

# Metaphors for crises, cycles and equilibrium

A conference in Lausanne  
Centre Walras-Pareto, 24-26 October 2019

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## PART I: Equilibrium

### The metaphors of “équilibre” in the *Journal des économistes*, 1841-1874

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This article investigates the vocabulary used by French-speaking liberal economists in the middle of the XIX century and, in particular, the word *équilibre* (equilibrium). It deals, first, with a semi-quantitative CAQDAS analysis to identify the uses of this word in the main liberal journal of the time, the *Journal des économistes*. Then, it discusses these uses along three lines: the objects that were supposed to be in equilibrium, the signifieds of the word *équilibre* (i.e. what did they mean by “being in equilibrium”?), and the metaphors associated to it. The aim is to question the links between these three aspects, in order to give an idea of the terminological context of the epoch, in French-speaking economics.

The way the liberals of the *Journal des économistes* used *équilibre* is not anecdotal, because some of them are also the ones who introduced the term *équilibre* in the French edition of *The Wealth of Nations* in 1859, in several places where Smith did not use it : this edition is still the main one printed in France nowadays and was used as a reference for the diffusion and the retranslation of *The wealth of nations* all across Europe. It is also this edition that Léon Walras used. The French liberals’ interpretation of Smith in terms of equilibrium is therefore the one that spread, together with what they meant by this word. Hence these liberals, who are almost unknown nowadays, have pushed in Smith a notion that didn’t exist in the original versions, and through it, they gave a strong and widespread interpretation of the main text of economics.

But strangely enough, the way the French liberals of the XIX century used the term *équilibre* has never been studied. And unlike value, money or Say’s law, this word is not the object of debates at the time either<sup>1</sup>. Hence one has to reconstruct the shaping of

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<sup>1</sup> One exception, though: in 1856, during a presentation of his work to the Political Economy section of the French Academy of Moral and Political Sciences (*Académie des sciences morales et politiques*), the Belgian economist Gustave de Molinari was challenged by Charles Dunoyer about his use of “the law of equilibrium”, characterized by the latter as “a new law, the existence of which he doesn’t discuss (...), but that should be better demonstrated” (Molinari, 1863, *my translation* of Molinari reporting Dunoyer’s discourse). Unfortunately, the details of the discussion between Molinari and Dunoyer have disappeared from the archives, but it shows that the concept of *loi d’équilibre* was still quite unacknowledged at the time.

“équilibre” as a technical term in economics through another source. My choice of the *Journal des économistes* has to do with the historical context of the liberals’ writings. This journal was founded in 1841, and it was the main dissemination channel of the liberal’s theory. It is the world’s first professional journal in economics. This journal was addressed to – and, equally, written by – liberal theorists, but also by entrepreneurs, and any private individual interested in liberalism; they were from all the European French-speaking countries (France, but also Switzerland, Luxembourg and Belgium). The *Journal* was also read all across Europe, by economists such as Wilfredo Pareto and William Stanley Jevons.

I chose 1841 because it is the creation of the *Journal*, and 1873 because it is just before the publication of Walras’ *Elements d’économie politique pure*, in which the term “équilibre” appears much more than in any other writing of the time, and is understood in such a particular way that it might be a turn in the perception the XIX<sup>e</sup> century economists had of this word, that would have to be studied on its own.

The main issues I explore in this paper are the following: how did the Liberals use the word “équilibre”? Was it in a technical way? Or not at all? Was it, like the only one that appears in Smith’s original text, associated to a metaphor? What did they mean by it, precisely?

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## **The Pendulum & equilibrium**

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The vertical positions are privileged states of a pendulum, in that, if reached and not disturbed, the bob is not subject to change-inducing forces. They are therefore equilibrium states of the system. The upper position is unstable, in that the smallest disturbance will take the bob away from this position and the resulting forces will amplify the original deviation; the lower position is stable: if the pendulum is subject to friction, the effect of any impulse will eventually damped by the dynamic forces to which the pendulum is subject and the movement will converge towards the rest position, where the pendulum eventually settles until next disturbed. In a frictionless

pendulum, the bob will perpetually oscillate around the equilibrium point, at an amplitude depending on the intensity of the original disturbance.

Such a system, also because of the familiarity of the object (if not the physics governing it) and its surface simplicity, was bound to provide a metaphorical reference for many writers in economics who discussed either the rest position or the movement towards (or around) it. Our paper focuses on the pendulum as a metaphor for equilibrium, ignoring the equally interesting usage of the same metaphor to discuss the business cycle. The first, most obvious and seemingly innocent usage has been by means of comparing the rest position of the pendulum with the tendency to equilibrium of prices subject to adjustments of supply and demand, with market forces seen as analogous to gravity. But this soon raised a number of issues, in particular concerning the pertinence of the analogy and the nature of the disturbances, and the epistemological issues relating the choice of focusing on the equilibrium position while ignoring the actual movement leading to it, eventually implying different notions of equilibrium itself.

