

Governing Economic Life: W. S. Jevons and the Birth of Liberal Biopolitics in Victorian England

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ABSTRACT: The article proposes a novel way to analyze and link pioneer marginalist W. S. Jevons logic, theoretical and applied economics within a single framework. Using the foucauldian concepts of biopolitics and government, it is shown that Jevons's contributions in logic, economic theory and practical economic issues can be regarded, broadly speaking, as possible "parts" of liberal biopolitical apparatuses. With this new interpretation, it is possible to find coherence between Jevons's different contributions without necessarily privileging his pure theory. The possible inconsistencies between Jevons's pure and applied economics can also be tentatively justified by their being different "parts" of biopolitical apparatuses.

Keywords: W. S. Jevons; biopolitics; government; economic liberalism

JEL Classification: A12, A13, B13, B31

RESUMO: O artigo propõe um novo modo de analisar e ligar as contribuições à lógica, economia teórica e economia aplicada do pioneiro da análise marginalista, W. S. Jevons em um único quadro. Usando os conceitos foucaultianos de biopolítica e governo, mostra-se que as contribuições de Jevons em lógica, teoria econômica e economia aplicada podem ser consideradas, falando de modo geral, como possíveis "partes" de dispositivos biopolíticos. Com essa nova interpretação, é possível encontrar coerência entre as diferentes contribuições de Jevons sem necessariamente privilegiar sua teoria pura. As possíveis inconsistências entre a economia pura e aplicada de Jevons também pode ser tentativamente justificada pelo fato de elas serem "partes" distintas de dispositivos biopolíticos.

Palavras-chave: W. S. Jevons; biopolítica; governo; liberalismo econômico.

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1. Introduction

For historians of economics, W. S. Jevons is usually known as a pioneer of the marginalist movement and as an applied economist who dealt with issues as wide-ranging as the relation between capital and labor, the fall in the price of gold and the limits of growth due to the scarcity of coal as a source of energy. However, W. S. Jevons (henceforth Jevons) was also “one of the great Victorian polymaths” (Mosselmans and White, 2006), having given important contributions on scientific methodology and logic. Recent historians of economics (e.g., Mosselmans (2013), Peart (1996) and Schabas (1990)) have mainly focused on Jevons’s theoretical economics and logic, leaving less space to study his applied works and the ethics which underlie them. Jevons’s empirical work can be seen as derived from the methodology he proposed in his *Principles of Science* (1874), as Peart (1996: ch. 9) demonstrates, whereas his ethics would have roots in his Unitarian family background (Mosselmans, 2013: ch. 6).

However, the threads that might bind Jevons’s theoretical and empirical works, his logic and his ethics do not seem to meet anywhere in sight. Just as an example, his most important theoretical work, 1871’s *The Theory of Political Economy* (henceforth TPE), hardly mentions the importance of the state institutions for the working of the economy. However, in more applied work – say, his *Methods for Social Reform* (henceforth MSR, 1882) – state institutions are seen as central to implement reforms. How can one explain this apparent contradiction? It is possible to deal with it in a Marxist vein, insisting on the contradictions of a purely theoretical discourse which denies the presence of concrete social conflicts and state institutions only to bring them back when one deals with practical economic matters. Another way to deal with this contradiction is to appeal to the mathematical rigor of the theory: as the inclusion of variables like social conflicts and the state would make the theory formally intractable, it would be better to study only a simplified market economy populated with self-interested agents.¹

This article will try to present a novel and tentative way of finding a common thread that binds all of Jevons’s different lines of thought. *It will be suggested that the foucauldian-inspired concepts of biopolitics and liberal government might be useful in this regard:* these concepts can work as a framework within which it is possible to envisage the most important contributions of the English polymath within a coherent frame.

So, the *object* of this article comprises the analysis of some chapters of three central books in Jevons oeuvre: his economic theory book (TPE), his applied economics book (MSR) and his *Principles of Science* (henceforth PS), his book on logic. Our *objective* is to link the subjects in these different books in a coherent way, by using the *methodological framework* given by the notions of biopolitics and government. The *novelty* of this article lies exactly in trying to use this methodological framework to understand Jevons’s work within a coherent perspective. It is expected as a *result* to show that the practical and theoretical strands of Jevons’s thought can be understood as useful tools for the possible application of liberal governmental techniques in the British population in the nineteenth century.

The article is divided in 5 sections (including this introduction and a conclusion). The *second section* tries to explain what government and biopolitics are: the notions of power, liberal type of government and of apparatus (*dispositif*, in French) are tackled. The *third section* focuses on Jevons’s logic and his theoretical

¹ This kind of separation between applied and theoretical work had already been suggested by classical British political economists, like Nassau Senior and J. S. Mill. But the link and scope between the practical and theoretical domains of economics remained under dispute during most of the nineteenth century, as the british and the german *methodenstreiten* made clear.

economics, showing how they can fit into governmental apparatuses. The *fourth section* deals with Jevons's applied work, showing that, despite being a different discourse, it can fit a liberal government apparatus. Finally, a *fifth section* concludes the paper.

