or even below, with losses, but as something exceptional, temporary. It is obvious that overall, in the long run, firms operate with profits. To be more precise, they try to maximise them in the medium-long term when making decisions (on product range, activity level, firm size, worker hiring and types of contracts, technology options, etc.). That is, of course, within the framework of the firm's possibilities, and the legal rules and constraints.

This observed pattern even has a standard expression in corporations' reports and top executives' public speeches or declarations: "the company's guiding objective is to create value for its shareholders".

In relation to this, for any attentive observer – or participant – of business life, it is a matter of fact that companies tend to grow, to produce as much as they feel able to sell, as long as this increases or allows them to maintain their total profits. A general business strategy in this line is precisely to try to "gain market share". As it also is to extend the market-territory to be covered (to new areas within the country, and to other countries).

In short, it is easily observable that, in our market economies, sales prices are normally higher than the respective average cost of the product for the producer / selling companies. Even in the case of reasonably competitive markets. In fact, the ordinary business practice of applying a given profit-over-cost percentage, M, – so to determine the selling price to set/offer to potential customers – even has a traditional name: *mark-up*. It is usually expressed in terms

[3] With a nuance-remark, in some standard text: when the author points out that she/he considers, as a component of the *average cost* concept, a theoretical "*normal unit-profit*". I discuss this later on, in section 5.

of rate, M/100= *m*; *margin rate*. Thus, the practice most commonly observed in companies' behaviour in order to determine the respective selling/offer prices for each of their products/services is of the type: *Price = Average cost*x (1 + *net margin rate*); $P=AC\cdot(1+m)$.

It is also fairly common knowledge that such a margin rate, *m*, tends to be higher – and consequently so does the price – when a firm has some market power or operates under oligopoly conditions for a given product. This is even more the case if it holds a monopoly over it. It is *higher* (margin rate) relative to the average that tends to prevail for companies – in the specific economy – when the situation within the sector is of a *reasonably competitive market*; for example, about 10 or more companies offering exactly the same good, and each of them with relatively similar characteristics and degree of access to the communication channels with potential buyers.

In the latter case it is observed that the over-cost margin rate (profit) does actually tend to converge among the different companies operating in that market and, therefore, so do their selling/offer prices. This is simply an empirical acknowledgement. We may interpret that situation as, for example, that there is – at such a moment and in a regulatory and legal framework (country) – a certain minimum margin rate below which the persons who own a company in that "industry" are not interested in remaining in the business in the medium-long term. However, elaborating a deductive theoretical explanation about such enterprises' behaviour would not alter the observed reality,[4] that even in reasonably competitive markets, companies usually operate with a certain rate of profits.

From an empirical approach, the relevant question would in any case be: on average, what is the order of magnitude of the mark-up, the net margin rate, *m*, of companies in our economies?

3. Empirical evidence on the percentage of mark-up

The ubiquity of mark-up business practice for deciding selling/offer prices is common knowledge, especially among people involved in enterprises' commercial and administrative activities. However, on the other hand, it is difficult for someone "from outside" to directly quantify rates of margin for a particular company: the prices applied by that company for each of its products may obviously be public knowledge. However, the unit costs for each of them are – for obvious reasons – highly confidential internal information, a professional secret not only to customers but to competing firms.

However, if we have access to a company's accounts statements for a given period[5], it is possible to deduct what *average* rate of margin over cost (mark-up) was applied by the firm for its different products during that period, regardless of the specific mark-up option concerning the concept of *average cost* to be taken as the base, to then apply a given %. Let us suppose, for example, that the company option was to apply a certain overhead % on the

[4] It could be theorised that this minimum rate observed in "reasonably competitive" markets is due to enterprises' owners requiring a certain remuneration for the financial capital invested, or that the margin rate is rather related to the economic risks they assume as entrepreneurs (customer payment defaults, for example). I will come back to this in section 5.

[5] This is actually easy: in some countries annual accounts of companies are made public on a regular basis. For example, in the case of Spain, any company (SA or SL) has the obligation to deposit their annual accounts – Balance sheet and Income statement – in the provincial *RegistroMercantil* using a standard template.