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## **The metaphor of “robinsonade” with regard to equilibrium theories with expectations**

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The ‘economic man’ postulate plays a role in the notion of equilibrium, notably when equilibrium is seen as an expectational concept. “Many theorists [...] have also required the further condition for equilibrium that every participant be optimizing in relation to those correct expectations”: whereas Samuel Phelps raised the issue, he shunned it right away and focused on the prime condition of expectational equilibria (conformity of outcome to expectations)<sup>1</sup>. In any case, the “every participant” clause remains. By stressing it, one contrasts the fact that *each and every* individual stands with one’s concerns when following rules of maximization/optimization. Economists debated much those. There is also a point in questioning the role of “economic man” in equilibrium theories as a pre-condition. This paper aims at discussing whether the image

that was given and the reproach that was formulated by using the term “robinsonade” relate, and how.

1 The first condition is that economic equilibrium implies an outcome that conforms to the expectations of the participants in the economy. The quote gives the *further* condition. Both conditions imply individual participants (S. Phelps, *New Palgrave Dictionary of Economics*, entry “equilibrium: an expectational concept”, vol. 2, p. 177).

2 Suffice to refer to the entry by Murray Musgrave “equilibrium: development of the concept” (*New Palgrave*).

The term “robinsonade” can be tracked back to Karl Marx confronting British Classical political economists. Now Marx belonged to a stage in economics when the concepts of general (and partial) equilibrium were yet to formulate. However 1°) the issue of equilibrium already existed (about “natural prices”), since Adam Smith (and even Sir James Steuart)<sup>2</sup>; 2°) some disciples of Marx later worked on equilibrium (for instance, in the so-called “debate over socialist calculation”, notably Oskar Lange vs. Ludwig von Mises); 3°) the “economic man” became the agent of equilibrium theories in general, after Marx, but if one relates Marx to the German Historical School, it opens a methodological debate.

In shaping and using the “economic man representation”, do we find an indispensable feature of equilibrium theories? Which “economic man” is thus hypothesized/pre-supposed, and is it *by* and/or *for* equilibrium theories? To which extent does the metaphor of “robinsonade” hit target when addressed to the “economic man” of expectational equilibrium? Are dis-equilibrium theories more suggestive? If “robinsonade” is a metaphor used to display sharp criticism, which theories does it discredit then, those where equilibrium is stressed, or those that elude this issue in some way?

The perspective in this paper is both historical and philosophical. Besides Marx, it aims at discussing the impact of the Austrian formulation (initiated by Carl Menger). More precisely, so-called Austrians often criticize equilibrium (especially its mathematized versions). They were also often criticized in turn for putting forth “robinsonades” (for instance, Menger was sharply attacked by Gustav Schmoller). The debate seems to revolve around the nature of the relationship between individual subjects/“economic man” and the approval/rejection of the notion of equilibrium. Which “economic man” is indispensable to equilibrium theories, if any? Is it the one that is also criticized by people who reproach economic equilibrium modelling with “robinsonades”? Is their criticism addressed to the “economic man” feature, the way expectations are formulated in equilibrium, or in other theories? Does it hit target?

Those issues will structure the submitted paper. We shall rely on literature about equilibrium theory especially at an early stage: Marx’s criticism to Classical political economists; the issue whether to enter the path of equilibrium (Walras) or not

(Menger); the means to adopt/adapt an image of “economic man” when equilibrium theories arose (for instance, Auspitz and Lieben as debated by Menger). The idea of expectations needed a frame: it both helped build and criticize that frame altogether: how to understand that? In this paper, we shall confine ourselves to the study of this issue at an early historical stage so as to rely firmly on documented ground we found in archives (bibliography shall be provided).

Keywords: expectations in equilibrium, methodological individualism, Marx (Karl), Menger (Carl), robinsonades, Schmoller (Gustav)

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## **Statistical equilibrium in early twentieth century Italian economists**

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While it is common knowledge that the engineer Vilfredo Pareto is acknowledged as a forerunner of modern econophysics, his use of analogies with the theory of gases, and concepts such as statistical equilibrium are not so clear. Certainly, he had already written his most important works by the time quantum mechanics and statistical physics were taking root, but he had a clear understanding of what was then conceived as statistical equilibrium applied to the study of large aggregates.

Pareto introduced the idea (though he never voiced it clearly) of statistical equilibrium while developing his explanation for the law of incomes. Mainly in his *Treatise on Sociology*, he considered statistical equilibrium—as the kinetic theory of gases—as an appropriate tool for examining the effects of the oscillating movements of different elements within a system that largely offset each other in the aggregate, thus achieving a global equilibrium.

The basis for the analogy between *statistical* equilibrium and the kinetic theory of gases (1916, sec. 2074) lay in the admission that individuals' actions offset one another, so the oscillatory states of individuals may result in a stable trend.