2. What is biopolitics? What is government?

2.1 Defining biopolitics

Let's first start with the concept of biopolitics. The origin of this concept lies in Michel Foucault's lectures at the university of the state of Rio de Janeiro in 1974 and at the College de France, between 1974 and 1979². In these courses, Foucault developed the idea of a new form of political power which could be applied to influence – and sometimes, even manipulate -- certain biological characteristics belonging to a given ensemble of heterogeneous human individuals. Among these characteristics, one could find, for example, birth and mortality rates, life expectancy, susceptibility to diseases and risks associated with certain walks of life. Roughly, one could say, then, that biopolitics is related to a political practice which has as object given biological characteristics of a population in a certain territory.

As a basic, even didactic definition, this might be sufficient. However, it does no justice to the complexity and range of the subject in Foucault's lectures. A first reason for this complexity lies in the fact that Foucault's lectures were never prepared for publication. They were more of a "work in progress" that never fully materialized in a book centered exclusively on biopolitics (even though the first volume of his *History of Sexuality* was strongly linked to biopolitical practices regarding the conduct of human sexuality). A second reason is that it might be argued that there is an important inflexion in Foucault's use of the notion of biopolitics between 1976 and 1978/1979 (see Collier, 2009). According to this interpretation, Foucault's initial treatment of biopolitics as a form power emphasized its "systematicity, functional coherence and totalizing reach" over society, as Collier (2009: 79) clarifies. However, in 1979, Foucault would change his vocabulary so as to underline the functioning of biopolitical power as comprising a heterogeneous assemblage of contingent techniques, institutions, scientific disciplines, moral-philosophical discourses, people etc. These elements are linked in a specific way and aim at solving a specific problem. This is roughly the definition Foucault himself gives of the *apparatus*.³

In defining biopolitics, the approach adopted by this paper will be conservative. That is, we will not veer away from Foucault's basic definitions presented in the aforementioned courses. The proliferation of new uses⁴ for the notion of will not concern us here. To be more precise, we will adopt the view of

² In fact, Lemke (2011: 165) draws attention to the fact that the word "biopolitics" has more than 100 years of use, being first employed in organicist conceptions of the state in the 1920's in Germany and as a research field in American political science in the 1960's. However, the current usage of the term is firmly linked with the development of the work of Foucault.

³ Quoting Foucault: "What I'm trying to pick out with this term [apparatus] is, firstly, a thoroughly heterogenous ensemble consisting of discourses, institutions, architectural forms, regulatory decisions, laws, administrative measures, scientific statements, philosophical, moral and philanthropic propositions—in short, the said as much as the unsaid. (...). Secondly, what I am trying to identify in this apparatus is precisely the nature of the connection that can exist between these heterogenous elements. Thus, a particular discourse can figure at one time as the programme of an institution, and at another it can function as a means of justifying or masking a practice which itself remains silent, or as a secondary re-interpretation of this practice, opening out for it a new field of rationality. Thirdly, I understand by the term "apparatus" a sort of—shall we say—formation which has as its major function at a given historical moment that of responding to an *urgent need*. The apparatus thus has a dominant strategic function". (...). (Foucault, 1980 [1977]).

⁴ In the last decade, a number of Italian political philosophers developed Foucault's ideas regarding biopolitics in different directions. Also in the USA the concept has been widely utilized in the social sciences. For more information, see Negri (with Michael Hardt) (2000), Agamben (2002) and Esposito (2008). On the American side, we can cite Rose (2007) and Rajan (2006).

biopolitics presented in the 1978 (“*Security, Territory, Population*”) and 1979 (“*The Birth of Biopolitics*”) courses by Foucault. The reason for this choice is twofold: first, these two courses deal exactly with the history of the *liberal and neoliberal* biopolitical government. As will be shown in sections 3 and 4, Jevons’s contributions in logic, theoretical and applied economics can be understood as applicable to this specific form of government.

The second reason is that the different branches of Jevons’s researches – logic, theoretical and applied economics – can also be better interpreted as different discursive “parts” of a heterogeneous assemblage which can be termed “biopolitical government”. In this interpretation, one is *not* looking primarily for a way to make Jevons’s applied economics compatible with the general framework of his theoretical economics. Of course, one does not want to say that this type of internal research is useless or misleading. On the contrary, this kind of research might be useful to show how and if, from a logical point of view, Jevons’s practical and theoretical economics can be matched. Our investigation, however, tries to look at the problem of compatibility from a different angle: we are interested in how these different discourses might function within a wider assemblage of practices – in our case, the apparatus of biopolitical government practices.

Since we have already given a rough idea of what biopolitics is, it is important to define with more precision which areas Foucault’s investigations encompassed in the period between 1974-1979 and how they might apply to what Jevons produced.

In this regard, the book by Fahri Neto (2010) can be valuable for our purposes. First, because he aims at a conservative and descriptive reading of Foucault’s formulations of biopolitics. And second, because he adds a chapter which deals specifically with the role of political economy in a biopolitical government.