"*direct* average cost" (*dAC*) for each product. A posteriori, having its *Income Statement* for the period in hand, it is easy to calculate the implicit average overhead rate on the *total average cost* (*AC*) of each product, i.e., the net margin rate: *m* = (Revenue from sales/Operating expenses) – 1. And when the aim is to measure the relative importance of enterprises' rates of profit-over-cost in an economy, as is with our topic here, there is no doubt that this average percentage overhead on *AC* – i.e., the *net margin*, *m* – is the most relevant indicator.

The above is precisely the situation and calculation procedure most common in surveys, studies or academic empirical research about *mark-up*. The ground data are aggregates from the Income statements of large sets of companies: from a certain sector of activity, from a certain area/country, and for a certain year. Moreover, the quantitative determination of the mark-up rates is basically of the same type described above. The only difference is that researchers work on aggregate data (basically for *sales revenues, SR*, and *operating expenses, OE*) from a large number of firms. Thus, $\bar{\boldsymbol{m}}=(\Sigma SR / \Sigma OE) - 1$. The resulting value, $\bar{\boldsymbol{m}}$, therefore represents an average of the respective average-margin-rates of each of the companies in the database selected by the researchers.

Thus, by way of example, the Central de Balances of the Spanish central bank (Banco de España) publishes aggregates of annual Income statements for a very large number of companies. Carrying out the above calculation, $\bar{\boldsymbol{m}}= (\Sigma SR / \Sigma OE) - 1$, for all the companies included in this database for the year 2017, (484,395 companies)[6], the outcome is $\bar{\boldsymbol{m}} = 0.09$, that is, a net profit over costs (=operating expenses) of 9%, on average, for that important proportion of Spanish firms.

Here it follows another example; in this case from a research strictly speaking, with much more coverage.[7] It studies the annual accounts submitted to stock exchange agencies by all publicly traded companies in the US, and covers several years. The article summarises the author's measurements of the average mark-up rates of each statistical sector (from the database used) for each of the years from 1959 to 2012. However, the results are presented in terms of average mark-up rates for the whole set of companies (all statistical sectors together) in such an extensive sample, for each year. The following data for some specific years are representative of these measurements: 1965, $\bar{\boldsymbol{m}}\approx$15%; 1980, $\bar{\boldsymbol{m}}\approx$9%; 2012, $\bar{\boldsymbol{m}}\approx$16%.[8]

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[6] Own elaboration, by using aggregates from *Central de Balances – Resultadosanuales de las empresas no financieras, 2017*, Banco de España, Madrid (2018) p. 85 and following.

[7] Traina, James (2018). The database used is Compustat (USA), excluding banks and other financial companies as well as public utilities.

[8] Traina (2018), pp. 5-8. It should be noted that the author's calculations –and therefore the figures he presents– are expressed in terms of the equivalent to (*Revenues from Sales*)/(*Operating Expenses*). That is, they are expressed not in terms of ***m*** but of (**1+*m***). He does, however, use an unnecessarily indirect approximation to determine that. He takes this calculating formula from De Loecker and Eeckhout (2017):

$$\mu = \theta^{V} \cdot \frac{P^{Q} \cdot Q}{P^{V} \cdot V}$$; for each statistical sector (i), and for each year (t)

In more standard language, this expression means: $\mu = \theta^{V} \cdot$ [(*Revenues from Sales*)/(*Total Cost of "a* (sic) *variable input"*)]; where θ^{V} is then defined by the authors as "the elasticity of total output (Sales) to the (unspecified) variable factor". This unusual concept, θ^{V}, is in turn quantified by them, for each statistical sector of the corresponding database, making assumptions and estimates grounded in the theoretical setting of the abstract Cobb-Douglas production function.

However, when applying this methodology as curious as it is indirect and sophisticated, Trania just takes as "*Total Cost of a variable input"* the figures for *Operating Expenses* from the Income statements in the database. Therefore, the concept of mark-up that he is measuring is just the one referred to here: *net margin rate over costs*, ***m*.**

4. Average cost vs. marginal cost in the literature on the subject

It is worth underlining that in the academic literature on measurements of mark-up percentages, in the section of the article or report devoted to setting out the theoretical framework (on which the methodology and the mathematical expression to apply are justified), authors talk more about evaluating "the difference between price and *marginal cost*" (rather than *average cost*). This is also the case with the ones cited above.