The choice of the analogy with the theory of gases was simply prompted by the observation that society is composed of more heterogeneous *molecules* than those comprising the economy (as Pareto said in sec. 2079 of the *Treatise*), but this very observation led Pareto to consider other aspects, the first of which was the social system's organization:

The economic system is made up of certain molecules set in motion by tastes and subject to ties (checks) in the form of obstacles to the acquisition of economic values. The social system is much more complicated, and even if we try to simplify it is far as we possibly can without falling into serious errors, we at least have to think of it as made up of certain molecules harboring residues, derivations, interests, and proclivities, and which perform, subject to numerous ties, logical and non-logical actions. (1916, sec. 2079)

Judging from the above words, statistical equilibrium would seem a fitting explanation for economic equilibrium, while society demands broader concepts, such as social equilibrium. Actually Pareto did not go further along this path although further investigating the analogies with the theory of gases would have led him to shed light on the stability of large distributions (like that of income).

However, the insights coming from the Pareto of the *Treatise on Sociology*, on the one hand, the contributions on probability provided by the then Italian mathematical school, on the other, fed the interest for the use of chemistry analogies in economics. If Pareto evoked the statistical equilibrium of aggregates looking at the theory of gases, albeit without much emphasis, some economist, often referring to the 1919 Guido Castelnuovo's treatise on probabilities, appeared less hesitant in adopting the analogy with the behavior of gas molecules, particularly dealing with the laws on income distribution. In addition, Francesco Paolo Cantelli, at that time well-known mathematician, in 1921 interpreted Pareto's distribution in the light of Boltzmann and Gibbs' studies on the distribution of gas molecules inside a closed container: the idea was that a fixed amount wealth was distributed among heterogeneous agents according to not yet determined laws.

Arrigo Bordin (1933), a less-known Paretian economist, arguing that the distribution system reaches a condition of equilibrium whatever the initial distribution, made explicit reference to Maxwell's law. The very large number of small causes influencing the distribution between two or more groups makes it impossible to forecast the distribution, which is ultimately a product of "random factors". So, an agent's belonging to one group instead of another was a matter of probability as the price at which he exchanged was matter of probability. Bordin gave a modern view of



statistical equilibrium stating that aggregates reach a stable condition, which allows calculating average prices, while each individual can trade in disequilibrium conditions, that is, not maximizing her/his own utility vectors.

In those years, Alfonso De Pietri Tonelli (1931), a loyal Paretian economist, wrote that: ... just as it is not possible to study the movement of each gas particle against the bottle containing it, but it is feasible to deal with pressure and gas mass by means of statistical averages, ... so it is not possible to study the impulses of each individual, but it is possible to deal with the uniformities resulting from averages and sums of the actions of heterogeneous individuals belonging to a given social circle or class, according to the random distribution of such impulses (1931, p. 43).

Statistical equilibrium was useful for analyzing not society as a whole, but groups:

The equilibrium of many individual within a class is however a statistical equilibrium ... of individuals presenting different behaviors ... What can be known is the resultant of the entirety of individual actions in a class. (*ibid.*)

Briefly, De Pietri-Tonelli built a model in which individuals with opposing interests form opposing pairs. The resultant of each opposition can be zero or other than zero. There is statistical equilibrium within a group or class when the sum of all the resultants is nil.

Like De Pietri-Tonelli, Giuseppe Palomba (1935) saw the distribution of wealth as matter of conflict between social groups, each formed by a particular ideal-type of individual, more or less in opposition, more or less involved in political affairs. Here again, the Maxwell law is evoked to explain the distribution of real income.

In conclusion, it is true that an analogy between agents and gas particles induces us to consider the distribution of income (i.e. each agent's resources), but questioning the implicit assumption that the agents' behavior will depend on their endowment. Agents are by no means unintelligent like gas particles. But Pareto's analysis of sentiments hints at another possibility, what might be an umpteenth outcome of his thorough experimental approach. Pareto seems to suggest that, when agents act under certain conditions—in a protected market, for instance, which means their heterogeneity is denied— then even differences in endowment do not matter (1916, sec. 2209). If we accept this dynamic interpretation of heterogeneity, we may also find the application of the kinetic theory of gases to individuals in society entirely plausible, as it is grounded on the epistemological strength of statistical equilibrium.

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## **PART II: Commercial crises**