So, how many formulations of biopolitics are there in Foucault? Fahri Neto identifies five of them: politics in relation to medicine, to war, to sexuality, to security and to the economy. In each one of them, there are apparatuses which must deal with specific problems regarding the biological life of an ensemble of individuals in a territory⁵: **medicine**, when seen from a political perspective, addresses the problem of the *care* of human bodies, so that they remain healthy and free of diseases. **War** can also be seen as political when it is carried out *to destroy* the life of enemy populations and *protect* our own population and territory.⁶ **Sexuality**, from a political perspective, deals with the problem of the *reproduction* of life: life it should be preferably reproduced and sex practiced within certain privileged institutional settings (e.g., the nuclear family in modernity) and not others (e.g., extended families). Following Foucault’s argument, specialists like psychologists, psychiatrists and psychoanalysts are an integral part of the “sexuality apparatus”: they can help people conform to certain sexual practices considered normal. As for **security**, it *preserves* the life of the population from risk: everything that can be damaging to biological life – like accidents, terrorist attacks, robbery, murder, uncertainty regarding employment etc., must be somehow curbed by a series of political interventions. And lastly, there is the relation between the **economy** and biopolitics: the question here concerns the *maintenance* of life by means of an appropriate level of production, consumption and distribution of goods and services among a given population. Since Foucault traces the history of liberalism and neoliberalism in his 1978 e 1979 courses, what is most interesting here for us is to understand how a liberal economy operates -- how it deals with production, consumption and distribution of goods and services in a population.⁷

⁵ Here it is important to notice Agamben’s (2002) differentiation between *zoé* (which identifies life as the purely biological functioning of bodies) and *bios* (life in its social aspect – as a specific way of living of different human groups). According to Agamben, what is characteristic of western mode of government is the appropriation of *zoé* as *bios*, that is, of the purely functioning of biological bodies as an object of government of human groups inside a territory.

⁶ Foucault has in mind here the Nazi and Stalinist experiences: both the external enemies of a nation and the members of the population who threaten its integrity must be fought. See Foucault (1997 [1976]).

⁷ According to Foucault, “only when we know what is this governmental regime called liberalism was, will we able to grasp what biopolitics is” (2008 [1979]: 22)

There are also relations among these five apparatuses. One can see that the apparatuses of sexuality, medicine and security have “parts” that must work together. For example, the calculus of risk in the transmission of a given venereal disease involves knowledge and institutions present in the apparatuses of medicine, sexuality and security. The same happens with the calculus of probabilities of insurance companies, or with the programs to protect the poor in case of unemployment: both deploy “parts” of the economic and security apparatuses, like knowledge about probabilities and institutions which calculate the risk of different activities or professions. As we will show in the next sections, Jevons’s work can function as parts of the apparatuses of security and economy, but, perhaps surprisingly, also touches on issues regarding medicine and sexuality.

2.2 Defining Government

What about the definition of government? It is again in the 1978 and 1979 courses that Foucault tries to explain what government is. However, before we enter into the definition of government, it is necessary to see how Foucault understands *power*.

For Foucault, power can be conceptualized as a dynamic relation between forces: power acts upon actions, not primarily upon individuals.⁸ Power also partly constitutes the very identity of the persons and institutions through which it is exercised – for example, it is exercising power at a place named “school” that “teacher” and “student” gain their institutional identity. In other words, power is pervasive to the social fabric, and is not a privilege of institutions like state apparatuses. Quite the contrary: if state apparatuses have power it is because they have, as a foundation, the flows of force that run between different people and the things they handle. Foucault’s work on discipline in books like “*Discipline and Punish*” (1975) is an example of how power is exercised: institutions like the prison and the school need to arrange the space in a certain way, so as to make human bodies act systematically within a given period of time. In this sense, Jeremy Bentham’s panopticon⁹ exemplifies a way in which the forces present in human bodies – in their arms and legs, but also their minds -- are coordinated by means of a central control that organizes their movements, the space where they act and apportions an amount of time for each of their actions. Although one might be tempted to say that power is located in the panopticon’s central tower, the real source of power lies in the forces that flow between and inside people in a population. The central control mainly organizes and coordinates these flows of forces.

It is within the question of organizing and coordinating these flows of forces between people that the subject of government is raised. Foucault defines government somewhat cryptically as the “conduct of conduct”.¹⁰ It is possible to interpret this definition as the problem of conducting one’s own and others’ actions. That is, it is a problem of how to coordinate and organize the forces that traverse different human bodies and make them act in a certain way to achieve certain ends.

It is important to emphasize that this “conduct of conduct” refers *both to oneself and to others*: that is, it is necessary for a person both to have a specific subjectivity and to be considered as an object on which forces can be applied. In other words, the relation of forces that characterize power must be applied to the individual *both as subject and object*. In this sense, a student is not only an individual who performs certain coordinated and organized actions in an institutional setting named school: s/he is also a subject that must

⁸ The source for this analysis of power in Foucault can be found in Foucault (1983: 219-20) and also in Kusch (1991: 127-56).

⁹ The panopticon is a sort of building which has a central tower where a watchman can observe the behavior of all people who act inside the walls of the building. This idea was first used by Jeremy Bentham in a 1787 book.