This may be surprising, since for empirical research using companies' annual *Income statements* for such a conceptual distinction is irrelevant. Insofar as a company operates minimising its total costs – in the simple case of a single-product undertaking, minimising its average cost – the *marginal cost* for any of its products (if calculated) is by definition equal to the corresponding *average cost*. These are just two ways to say the same in economics: that the firm is "cost efficient" because it is minimising its unit costs. Therefore, if an author (implicitly) assumes that companies whose Income statements contain the database (on which to work in order to measure the mark-up rate) have operated by tending to minimise their costs (an assumption widely accepted as to be reasonably realistic), then it is quantitatively indifferent to talk of *marginal cost* or of *average cost*, since the data to be used are the ones in those Income statements.

Marginal cost is a theoretical concept that cannot be calculated from a profit-and-loss accounts database. The reason why authors formally refer to marginal cost instead of *average costs* – or simply *operating expenses*, which is the variable they actually take for their research – belongs to academic life dynamics. It could be explained on the grounds that these articles or surveys are elaborated from within the language and referential framework of standard, orthodox, neoclassical, economic theory. And in this theoretical framework, *marginal cost* is a key concept (formally: first derivative of the total costs, for a given good, regarding output quantity) around which pivots the postulate of a *market equilibrium* and therefore the model of *general equilibrium of competitive markets* which, in turn, is the core paradigm of mainstream economic theory.

5. A biased definition, with ideological implications

As pointed out earlier, in some orthodox economics/microeconomics textbooks, when it is stated that "in equilibrium, firms sell at a price equal to their average cost, i.e. without making a profit", authors add a provision. This is that the concept of average cost they are referring to includes, in addition to the actual average cost, AC (the one firms calculate), a certain amount in terms of *"normal" profit-per-unit*. This theoretical concept, *normal unit-profit*, (*nup*), when explicitly defined refers to the opportunity cost of the factor "*financial* capital invested by the owners of the firm". These textbooks' authors are therefore (implicitly) talking about a different concept of average cost: AC^{+}, equal to *AC+nup*. It is therefore higher than the average cost strictly speaking. If we follow such a definition, then when we observe a specific real case, *Price* = *AC* + (*unit-profit*), we should express it as *Price=AC+*[*nup* + (*extraordinary unit-profit*)].

Certainly, if we take this semantic resource into account, the postulate of the orthodox model (general equilibrium of competitive markets) – intended to refer to a capitalist market economy – that "in a free, competitive market, in equilibrium, in the long run, firms obtain zero

profits" is less shocking. It must be understood, then, that what is meant by this is, "(in equilibrium) $P = AC^{+} \equiv AC+nup$".

Is this theoretical resource useful when the aim is to explain the workings of market economies based on private enterprises? Does it make sense in an economic theory to define the average cost, including a portion of the profit margin? Or, looking at the matter from another viewpoint, does it make sense to define, to describe, business profits as something restricted to the theoretical concept of "extraordinary profits", and to simultaneously postulate that it will "generally be null" for any good/firm? In short, is it ethically neutral to talk about business profits with a meaning other than the usual one, not only in the business world (enterprises' annual accounts) but also in tax rules (corporate income tax) and in the field of National Accounts, as well as, of course, in common language?

In any case, to talk of *average cost* with such (usually implicit) assumptions is at least a source of misleading confusion for students and readers of economics textbooks. This is even more so when adding in these texts – generally also implicitly – the assumption that normally the "residual" component, the "extraordinary unit-profit", is zero. On the other hand, the "normal unit-profit" (*nup*) is a purely theoretical concept, in the sense that is not possible to measure / quantify it in a real case – for reasons parallel to Rashid's argument cited at the beginning: such a concept of *nup* rests upon the standard assumptions of equilibrium, perfect information, perfect competition, etc.).

Such a theoretical-semantic resource ("average cost" with the meaning of *AC* + *nup*) is like consciously or unconsciously offering an idyllic (or *naive*) picture of the workings of a market economy, basically made up of private and, therefore, profit-seeking undertakings. This picture is summarised in the orthodox model's motto, "(in equilibrium) companies do not obtain (extraordinary) profits", where, moreover, the contents of the parentheses are usually implicit. This does not seem to be something scientifically-academically neutral. It is a theoretical resource that could seem to be intended to generate a certain idea that the capitalist market system is by nature something morally fair. It suggests that "companies normally earn "just what is fair" if markets are given full freedom to operate". The contrast of this with what the direct observation of economic and business reality shows, is not worth highlighting again here.