### **Economic crises in nineteenth century Italy: a cultural analysis**

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This essay analyses how economic crises were defined and perceived in Italian speaking countries in the nineteenth century. Data are taken not only from the writings of economists and intellectuals but also in high and popular literature of the time. The methodology of the enquiry is qualitative, in the analysis of texts, and quantitative, in highlighting, when possible, the diffusion of certain words, metaphors and significances. The study follows the emergence in the Italian culture of the idea of crises as economic occurrences that cannot be individually controlled. The perception of economic determinism was completely alien to Italian writers and intellectuals at the beginning of the nineteenth century and would only slowly emerge and spread in its last decades. Initially the relative backwardness of Italy's economy and the almost complete absence of an industrialization process restricted the diffused perception of economic crises to food shortage and famine. The recurrence of such disasters stimulated the economic debate on free trade, particularly at the eve of 1848. The discussion on industrialism, instead, and the effects of the introduction of mechanical innovations in the production process, was conducted on Italian periodicals only in reference to England. The image associated by Italians with economic crises was a Mancunian hell of factories full of machines and destitute laborers living in unhuman conditions. The opposite depiction of the Italian countryside become another recurring theme in the writings of the time. After Italy's unification in 1861, periodic financial crises called for a change in theorization and an adjourned debate on newspapers and academic journals. Speculations, crashes and frauds found so their way also in literary works. Throughout the century the most diffused metaphors to discuss crises were medical. Crises acquired their significance from the original medical definition and were depicted as plagues or expressions of economic pathology, mostly ailments that could be cured. In literary works crises called for more complex representations as shipwrecks or *krachs*. Starting in 1848, in fact, the diffusion of economic determinism in academic and generic literature, extremized metaphors toward cataclysmic pictures foreboding the end of capitalism.

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## **Clément Juglar's epistemic usage of metaphors**

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Clément Juglar extensively used metaphors in the theoretical parts of his writings on crises (almost none is to be found in the historical and descriptive sections). Some are used to characterize the main features of crises (their suddenness, short duration, violence, the propagation of their effects) and of the subsequent liquidation (their longer duration, the sufferance they bring). The most interesting ones, however, were essential in defining Juglar's epistemological approach to crises. Like some of his contemporaries (but contrary to the mainstream approach of his French liberal colleagues), Juglar came to the conclusion that crises are not accidents but are a consequence of the (ill-defined) 'excesses' of the prosperous phase (abuse of credit, overtrading, overspeculation). This is expressed by means of metaphors such as the 'predisposition' to disease, the necessity that the explosive charge has to be loaded before the explosion can take place, and the last drop causing an already full water basing to overflow. Juglar's emphasis is on causation rather than on the specific mechanism, with two interesting corollaries. The first is that he saw the credit mechanism as at once as necessary to prosperity and intrinsically unstable, so that after some point *any* disturbance can trigger the crisis. The second lies in his criticism of the mainstream understanding of crises as anomalies: since any disturbance can cause a crisis once the system is predisposed, the theories focusing on the disturbances mistook secondary causes for the true cause of crises.

Our paper first discusses Juglar's metaphors for crises; then it compares them with other metaphors used in the contemporary literature, both considering whether and how his own metaphors were used by other writers, and by comparing them with the metaphors evoked by other writers to stress similar points.

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## **Riders on the Storm: W. Stanley Jevons' "Statistical Atlas", Meteorological Metaphors and the Analysis of 'Commercial Fluctuations'**

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In the early 1860s, W. Stanley Jevons began a project to explain the great 'commercial storms' of 1793, 1815, 1826, 1839, 1847 and 1857. This was a highly detailed analysis, using statistics and graphs, which can be traced in the manuscript of his unpublished "Statistical Atlas", two large graphs published in 1862, a paper read to the British Association for the Advancement of Science in the same year, *A Serious Fall in the Value of Gold* (1863), papers read to the London Statistical Society in the mid-1860s and unpublished archive materials. The core of his approach was to argue that wheat/corn prices provided the trigger for the storms, by altering the amount of available capital. A fall in wheat prices was followed by changes in interest rates and credit availability which set off a speculative 'mania' which eventually reached its limit in the availability of capital. A rise in wheat prices then triggered the downturn. The analysis was carried out with a detailed statistical investigation, including graphing, of the markets for money and credit, investment, prices and quantities of numerous commodities, wages and pauperism. Based on that information, Jevons also drew stylised diagrams of a decennial business cycle, consistent with his description of the large commercial fluctuations.

Jevons initially attempted to graph various fluctuation indicators against statistics for rainfall, temperature and atmospheric pressure. The principal difficulty with the analysis, however, was that he could not establish the requisite periodicity for wheat prices and the storms. It was that problem that initially led him, in 1875, to rework the argument in terms of sunspots. Although the latter analysis will not be considered here, it was the result of Jevons' initial difficulties with periodicity.

The explanation for the key role played by meteorological indicators in the story is, in part, that it reflected Jevons' close interest and work in meteorology, as shown by his publications in the 1860s. These had begun in Australia where the search for the

periodicity of droughts and floods was evident. Publications following his return to London showed, for example, a detailed knowledge of measuring instruments for rain and barometric pressure, as well as a close interest in analyses of ‘the law of storms’. If Jevons’ graphs, recording of statistics and conceptualisation of periodicity were in part based on those in meteorology, a more general context was that Jevons’ approach mirrored the search for accurate weather forecasting by Robert Fitzroy at the Meteorological Department of the Board of Trade that began in 1861. Analogous to Fitzroy, Jevons argued he had identified statistical indicators of forthcoming crises.

It has sometimes been suggested that Jevons was initially not interested in analysing the great storms or that much of his analysis of business cycles was derived from the work of the Manchester banker, John Mills. Ironically the latter claim was made by Mills himself after Jevons’ death in a controversy which briefly exercised the Manchester Statistical Society. An examination of that little-known episode and the later commentary shows that Jevons owed very little to Mills in formulating his analysis.