¹⁰ Foucault (1983: 220-1) says: “Perhaps the equivocal nature of the term conduct is one of the best aids for coming to terms with the specificity of power relations. For to “conduct” is at the same time to “lead” others (according to mechanisms of coercion which are, to varying degrees, strict) and a way of behaving within a more or less open field of possibilities. The exercise of power consists in guiding the possibility of conduct and putting in order the possible outcome. Basically power is less a confrontation between two adversaries or the linking of one to the other than a question of government.” Dean (2010: 267) suggests defining government as “the conduct of conduct”.

incorporate certain values, a certain sensibility and certain worldview to properly act at school.¹¹ Following Foucault's account, disciplinary institutions like the school, the army, the hospital and the prison¹² all try to control these flows of forces by dividing space and time, so that people act according to these divisions (for example, at 7 a.m. one sings the national anthem at the entrance hall at school; at 7.30 a.m., one goes to the classroom; at 8 a.m. there is a five-minute break at the yard and so on).

Whereas discipline may be an efficient way of conducting the conduct of people – that is, of governing them -- in what we may call “micro” institutional settings, one cannot explain with disciplines alone how a government can govern a whole country. In such “macro” institutional settings like a federal government, discipline must be complemented by a series of other institutions and applied social sciences which can deal with the problem of the *population as a whole*. After mid-eighteenth century, with the explosive growth of population in western European countries, the government of ever increasing masses of people became urgent. In the foucauldian framework we are adopting, this urgency will demand a special set of apparatuses to deal with problems associated with a growing population.¹³

One can put the problem the following way: besides disciplinary institutions – which give people different institutional identities and coordinate people's forces and actions in different ways – how it would be possible to find a *common ground* to govern a population composed of heterogeneous people and institutions? There does not seem to be an *a priori* guarantee that the coordinated and organized actions of people in different “micro”, disciplinary institutional settings can generate organized and coordinated actions at a “macro”, population level. Putting the problem in other words: what could priests, professors, students, mothers, robbers and politicians have in common so as to allow their conduct being conducted at the level of population? A foucauldian-inspired answer would say it is their *biological characteristics*. They all have something like a sexuality; they all have a health that can degenerate or be maintained; they are all susceptible to a series of risks in their work and family environment; and – central to the objective of this paper -- they all experience pleasures and pains which can guide their actions regarding production, consumption and distribution of goods and services.

One can say, then, that a *biopolitical government purports to organize the forces that flow through and inside the members of a population by using apparatuses which act on the biologically-based characteristics of humans* – like their sexuality, their health, their fear of damage and their economic interests. To govern people in a biopolitical key would involve making use of a series of discursive and non-discursive apparatuses – of medicine, security, sexuality and the economy -- that try to drive people's actions in the direction of the maintenance and flourishing of their biological lives.

Because the biological characteristics of people are different – we are dealing with a multitude of different people – the use of statistics and the notion of normalization must be parts of biopolitical apparatuses. The function of statistics is to organize the different characteristics of individuals in a population (e.g. weight, blood pressure etc.), in order to find what is normal (that is, more frequent in the population), and also to identify deviations from this norm. Whereas disciplinary institutions try to normalize the characteristics of individuals (e.g., doctors in hospitals trying to make people lose weight or control blood pressure), federal government statistics will show which groups of individuals are more distant from the

¹¹ Notice that this interpretation of Foucault's view regarding the relation between individuals and institutions finds some similarity with the transformational model of social action proposed by Tony Lawson (2003: 40 and ff.). In this sense, it is possible to interpret Foucault as proposing a type of realist analysis that may be useful to studying economic phenomena.

¹² According to Foucault (2009 [1978]: lesson 5), the background for many disciplinary institutions is in the “pastoral power” of the church in the middle ages. By trying to discipline the “souls” of believers by means of confession, the church made possible the future appearance of modern techniques of discipline applied in modern institutions, like the school, the prison, the hospital and the factory.

¹³ For example, problems like rising criminality, the spreading of new diseases among the population, sanitation, housing, transportation etc.

norm (over- or underweight people or people with hypertension). With the production of this statistical knowledge, it is possible for governmental institutions to act upon the actions of people who are at a certain distance from the norm. In other words, *with this statistical knowledge it is possible for the government to properly govern people*. Jevons's statistical works on social issues might function as a discursive part of a state institution which aims to act on people's actions as we will show in section 4.2.

This biopolitical form of conducting people's lives can be carried out by different institutions with different levels of interference in people's conduct. That is, the legal-judicial-institutional apparatuses of government can either directly interfere with people's behavior (e.g., by means of prohibitions or imprisonment) or to stimulate them to act a certain way (e.g., by imposing taxes on certain "undesirable" products, like cigarettes). The former case is related to direct intervention in people's lives and characterizes non-liberal forms of government. What is interesting for us, however, are *liberal types* of governmental intervention – that is, interventions that do not directly meddle with people's actions. This kind of indirect intervention tries to modify variables of people's natural or social environment so as to stimulate people to act according to the goals of government. The possibility of not complying with the stimulus of government opens the way to what we may term *freedom*. This point is important to see the extent to which Jevons proposals of political intervention can match the idea of a liberal government.¹⁴

Having finished our very brief sketch of how Foucault understands government and biopolitics, it is now time to turn to Jevons and how his work on logic and theoretical economics depicts humans. Jevons will describe humans as economic agents which have a principle of motion of biological origin. At the same time, human reasoning is seen in a mechanical way, so that it does not depend on any historical or cultural specificity. As a consequence, different economic agents could, in principle, be aggregated in a population whose behavior could be analyzed statistically.