(II) Market structures (for any good/industry) most generally observed in real life

6. Generic-evidence statement 2: Companies holding *market power* are something not exceptional in our economies

For any observer of the reality of our economic world, the following statement may be self-evident: the situation of "reasonably-competitive market" – meaning by that, for example, about 10 or more companies offering exactly the same good, and every one of them with relatively similar characteristics and degree of access to the communication channels with potential buyers – does not appear to be precisely the dominant one in practice, let alone the situation of "perfectly-competitive market".

The generic empirical observation of the business world in which most people in our economies earn their living shows that the three market-type structures – reasonably

competitive market, different degrees of oligopoly, and monopoly – as well as several mixtures of them,[9] occur with significant frequencies. As the empirical data presented below indicate, in actual fact there are as many cases of markets ("industries", sectors, products) with few producer-supplier companies (oligopolistic situations), as cases of markets with a number of or many competing companies (reasonable, significant, or strong competition), and equally numerous cases of monopoly situations. In other words, market dominance positions (oligopoly or monopoly situations) by one or a few companies are actually considerably more frequent than is usually assumed in mainstream economics / microeconomics texts.

Generic evidence about this is especially visible to those who are employed in the commercial areas of companies' activities, mainly in purchasing departments (few options for suppliers of this or that product). This is, however, also the case in sales activities (companies' usual internal practice of self-setting market share targets for a given product or for a product range).

More precisely we have, of course, specific empirical evidence in the form of official statistics, professional empirical studies, research reports, etc. The degree of monopoly-oligopoly in a specific market (good, industry, sector) has traditionally been measured in economics by a *market concentration ratio,* ***C***. This measures what proportion of the total sales in a market is covered by the top three, four, or five companies (*C3*, or *C4* , or *C5*, ..., ratios). Thus, if the top four companies in terms of sales amount to 85% of total sales in a specific market (product/sector/"industry") – an oligopolistic type situation, therefore – then we talk of a market concentration ratio of *C4* = 85.

Thus, in the classic manual of Industrial Economics by Roger Clarke (1989), we can see market concentration ratios, measured at the level of the top 5 companies (*C5*), for different types of goods (statistical "sectors", in fact) in the United Kingdom[10]. "Industries" such as sugar, cables, cars, breakfast cereals, coffee, batteries, cement and others, are listed with *C5* figures above 90%, and for some of them (such as sugar, tobacco and hydrocarbons and their derivatives) the *C5* ratio was 100%. Which indicates oligopoly/monopoly situations.

The detailed study by Sutton on market concentration ratios (1998) is historically noteworthy. In this case it presents indicators, for the United States, referring to the top four companies' market share (*C4*) for each of the 197 types of goods or "industries" (industrial sub-sectors, according to the statistical classification of economic activities at the 5-digit level in the USA). Percentages in the order of 60%, 70%, and 90% also appear with significant frequency.[11]

In both cases, these are ratios obtained (or calculated) from sectoral statistics published by the official agencies of the respective country. In that context a sector, sub-sector or "industry" – for example, "Pharmaceuticals", or "Cables" – actually includes several or many different products. Its corresponding indicators (e.g. "Pharmaceuticals", *C5*=75%) thus actually represent the average of the market concentration ratios for the different specific goods/markets encompassed by the corresponding statistical grouping (classification code-

[9] By way of example, in Spain there are quite a large number of undertakings producing kiwis but one of them, *Kiwi Atlántico*, represents 60% of total national production. Should we qualify this situation as "competitive market" (because of the high number of enterprises in it) or rather as "quasi-monopoly" (because of the market dominance by one of them)?
[10] Clarke (1989), tables 2.2. and 2.3., on p. 22 – the statistics database used by Clarke to determine these *C5* ratios corresponds to the years 1977-78.
[11] Sutton (1998), Appendix 4.3, tables 4.3.1 and 4.3.2, pp. 550-557.

level). Which means that the *C* ratios calculated from these data give, inevitably, a *low-resolution* information on markets concentration.

On the other hand, a public statistical agency could obviously also calculate concentration ratios by taking the market share of the leading, top, firm in the industry, or the sum of the top two (*C1*, or *C2* level ratios). This would give more accurate information about monopolistic situations. However, we will not find data at that level (or at *C3* level) in statistical agency reports – and therefore not in academic studies either – because the confidentiality clauses of public agencies publishing these statistical data prevent this (on the grounds that otherwise specific companies' data could be easily identifiable). That is why the most common in the statistical releases are *C4* and/or *C5* indicators.