One final aspect of the paper will be to show that Jevons’s treatment of business fluctuations and his marginalist explanation of value and distribution projects were initially meant to be part of one general project, where the link was the common conceptualisation of capital and different types of investment.

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## **From “Explosion”-Metaphor to “Double Crisis”-Concept: Karl Marx as Journalist and Theorist on Economic Crises.**

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The aim of this paper is to present some research results firstly on the characteristics of Marx’s usage of metaphors in reporting economic crises by comparison with his contemporary fellow journalists, and secondly on his theorizing process to generalize own observations and intuitions on ongoing business cycles. The paper is based on the research the author conducted in the process of editing the *Marx-Engels-Gesamtausgabe*, Part IV Volume14 (MEGA IV/14, 2017, De Gruyter), which contains Karl Marx’s never-before published notebooks, the so-called *Books of Crisis*.

The 1857 crisis was the one Marx investigated most intensively in his life time, i.e. he reported as an economic journalist (namely for the newspaper *New York Daily Tribune*, *NYDT*) in real time the whole business cycle of ten years beginning in 1848 and ending

with the crisis in 1857 (which continued until early 1858). For collecting and systematically organizing a voluminous amount of economic data, Marx for his part consulted all major economic journalism available at the time in London (and Manchester, where Engels lived) such as *The Economist*, *The Times*, *The Morning Star*, *The Standard*, *The Manchester Guardian* and so on. The data cover France, United Kingdom, Germany and more than ten countries from the West and the East, with regard to money markets, commodity markets, labour markets and other topics. The notebooks, called so far as *Books of Crisis*, comprehend a total of 191 manuscript pages and more than 1500 units of excerpts from 12 newspapers and magazines in the period spanning from November 1857 to February 1858. Based on the data and reports from these *Books of Crisis*, Marx published his own commentaries on the ongoing crisis in seven articles of *NYDT* in the same period. After carefully comparing reports by Marx and his contemporary journalists, one cannot overlook some remarkable differences, one of which was obviously the usage of metaphors (besides Marx's typical emphasis on the production instead of commerce and credit as the ultimate cause of crises). Marx expressed the occurrence of an economic crisis, besides as earthquake, storm and epidemic, frequently as "explosion" in such a sense as e.g. "the explosion of the long-prepared general crisis" caused by "the spark into the overloaded mine of the present industrial system" (MEGA I/12, 151). The "explosion" was sometimes also replaced with "eruption". This usage can be seen as characteristic of him because no single example can be found in more than 1500 articles from the major contemporary newspapers Marx used to refer to in the *Books of Crisis*. Marx's dual connotation such as "spark" and "long-prepared", "overloaded mine" in the "explosion"-metaphor contrasts as well with the famous stove-metaphor by Aftalion, where "fire" can be regarded as a continuously increasing function of "fuel" (though with time lag obviously), as with such bare accidentalness as e.g. the "financial thunderclap which suddenly burst" in *The Times*, December 9, 1857, excerpted by Marx in the *Books of Crisis* (MEGA IV/14, 28).

While in empirically investigating the 1848-57 business cycle Marx acquired an intuition on phenomena and causes of the crisis as was expressed by means of metaphors of "explosion", he tried to theorize his (at first sight quite naïve) intuition in terms of "double crisis", and he was to continue elaborating on this concept until his late years through the *Grundrisse* of 1857-58 to the *Capital* manuscripts of 1870s. Marx understood the "double crisis" to mean a simultaneous occurrence of *over-production* on the industrial market and *under-production* on the produce market. The extraordinary expansion of production in industry namely tends to cause not only excess supply (over-production) of industrial products but also excess demand (under-production) for raw materials, which causes the price of products to decline, and the price of raw materials to rise. Declining prices and increasing costs put pressure on

industrial profit margins. Analyzing at a more abstract level, Marx considered the disproportion between fixed and circulating capital to cause the double crisis. A disproportionately large part of capital tends to be invested to produce for the needs of fixed capital (e.g. machines, factories, railways, ships, etc.), leaving an insufficient amount of capital for the needs of circulating capital (e.g. raw materials, wage goods, etc.).

In the notebooks VI and VII of *Grundrisse*, which were written soon after he finished the *Books of Crisis*, Marx started scrutinizing the problems of the above disproportion in terms of peculiarities of fixed capital, especially the "transformation of circulating capital into fixed capital" and "continuity of production" based on the distinction between construction and utilization periods. By representing this very idea, Marx was to be affiliated to a stream of crisis theories that stress the importance of fixed capital, originated in Ricardo on machinery and reaching from Wilson through Aftalion up to Hicks.