3. Making reason universal and mechanical

3.1 The mechanization of thought in Jevons's "Principles of Science" (PS)

Contrary to the opinion of former 19th century logicians (like J. S. Mill and William Hamilton), Jevons defined formal logic as an objective science, like mechanics or mathematics (see Schabas 1990: 57-8). This will have important consequences for the way he understands human thinking: if former logicians understood logic and as branch of human psychology, now Jevons puts forth the proposition that the laws of logic would be as general and universal as mathematical principles.

Jevons's ideas about human thinking and logic are mainly found in his 1874 book "Principles of Science" (PS). With this book, Jevons tried to propose a new conception of what it means to correctly reason in order to find rigorous, scientific knowledge. Jevons started this work with his six "laws of thought". Their definition and their basic operations are represented below (see Schabas, 1990: 60; Jevons, 1958 [1874]: 35, 73-8):

1. Law of Identity: $A = A$
2. Law of Contradiction: $Aa = 0$ (zero)
3. Law of Duality: $A = AB \cdot | \cdot Ab$
4. Law of Commutativeness: $AB = BA$; if $A = B$, $B = A$; $A \cdot | \cdot B = B \cdot | \cdot A$
5. Distribution: $A (B \cdot | \cdot C) = AB \cdot | \cdot AC$

¹⁴ It must be noted that the concepts of liberal and non-liberal forms of government are akin to ideal types, in a weberian sense: what exists in the real world are different mixes between liberal and non-liberal practices. There are no concrete governments that allow complete freedom for individuals, as there are no concrete governments that completely control each action of people in a population: in practice, some governments deploy more liberal practices while others make more frequent use of non-liberal practices.

6. Transitivity: $A = B$ and $B = C$; therefore $A = C$.

A, B and C are what Jevons calls *terms*. According to Mosselmans (1998: 86), a term “is a name for a collection of objects and it may be interpreted in two ways. Interpreted as regards intension, a term is a group of qualities. Interpreted as regards extension, a term is a group of objects possessing those qualities” (see also PS: 24-30). A *proposition*, according to Jevons, “expresses the relation between two or more terms” (PS: 24). Lowercase letters (a, b, c) represent the negation of the term. The symbol \cdot represents the logical connective “or”, which, for Jevons, is taken to be the inclusive “or”. Controversially, Jevons takes the symbol “=” to denote identity, as Boole had done before him. He does so, because he thinks there is an analogy between mathematical equations and logical propositions. This is an important difference between Jevons and previous logicians like J. S. Mill and Herschel. We will come back to this difference at the end of this section.

When Jevons puts terms side by side, like in AB, or AC, or BC, he means that the first letter is a subset of the second letter. Following Schabas (1990: 60), let A = copper, and B = metal. We can say that $A = AB$, that is, “copper is a metal”. The symbol “0” (zero) means “nothing” or something that is logically impossible.¹⁵

With these explanations, we can use the symbols above to make inferences about sentences. For example, using the classical syllogism, we can use the symbols A, B and C to make a direct deduction:

A = Socrates
B = man
C = mortal creature

By saying that $A = AB$ (Socrates is a man) and $B = BC$ (man is a mortal creature), we can write $A = ABC$ (Socrates is a mortal creature).

The job here seems uncomplicated because we are dealing with propositions of only three terms. But Jevons soon came up with the idea that one could make series of combinations of many more distinct terms. For example, a series with two terms (say, A and B) could have four possible combinations (AB, Ab, aB and ab). A series with three terms (say, A, B and C) would give us eight possible combinations (ABC, ABc, AbC, Abc, aBC, aBc, abC and abc). Accordingly, a proposition with \underline{n} terms would give us 2^n possible combinations. Jevons named the set of all possible combinations of a sequence of \underline{n} terms the *Logical Alphabet*.

Once we have in front of us the logical alphabet, it would be interesting to know, beginning with certain premises, which of the possible logical combinations are consistent with the given premises. In order to carry out this task, Jevons conceives of two instruments: the Logical Abacus and the famous Logical Machine. What is the objective of those instruments? To make inferences like the ones exemplified above mechanically, saving our mental job. Their great advantage is that one could insert in them certain premises and, after pressing some keys, the machines would give us the combinations of letters which were logically consistent with the premises in question.

One can see in the operation of the Logical Abacus and the Logical Machine the germs of the conception of a machine which, by separating consistent from inconsistent logical combinations, could actually *think* – or, at least, to replace human process of reasoning. However, one might argue that there is a difference between carrying out a set of mechanical operations and the process of human thought. The whole point is to understand how human thought and mechanical calculation are becoming interrelated in Jevons’s time. As we will see, this will also have implications for Jevons’s conception of economic action.