Another example of empirical data is the one below, resulting from a broad study which uses statistical databases corresponding to 10 years later than the ones used by Clarke in his above-cited work. In this study, *C4* market concentration ratios are calculated for the whole set of industrial sectors of several countries, and then average values for each country are presented[12]:

	C4 (average)	(s.d.)
Germany	35,9	20,8
France	34,9	23,5
Italy	31,6	22,3
United Kingdom	39,5	22,3
US	31,4	16,4

More recent data (2004), specifically for the UK, released by the *Office of National Statistics (ONS),*[13] show that the situation regarding market concentration is quite similar to the one three decades before, as per the work by Clarke. A 2018 report by the OECD[14] on market concentration ratios for several relevant industries in the UK is also in line with this view: sectors such as Groceries, Broadband, Telephony, Electricity, Gas, Banks' personal current accounts, present figures for *C4* of 90–70%; of about 60% for Mortgages; and of 50–40% for Cars.

Since the end of the 80s, besides the *C* ratios, preference has been given by researchers and public agencies to an alternative measure of market concentration: the Herfindahl-Hirschman ratio (*H*). This indicator is calculated as the sum of the square of the market share of each of the firms in the specific market. I.e., not only is the market share of the 4 or 5 top firms taken, but rather that of all the firms operating in the sector/industry. Thus, the possible values of this ratio go from *H*=10000 for a pure monopoly situation (the square of 100%), to values close to zero for a situation of "almost perfect competition". This ratio has the advantage of allowing a good discrimination between different degrees of monopoly-oligopoly (see below). However, it also has the disadvantage of giving values that – unlike the "traditional" C ratio – are of non-intuitive interpretation, since they do not vary in proportion to what is commonly understood by degree of concentration of firms' market power – as can be seen in the following simulation:

[12] Lyons, Matraves and Moffatt, (2001), table 1, p. 12
[13] Mahajan (2006); appendix 1, pp. 42-44
[14] *OECD,* (2018) (p. 9).

Simulation for the Herfindahl-Hirschman market concentration ratio (H)

	Different possible type-situation, for a specific market/product/sector:	Market shares for the top firms active in the market in %					Rest of the firms active in the market		**H ratio**	C_5 ratio	C_4 ratio
		1ª	2ª	3ª	4ª	5ª	Share in %	firms			
1	Pure monopoly	100	0	0	0	0	-	-	**10.000**	100	100
2	De facto Monopoly	90	0	0	0	0	0,25	40	**8.103**	90	90
3	Oligopoly/monopolistic (a)	60	10	10	10	0	0,25	40	**3903**	90	90
4	Oligopoly/monopolistic (a)	40	15	15	15	15	-	-	**2500**	100	85
5	"Balanced " Oligopoly	20	20	20	20	20	-	-	**2000**	100	80
6	De facto Oligopoly	20	20	20	20	5	0,50	30	**1633**	85	80
	6 > (in-between) > 7	15	12	10	8	5	2	25	**658**	50	45
7	Reasonable competition (20 similar firms)	5	5	5	5	5	5	15	**500**	25	20
8	High competition (80 similar firms)	1,25	1,25	1,25	1,25	1,25	1,25	75	**125**	6,25	5
9	Atomised n ("almost perfect") competition (200 similar firms)	0,5	0,5	0,5	0,5	0,5	0,5	195	**50**	2,5	2

Thus, in the aforementioned work by Sutton, besides the already commented *C4* market concentration ratios, we find data for *H* measures for each of the sectors. Also, in line with what was pointed out before on the basis of his *C4* measures, values higher than 2000 for the *H* ratio for most of the sectors appear in the tables cited above.

Let us, however, look at more recent data, first referring to the UK.[15] Working on the latest detailed data published by the public agency *BIS*, the following summary can be produced:

Degree of market concentration (UK, 2015), *Herfindahl* ratio

1. Oligopoly & Monopoly situations: 1600 < H : 137 sectors
   - 1.1) 8000 < H, (10 sectors)
   - 1.2) 4000 < H < 8000, (22 sectors)
   - 1.3) 1600 < H < 4000, (105 sectors)
2. Relative competition situations: 500 < H < 1600: 129 sectors
3. Situations of reasonable or high competition: H < 500: 114 sectors

Own elaboration on the basis of "BIS Analysis of key sectors (by SIC2007)/Table 5: The Herfindahl-Hirschman Index for each 5 digit SIC2007 code". BIS release 03/05/2016.