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## **Ontological commitment and the empirical analysis of commercial cycles and crises in the work of Jevons and Marshall**

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My contribution to the conference “the usage of metaphors in the theorization of crises, cycles and equilibrium” speaks to one of its themes of attention, the possibility of characterizing the development of the historical usage of the families of metaphors (e.g., medical, weather, mechanical, etc.) used. I approach this theme by contrasting the two generic approaches of Jevons and Marshall in economics to the study of commercial cycles and crises. It is well-known that there is a substantial difference between Jevons and Marshall in their adherence to what is commonly considered a mechanical and organic worldview. While Jevons used his logical piano in his most accomplished work, *The Principles of Science* (1874), to defend a mechanical world view in the social and physical sciences, Marshall embraced biology as the new “Mecca” of the science of economics. Instead of looking at the implied use of metaphors in Jevons and Marshall’s theorizing, I look at its meaning for their empirical analysis of commercial cycles and crises. While Jevons was searching for mathematical laws governing the data, Marshall increasingly moved from an analysis of commercial



cycles as such to efforts to put the complex interplay of economic events with social and political events in context. As a result, Marshall substituted his earlier enthusiasm for the “method of curves” as witnessed from his contribution to the Jubilee issue of the London Statistical Society of 1885 (and as practiced with his students on his so-called *Red Book*), for diagrammatic displays that focused on economic crises instead of cycles. My hypothesis is that this shift also explains Marshall’s move back to a verbal instead of diagrammatic form of theorizing in his later work. Jevons and Marshall’s adherence to different metaphorical spaces thus conceals different ontological commitments which played out in their empirical analysis of cycles and crises.

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## **PART III: Cycles**

### **When money makes the difference: The nature of monetary disturbances in Austrian and Swedish business cycle theories**

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This paper investigates the role of metaphors in the business cycle theories of the Austrian school and the Stockholm school of economics. It is well known that in the interwar period the business cycle theories of these schools operated within the same framework, but reached very different conclusions (Laidler 1999). Common elements consisted of a method which Ebeling (1997) typified as sequence or period analysis, to indicate that changes over time play an important role in both theories. Metaphors abound in the work of the proponents of what some call monetary theories of the business cycle. A nice illustration is Wicksell (1898) who uses the simile of a spring (“Spiralfeder”) to explain the changes in the equilibrium dynamics of a barter economy when money is introduced as a medium of exchange. In a barter system the spring is “short and strong” but its equilibrium pull weakens when money starts to play a role. According to Wicksell money would elongate the “spring” between supply and demand. Every child knows what happens when you elongate a spring beyond its natural elasticity : it loses force.

However, even a weak and elongated spring will retain some residual elasticity. It is therefore surprising to find that in another place Wicksell (1935) uses the metaphor of “a ball or cylinder on a plane” to describe the deviations from monetary equilibrium in a credit economy. The ball or cylinder resides in an “indifferent” equilibrium. It continues to move until something external force will stop it, a process which symbolizes the cumulative process of inflation, a key feature of Wicksell’s monetary theory.

Authors of the Austrian schools adopted metaphors of their own making to describe what they consider key aspects of the dynamic adjustment process. Böhm-Bawerk (1921) described the economy’s capital structure as an enormous “Pumpwerk” to indicate that value is imputed through all stages of production and so allocates scarce

resources over alternative uses, which in this case may be uses at different times in the production process. Extending the analysis of Böhm-Bawerk, Hayek (1931) used triangles to explain why the introduction of money alters this dynamic adjustment process.

Metaphors may express what Schumpeter (1949) has called a scientist's 'vision' on the nature of the field that he studies. As such they must have a strong relationship with the perception of the operation of the economy. Whether it is ruled by equilibrium mechanisms, possesses stable properties when disturbed or, on the other contrary, behaves in a chaotic and fundamentally unpredictable manner (recall Shackle's (1972) metaphor of the "kaleidoscope").

This paper aims to shed light on the relationship between the contributions of the Austrian school and Stockholm school of economics to business cycle theory by addressing the metaphors adopted by their proponents. These metaphors may explain why they believe that money matters in the explanation of business cycle fluctuations and what forces drive the spectacle of the dynamic fluctuations that unfold.

Keywords: Austrian economics, Stockholm school of economics, business cycle, money, economic dynamics

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## **The constitutive metaphors in business cycle analysis: from Frisch to RBC, how economics failed to understand crises**

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My purpose is to check the language construction of the founding metaphors in bc analysis and check how they operate in current RBC models.

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## **Organic, Medical and Physical Metaphors in Germán Bernácer's Theory of Business Cycles (1916-1936)**

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The analysis of the economic crises was not, indeed, a common topic in the Spanish literature of the 19th century. Few economists paid particular attention to this phenomenon as they focused on the Spanish economic backwardness and the reforms to overcome it. When they did it, like Alvaro Flórez Estrada in the early 19th century, they referred to foreign countries experiences of economic turmoil. Even at the end of the century when the phenomenon of economic crises became more apparent, the Spanish economists merely focused on the social consequences of industrialization as pauperism and the reforms to face them up, but they did not prove to be interested in the causes and mechanics of the economic crises.