¹⁵ Jevons also uses the symbol \sim to represent non-identity between terms (PS: 45), but he does not give much attention to it because non-identity can also be represented by an equation sign. For example $A \sim B$ can be written as $A = Ab$. See Schabas (1990: 61).

So, now that we have sketchily explained how Jevons's logic works, we must investigate how Jevons's discourse is embedded in a mechanistic conception of thought. In order to carry out this job, I will resort to papers and book by Maas (1999; 2005a, b) and also Cook (2005).

Maas (1999: 589) objective is "to show how Jevons's work on the Logical Abacus is embedded in an emerging discourse on mechanical rationality". Following the idea of mechanical rationality is the possibility to unify methodologically the natural sciences and economics, and also "to conceive of 'economic man' as similar to a machine, and to analyze his behavior with the same formalism".

The development of machines that could calculate must be seen as part of the effort to calculate tables necessary for the new occupations coming up with the English industrial revolution (like insurance and navigation companies). The development of these machines initiated a discussion about the "possibilities of representing the human mind by means of mechanics" (1999: 589-90). Going after the project of mechanizing physical work (that had been going for several decades in the first wave of the Industrial Revolution) there came also a project of mechanizing the mental work of people who had to calculate numerical tables. It is in this context that we must understand Charles Babbage's project of building a Difference Engine, in the 1820's. When properly programmed, this Difference Engine could count series of numbers. Nowadays this might seem trivial to us. But at the time, Maas reports on how people "fell in amazement" with the machine.

The discussion that appeared with the Difference Engine regarded the ability to explain all facts of nature – physical or psychic – as obeying mechanical laws. As Maas (1999: 593) explains: "What reason was there to suppose that the human mind functioned in a *different* way from the calculating machine? (...) consciousness could be the by-product of the invariable mechanical laws of nature." (Maas's italics).

The next step in the discussion came with George Boole's work on logic. Boole "suggested that logic was not merely an abstract, formal discipline, but described laws inherent in our mental constitution" (Maas, 1999: 596). Because association psychology still held sway of many important scholars in England, Boole's claim about the similarities between logic and the laws was not readily accepted – or else were accepted in a different version.¹⁶ Another possible reason for this is that this reticence can be found in the implication for the breaking down of the frontiers between "traditional mental categories" (like "laws of mind" and "associations of ideas"): following Boole and Babbage, all mental categories could be reduced to algebraic operations. This claim was controversial to the point of being criticized in other english universities, like Cambridge (see Cook 2005: 347).

The big difference, though – the "true revolution" in logic, according to de Morgan, came with the attempt to "quantify the predicate" (Maas, 1999: 598). What does this sentence mean? Well, in aristotelian logic, syllogisms were made out of a relation between genus and species. Thus, in the syllogism presented a few pages before, in which we deduce that the man Socrates is mortal, mortal beings is a class, and men are a subclass of mortal beings.

As Maas (1999: 598) elucidates, a proposition like "all humans are mortals" could be made identical to "some mortals are humans". Propositions like "all humans are some mortals" are also seen as valid. That is, propositions of syllogisms could be reversed, as Jevons suggested in his uses of symbols by the Law of Commutativeness: $AB = BA$, or $ABC = BCA = ACB$ etc. Here it is possible to understand the use of the symbol "=" to indicate identity: a *logical* proposition now could be expressed as an *algebraic* equation. Now, if logic deals with "thoughts and things, and immediately of the signs which stand for them" (PS: 9), and if these signs can be operated as an algebra, one can say that, according to this idea, *there is no specific quality in the workings of a mind that cannot be compared to the workings of a set of signs operated by a machine*. Jevons assures us that "signs, thoughts and exterior objects" are all "parallel and analogous". That is, "to treat any of the three series [signs, thoughts and exterior objects] is equivalent to treating either of the three series"

¹⁶ More on the attack of psychophysiology against association psychology can be found in Maas (2005: 629-32).

(PS: 9). There we have it: minds and machines can operate according to the same pattern, and this pattern involves the use of algebra, at least to some extent.¹⁷

Two consequences stem from this new approach to understanding the mental activities of humans: *the first* is that scientific language, according to Jevons, will assume a mathematical expression. Propositions of everyday language should be transmuted into symbols, so that their logical, mechanical operations could be analogous to human thought. Jevons himself does not think that the attempts to use quotidian language are proper in science (see his TPE: 29).

The second consequence of Jevons's approach to the human mind is that the behavior of economic man is not directly related anymore to the social milieu in which he acts. For a contemporary of Jevons (like J. S. Mill, for example), economic men had a dual nature: concrete, historical circumstances could interfere in the association of his ideas regarding the pursuit of wealth, strengthening or weakening the drive to accumulate riches.¹⁸ As we will see in the next subsection, the situation is different with Jevons. *The key difference is that J. S. Mill's social considerations regarding economic behavior were replaced by biophysiological laws.* If we follow Jevons, there are mainly two possibilities to study economic behavior scientifically: 1. to search into the biophysiological functioning of the human brain and body so as to find in there the basis for economic laws; and 2. To develop mathematical models of the economic behavior of humans.