Finally, the most recent empirical measures available for the US: every five years the US Census Bureau publishes highly detailed databases (classification of economic activities at

[15] The UK is probably the country for which the most data on market concentration indicators are available: Besides the *ONS* regular releases regarding *C5* ratios, there is also the *Department for Business Innovation & Skills (BIS)*, which publishes data on market concentration, in this case using the *Herfindahl* indicator, and on an even more detailed level: aggregates of economic activities at 5-digit statistical code (392 sectors).

the 6-digit level) with market concentration ratios, *C4* as well as *H*, for the different sectors covered.[16] Among these, the macro-sector encompassing all industrial activities stands out – in the sense of the prominence that is given to it by the public agency.[17] Focusing on these, and using the most recent data available (2007), at the 5-digit aggregation level there are 183 "industries" or types of manufacturing goods. By first analysing the corresponding data on *C4* ratios, the outcome* can be summarised as follows:

> For 38 of those 183 goods / industries / manufactures, the *C4* ratio is higher than 50%. For 23 of them, it is higher than 60%. Among the latter, the most outstanding ones, in terms of sales volume and degree of market concentration, are Tobacco, Breweries, Petrochemical manufacturing, Computer and peripheral equipment, Telephone apparatus manufacturing, and Appliance manufacturing.

By using the other market concentration measure offered by the report, the *H* ratio, the summary would be:

> Manufacturing sectors for which,
> H > 1000: 32, of which 12 with H higher than 2000 (situations of oligopoly/monopoly)
> H < 500: 94, of which 24 with H lower than 125; a border-value that could be associated with high competitive situations (see simulation table).
>
> (*) *Own elaboration, based on the database mentioned.*

As can be seen, the empirical measures about market concentration reviewed above allow us to maintain the overall assertion suggested by overall generic evidence, as stated at the beginning: the three types of market structure – competition, oligopoly and monopoly – (each of them encompassing different variants, as illustrated in the simulation table, first column) are present with similar frequency in the real market economies.

7. Innovation, market niches, and *natural monopoly*

The sequence of empirical evidence gathered so far on mark-up % as well as on market concentration ratios may appear to some readers scarcely surprising, since we are talking about real market economies, basically made up of private companies. Which are logically guided in their decision-making by profit criteria. In this respect, observational evidence shows us that a company's profits partly depend on a binomial: company's growth, and increase-of-its-market-share, or finding "market niches". That is, they depend partially on the fact that the company would hold a certain degree of market power. This business objective is in turn related to specific management strategies and instrumental or intermediate objectives, among which innovation – in processes, products, etc. – plays a significant role.

> "... competition is a type of behaviour by businessmen and not a market structure like 'perfect competition'" (Blaug, 1998: 15).

[16] https://factfinder.census.gov/faces/affhelp/jsf/pages/metadata.xhtml?lang=en&type=dataset&id=dataset.en.ECN_2007_US
[17] (Manufacturing: NAICS 310000-339999); US Census Bureau, *Concentration Ratios: 2007, Economic Census; Manufacturing (EC077315R12)*.

This dynamics in the business playground easily leads to technical-economic situations close to what we know as a *natural monopoly*: where a single firm may produce the Q units of a specific product/service that the market demands, cheaper than two firms producing Q/2 units each, etc. It is moreover worth underlining that, due to this dynamics, the *natural monopoly* is a market situation that is actually much more frequent than is commonly assumed in mainstream economics textbooks. It is especially frequent for many "ordinary" goods (in the sense of non- socially-sensitive or strategic goods) for which no regulatory issues usually arise. This is the case, for instance, of most complex-technology specialised equipment (such as a scanning electron microscope, a cinema's projection equipment, a power generation turbine, most sophisticated industrial robotic equipment, etc.). The same also applies to numerous luxury goods – such as yachts, armoured cars, private jets, etc.