During the early 20th century the absence of theoretical analysis of the economic crisis continued in the community of academic economists who were brought up in the faculties of law. However, a group of economists who, in high contrast with the mainstream of economics in Spain, had a mathematical, statistical or natural sciences background, began to be interested in economic crisis. This is the case of the heterodox economist Germán Bernácer who developed during the early 20th century an original theory of business cycles, which according to some scholars may have influenced in the time-lag theories of business cycles developed by the Cambridge economists Dennis Robertson and Maynard Keynes. Bernácer, who taught physics and chemistry in the

peripheral town of Alicante (Spain), far from the academic circles of economists, developed his theory of economic fluctuations in a monograph and in a series of articles which were mottled with metaphors coming from his natural sciences background. Bernácer used these metaphors for clarifying to an educated but not specialized audience the mechanics, causes and the shape of economic crises.

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## **The monster entrepreneurs have created: Faustian metaphor in Werner Sombart's business cycle theory**

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This paper explores the metaphor of the monster (*Ungeheuer*) and the role of the entrepreneur (*Unternehmer*) in Werner Sombart's business cycle theory. Both the monster and the entrepreneur were known "entities" in German economic thought of the 19<sup>th</sup> century. The combination of the two, so I argue in this paper, was only established by Werner Sombart in his magnum opus *Der moderne Kapitalismus* (1902-1927).

The origin of Sombart's monster metaphor can be traced back to Johann Wolfgang von Goethe's tragic play *Faust* and encompasses the idea that "in the end we are dependent on the creatures we have created" (Goethe, 1977 [1803, 1832], p. 204). Adapting this notion to the capitalist economy, Sombart claimed that "through a complicated psychological process the valorization of capital becomes [...] a power that forcefully imposes itself on [the entrepreneur]" (Sombart, 1902, pp. 196-197). The capitalist enterprise acts as a mediator between the individual entrepreneur and the monster. As the enterprise outlasts the lifespan of the individual, the monster transcends human life and is elevated to "an independent economic organism beyond the individual operating human beings" (Sombart, 1927a, pp. 35-36). Business cycles are thus "the breathing of the monster" and escape human control (Sombart, 1927b, p. 564). The entrepreneur is still the subject, but his choices are limited and depend on the monster. Similar notions about the business cycle were consolidated by Arthur Spiethoff and Joseph Schumpeter.

To support my argument of the novelty of Sombart's account, I will start by an overview of 19<sup>th</sup> century German crisis theory. On basis of the corpus summarized in Eugen von Bergmann's *Die Wirtschaftskrisen* (1895) and Norbert Pinkus's *Das Problem des Normalen in der Nationalökonomie* (1906), I aim to show that the entrepreneur did not occupy a crucial position in crisis theory. Individual agency was difficult to reconcile with the methodological holism widespread among the economists of the German Historical school. Similarly, the monster metaphor was only rarely evoked as the discourse was dominated by medical metaphors such as the disease of the body politic (see Besomi 2011).

The monster metaphor appears for the first time in Marx's *Das Kapital* (1867). Marx explains, while also quoting from *Faust*, that "by turning money into commodities [...], the capitalist converts value [...] into value which can perform its own valorization, an animated monster which starts to 'work' as if it had love in its body" (Marx, 1867, p. 161) However, as Blaug (2000) pointed out, Marx tended to ignore the entrepreneur's role in the capitalist organization.

It was the younger German Historical school that started to be concerned with human agency in the economy and, as a consequence, with the entrepreneur. The first occurrence of an entrepreneur as an agent in the business cycle, I encountered in Albert Schäffle's *Absatzverhältnisse* (1867, p. 47) as the "lucky combining entrepreneur who, by excellent calculations of the cycle [...], derives his above-average profit". But the idea that the entrepreneurs' actions influence the whole economic process did not take up much space.

Sombart's business cycle theory can thus be understood as a synthesis of Marx and the German Historical School—a synthesis that succeeded by resorting to a *topos* of Goethe's *Faust*. Existing literature rarely noticed the monster metaphor and Goethe's influence on Sombart. Helander (1923) pointed to the Faustian characteristics of German economic thought. Reinert and Reinert (2006) brought the influence of Goethe and Nietzsche on Sombart to the fore. Ebner (2005) highlighted the role of the individual entrepreneur as the driving force in Sombart's thought. To complement, I aim to emphasize the subordination of the entrepreneur to the sublime economic monster whose breathing decides upon the pace of the cycle.

Keywords: Sombart, Goethe, Faust, monster, metaphor, business cycle, entrepreneur

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## **PART IV: Planning & disequilibrium management**

### **Chemical metaphors in the restauration process modelling by Vladimir Bazarov.**

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This paper investigates the methodological peculiarities of the economic modelling conducted by Vladimir Bazarov, “one of the intellectual lights of the Bolshevik movement” and “the leading economist of Gosplan”, according to Alexander Erlich. He advocated wide implementation of mathematical methods in economics and the application of already established laws of physics and chemistry to the theorization of some social phenomena.