What does the above analysis add to our objective in the paper – that is, to show that Jevons's logic can be linked to his theoretical and applied economics within a biopolitical framework? Jevons's operation in logic allows us to disregard differences in people's thinking concerning their social, cultural and psychological backgrounds. This means that *a heterogeneous group of people can be homogenized in a population* as regards their calculative capacities. As we pointed out at the end of subsection 2.2, not only can these calculative agents be *objects* of study for statistics, but they must also see themselves *subjectively* as calculative. If they do not see themselves in a calculative way, they may not act so and be considered outliers in statistical analysis: as a consequence, their non-calculative conduct may be the object of government. In this case, the government must adopt measures so as to make them act closer to the norm.

But what, exactly, do these calculative agents calculate? The next subsection will try to show.

3.2 Jevons's use of psychophysiology to explain economic action in his TPE

Jevons's main economic book consists of eight chapters. The most important chapters for our purposes are the second (the "theory of pleasure and pain"), the third (the "theory of utility") and the fifth (the "theory of labor"). They are important because they deal specifically with the economic behavior of humans.

In the first chapter of the book, Jevons says that there is a "hierarchy" of pleasures and pains, but that he is mainly interested in feelings of "lowest rank". This happens because the calculus of utility when applied in economics supplies men with his "ordinary wants at the least cost of labor" (TPE: 39).

As a consequence, Jevons is interested only in lower pleasures, proposing that the science of economics should deal only with the "ordinary wants" of men. *The important point for us is that these lower pleasures are exactly those of biological nature – pleasures associated with the satisfaction of hunger, thirst, the need for air so on.* These are pleasures that men shares with other living animals whose biology is similar to ours.¹⁹

¹⁷ Note, however, that Schabas (1990: 61) observes that Jevons "upheld certain parallels with algebra (...). But in general, he was less prone to import elements of algebra into his logic".

¹⁸ Mattos (2005, section 2) shows how J. S. Mill's conception of the human agent is dual. See also Boff (2012: 117-21) to see how J. S. Mill regards the drive to accumulate riches as only a part of a process of material evolution.

¹⁹ For example, Jevons quotes approvingly of H. T. Banfield (the writer who, according to the English marginalist, best understood the basis of economic theory) as saying that: "The lower wants man experiences in common with brutes" (TPE: 48). He also calls lower-order needs (for example, for food, water and air) as "simple animal requirements" (TPE: 55). Schabas (1990: 94, 161) also

Jevons now needs to make his utility theory quantitative – but how can we measure pleasures and pains? In order to carry out this job, Jevons uses and reinvents Bentham’s quantitative theory of pains and pleasures, omitting the parts of the theory that could muddle economic theory up with the “science of morals”.²⁰ For Jevons, a theory of pleasures and pains would only consider four characteristics of those pleasures and pains: their “intensity, duration, certainty (or uncertainty), and propinquity (or remoteness)”. In the end, however, only duration and intensity of pleasures were considered (TPE: 42-3). Characteristics present in Bentham, like fecundity (the chance a feeling has to be followed by a feeling of the same kind); purity (the chance a feeling has not to be followed by a feeling of an opposite kind) and extent (the number of people affected by the feeling in question) belonged to the realm of morals and should not enter the discourse of scientific economics.

Jevons famously defined economics as “the mechanics of utility and self-interest”, and this forms the basis on which he could explain human action. According to White (1994b), the explanation was based on two pillars: the first was that human behavior had some laws that were “universally true”. If these laws are universal, then it would be possible to measure and aggregate the economic behavior of a population of heterogeneous individuals.²¹ Jevons’s hope was that, in the aggregate, the “vagaries of individual behavior” could be neutralized, and that the “accidental and disturbing causes” caused by an outlier would not be relevant. The behavior of a “trading body” – defined as possessing a myriad of different individuals with an “average behavior” – could, therefore, be studied by his theory.

So far, so good: the second and third chapters of TPE made clear that the explanation of human behavior should be found in pleasures and pains which could satiate their “ordinary wants”. What we need to show now is the biological basis behind these pleasures and pains and the possibility of finding a proxy to measure them. In this case, the history begins not exactly with the discourse of economic science, but of human physiology.

3.3 The psychophysiological basis of economic behavior

Roughly from the second half of the nineteenth century, advances in psychophysiology showed that it was possible to understand states of mind produced by the interactions of the body – its organs of perception, the nerves and the brain -- with its surrounding environment. Once again according to White (1994a: 197-230), the ground zero for understanding Jevons’s ideas regarding the human mind and human behavior must be found in Richard Jennings’s 1855 book, “Natural Elements of Political Economy” (henceforth NEPE).

Before we investigate the impact of these ideas on Jevons’s political economy, I think it is necessary to sketch a brief account of what psychophysiology is. As the name itself suggests, psychophysiology tried to explain psychological events like knowledge and experience of pleasures and pains appealing to the physiology of human bodies. This history goes like this.