Indeed, in some cases the technical-economic situation of *natural monopoly* occurs for a socially-sensitive or strategic product or service. These are the cases for which there tends to be a socio-political consensus that such a productive activity should be subject to regulation by the public powers, in order to avoid abusive prices and/or to guarantee supply conditions. The usual historical examples in this regard are basic public utilities such as the distribution of water, electricity and gas, as well as telecommunications, for a given population. These are cases where the *natural monopoly* feature comes mainly from the fact that they are *goods* that require an important physical infrastructure, such as a distribution network (wiring, piping), which in economic terms it does not make sense to duplicate, triplicate, etc. In addition to these historical examples, there are those of public transport services, which also present, in whole or in part, characteristics of natural monopoly. In these cases due especially to *economies of coordination* and to their features of socially-sensitive goods: service configuration (which type of urban transport?), interrelationship with urban development, and ensuring service regularity.

However, as stated above, it should be emphasised that while these cases – in which the technical-economic situation of a *natural monopoly* occurs simultaneously to that of socially-sensitive or strategic good – are cases of a high socio-political impact, they are not, even remotely, the most numerous cases of *natural monopoly* situations in practice.

8. Conclusions

(I) The core assumption of the modern-neoclassical standard model of mainstream economics, "in a market economy, in equilibrium companies end up by applying prices equal to their average cost – equal, in turn, to marginal cost – for the corresponding good or service; and consequently, they operate obtaining zero profits" is a clearly unreal assumption. It cannot be sustained in the face of the overwhelming observational evidence, not even as an acceptable methodological simplification.

If the flow of information that regularly emanates from the business world (for example, direct experiences of economic actors, managers talking about running their companies, economic press...) is not voluntarily ignored, it is self-evident that companies normally operate obtaining profits (sales prices are normally higher than the respective average cost); that they tend to grow as much as they can, insofar as this allows them to improve their profitability prospects ("competitiveness"); and that their selling price for a product is normally not taken as an external data, but rather as an internal decisional variable; i.e. that "pricing policy" is something important in any company's management.

Specific empirical evidence (measures of mark-up rates) confirms and shows us that, in our developed market economies, sales prices tend to be on average in the order of 9-16% higher than the respective average costs.

(II) In parallel to the above, it is not possible to uphold – in the face of the observational evidence – the orthodox standard model postulate – based upon the above assumption, among others – that

> "market economies tend toward a competitive equilibrium in each market (product, sector, industry); a kind of equilibrium characterised by the fact that none of the firms active in a specific market will hold any power over the price (non-existence of firms' market power)".

Empirical evidence shows rather that market situations where one or a few firms hold a dominant position (high market share) in the market are not actually infrequent. On the contrary, these situations are in some way systemic. Strong control over a given market is associated with an oligopoly-type situation – or a situation close to a monopoly. These types of situations (market power) are obviously what in turn allow companies to obtain higher profit margins.

In this respect, there has been presented here empirical data on markets concentration indicators that point out that market situations where five or less companies concentrate a dominant part of the total sales in a sector (i.e. oligopolistic or monopolistic situations) are actually present in about one-third/half of the markets (industries, sectors) in dynamic economies such as, for instance, US or UK. The empirical overview presented here on the market concentration indicators also suggests that it would be *naive* to expect that this extensive reality could be substantially modified by a regulatory body, such as a "competition-enforcing public agency"[18] – in the sense of going beyond its role of regulating the classic public utilities (and even in these cases, with the well-known limitations) or giving its green light to some big mergers.

All the above have certainly relevant consequences: Without these two (I & II) theoretical assumptions of the ESM (perfectly informed and efficient firms selling at cost price, and none of them holding any market power), the mainstream paradigm of the *general equilibrium of competitive markets*, which plays such a central, fundamental, role in mainstream economics, cannot be sustained.

To look at the matter from another perspective: from the point of view of the scientific method it can be said that mainstream economic theory does not properly explain the workings of our market economies, as far as the sphere of firms and markets. This is not regarding technical specificities or secondary details but rather regarding fundamental issues of the real economic world. Therefore, it should be substituted by another economic theory that gives a better account of how our real market economies work.

[18] By way of example, the EU's competition regulatory authorities are taking as a reference for giving their green light to a merger of companies from the same sector a value of H=2000 (see simulation table in the text) for the (estimated) concentration ratio of the would-be resulting market situation. In the case of the US (Antitrust rules), the reference value is H=2500.

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Author contact: Joaquim.Verges@uab.cat

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