Bazarov’s main theoretical task was to find the equation, describing the restauration process of the Soviet economy in 1920-1930, in order to provide the lacking theoretical foundations for the social planning. Stating the objective more generally, Bazarov was interested in modelling of the expansion stage of business cycle that was observed in the USSR in the 1920s. The result of his great theoretical work was his book “Capitalist cycles and the restoration process of the USSR economy”, published in 1927. The preface to this book stated that it was an attempt “to study social dynamics by the means of constructive models built in the image of the models in natural sciences”. It is exactly Bazarov’s methodology of metaphorical reasoning that is the focus of this paper.

First, we examine Bazarov’s attempt to build the model of social production cyclical dynamics, based mainly on the analogy with the second law of thermodynamics and Marxist ideas of labor. This could help him with achieving the “highest goal of the cognitive work of mankind”, which was the “monistic universal science”. At the same time, building a universal model of social production cycle was necessary in order to build theory-based efficient plan for the Soviet economy. In Bazarov’s opinion, using the methods of physics and mechanics in social dynamics analysis was absolutely justified since the social production mechanisms could be reduced to labor relations. Labor relations, in turn, are nothing more than interaction of physical bodies of workers in an organized production space of a factory (or any other location where social production takes place). That Bazarov’s attempt of building the complete socio-



economic theory in the image of thermodynamics failed due to a measurement issue. Nevertheless, he did not abandon the idea of borrowing modelling logic from physics. Bazarov claimed that even though building a general theory of social thermodynamics was extremely complicated, using analogies with natural world in modelling some particular cases of economic activity could be a success.

One of this “certain special processes” was the restauration of the Soviet economy, destroyed by international and civil wars. The modelling of the process and calculating its pace was necessary to accomplish Gosplan’s main goal of that time: plan the rehabilitation of the economy. Bazarov was using the analogical approach to describe the market saturation, corresponding to the expansion stage of the cycle, as the reaction caused by adding a significant amount of hydrochloric acid to the solution of sodium bicarbonate. The following table describes how the analogy was drawn.

<b>Chemical process</b>	<b>Economic analogy</b>
The product, obtained after the interaction of the hydrochloric acid and the sodium bicarbonate, carbon dioxide, goes away to the atmosphere.	When a good is available for human consumption it disappears from the market.
The reaction goes all the way to the end, i.e. to the transformation of all the molecules of the sodium bicarbonate into the molecules of the sodium chloride.	The sale of a good goes all the way to the full demand saturation, i.e. until all the consumers who need a good and are able to buy it, actually get it.
More generally: the transformation of the sodium bicarbonate into the sodium chloride.	More generally: the sale of a unit of a certain good in the market.
A molecule of the sodium bicarbonate meets a molecule of the sodium chloride.	A buyer who needs a good actually finds it in the market.

Taking this model as a basis, Bazarov derived another model, describing a similar, but more realistic case. It was supposed that when the static equilibrium of the depression phase was disturbed due to conquering a new market or technical improvements of internal production, there had not been any established demand yet, so the new goods (which are less costly to

produce, and thus, cheaper) were firstly appearing in small quantities. The new goods were competing for consumers' demand with already existing goods. According to Bazarov, in the very beginning when the potential demand significantly exceeds the supply, sales will increase in proportion to the quantity that has already been sold. As the demand gradually tends to saturation, and the number of potential consumers buying outdated products decreases, the process slows down, asymptotically converging to a new level. Also for this process Bazarov has found an analogy with chemistry, more precisely, with autocatalytic reactions. Those are chemical processes whereby each molecule stimulates the creation of the new molecules of the same structure. In this case, the speed of the process is, on the one hand, proportional to new molecules formed as a result of the reaction, and on the other hand, as well as in the first case, is proportional to the number of the molecules which have not reacted yet.

Thanks to the existing in chemistry formulas of the above described reactions, Bazarov derived the equation of the restauration process, which he found to be structurally identical to certain chemical reactions. He admitted that his models do not have the best prediction power, and the equations, provided in his book, were only an approximation. However, he said, "even these rough schemes can provide some help in the sense of properly orienting planning perspectives".

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## **Mendelian and racial analogies in the early 20th century: economic debates over immigration in the United States**

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When, in 1887, the young American Economic Association launched a competition on the theme of "the devil effects of non-restricting immigration", the question had already been a subject of many intense disputes since the middle of the nineteenth century among American economists.

Between 1882 and 1924, a next violent and harsh debate on immigration as a factor of economic and social disequilibrium took place in the American society: Progressive economists were the most active social scientists to discuss the evils of the *Golden Door*, borrowing numerous analogies to Mendelian theories, « scientific racism » and eugenics advocacies as a basis for their plea in favor of restrictionnism as the only mean to recover

some form of equilibrium within the American society.

After a brief presentation of the general debate on immigration, this paper aims at surveying some of the major biological analogies used by progressive economists on this issue of immigration as a major source of economic, demographic and social disequilibrium.