In the first decades of the nineteenth century, a scientific breakthrough was achieved in the realm of biology: the nerves responsible for the movement of our muscles and for the sensations we feel were properly identified and separated. Up until that time, associationist psychologists believed that knowledge and experience were generated by external stimuli that impressed our senses and the associations of ideas that

observes that Jevons thought it was possible to trace the “action of the postulates of political economy among some of the more intelligent animals”.

²⁰ See Sigot (2002: 265-70), Peart (1996: 125-6) and Jevons (TPE: 40).

²¹ As for measurement, Jevons equates – not without reservations -- the relation between the marginal utilities of two goods with the price relation between them. He also believes that “the private-account books, the great ledgers of merchants and bankers and public offices, the share lists, price lists, bank returns, monetary intelligence, Custom-house and other Government returns, are all full of the kind of numerical data required to render Economics an exact mathematical science.” (TPE: 32). That is, even though we could not measure marginal utilities directly, relative prices could be used, roughly, as a proxy of them. See also Backhouse (1985: 72) and Schabas (1990: 45).

come thereof. These associations of ideas allowed us both to understand human action and the reasoning of people – which included the behavior and motivations of economic man. This happened in the work of J. S. Mill.²² Psychophysiology changes all that, because we do not need external stimuli to impress our senses to explain human action. As White puts it (1994a: 210),

“By stressing the importance of relation between movement, the nervous system, and ‘in-born’ patterns of coordination, it was also possible to provide an explanation for the body’s spontaneous movements that were prior to and independent of previous external stimuli and consequently mental ‘associations’”.

In other words, it should be possible to explain human behavior by the configuration of the nervous system and in-born patterns of coordination. Human behavior could be viewed as automatic, without the participation of our conscious mind. It would also be possible that our mental states – pleasures and pains included -- were generated by our biological nervous system, so that, in the end, our conscience could be grounded in the physiology of our brains.

Psychophysiology enters our history by means of *two universal laws of human nature* that were important for Jevons’s economic science. According to Jennings, *the first law* stated that “the degrees of satisfaction do not proceed *pari passu* with the quantities consumed” (cited by White, 1994a: 201). As Jevons recognized, this definition was halfway to the law of the diminishing marginal utility.

The second law of human nature had to do with labor. According to Jennings, the effort people expended working could be “indifferent” or even “pleasurable”, but, eventually, that effort would lead to painful sensations. If labor continued to be performed in spite of these painful sensations, there would be a point in which the increase in work effort would make the pain unbearable. This explanation was also very similar to that presented in Jevons’s TPE (ch. 5, p. 125). Jevons, in fact, quotes a lengthy passage of Jennings in the TPE (p. 124-5), endorsing Jennings’s principle of human nature regarding labor.

With these two principles, a scientifically valid explanation for human economic actions had been given, according to Jennings. If we wanted to understand how the wage rate was determined, we would have to take into consideration both the “toilsome feelings” involved in the exertion of labor and the pleasurable feelings associated with the consumption of goods allowed by a wage. That is basically the origin of Jevons’s “Theory of Labor”, in chapter 5 of his TPE.

So, the road taken by Jennings (and also by Jevons and Edgeworth thereafter) was that of basing the knowledge about human behavior regarding consumption and labor on the physiological functioning of the human body. In the end, we can identify three interrelated modifications that Jevons operated on the scientific method and their impact on Jevons’s conception of the economic agent. *The first modification* concerns the gradual abandonment of the association psychology in favor of psychophysiology in the explanation of the economic behavior of humans. This leads us to *a second modification*, which deals with the separation between sciences of matter and sciences of mind – the latter could now be reduced to the former. Finally, *the third modification* has to do with the mechanization of thought proposed by Jevons when he conceived of the human mind as a machine.

It is hoped that the consequences of the above analysis for the purposes of the article are now clear: Jevons tried to reduce the scope of economic theory to the satisfaction of the “ordinary wants” of people – *wants of biological basis that all people in a population necessarily have*. At the same time, a mechanical reasoning could, at least in principle, *calculate the costs (pains) and benefits (pleasures) associated with the satisfaction of these wants*. As a consequence, Jevons provides a framework in which peoples’ thinking and behavior can be objects of statistics: their calculative thinking and economic behavior can be studied as uniform, as having a biological basis and as applicable to a heterogeneous population. These are exactly the necessary characteristics of a discourse that may be used by a biopolitical government – that is, a government

²² See, for example, J. S. Mill’s *System of Logic*, book VI, ch. 4.

that aims to conduct people's actions according to biological principles of pleasure and pain present in human nature. At the same time, a normative prescription seems to be implicit in this view: people *should* see themselves *subjectively* as calculative agents moved by pleasures and pains, at least in economic transactions. It is also part of the government's job to try to bring people closer to this ideal in economic matters, by direct or indirect interventions in people's physical or social environment.

4. Applied economics in Jevons: his "Methods of Social Reform" (MSR) in light of biopolitical government

4.1 The relation between theoretical economics, logic and applied economics

In a 1991 article, Silveira coined the term "Senior indeterminism" to suggest that pure, mathematical economic theories should not be directly applied to solve applied economic problems. Concrete economic reality is so complex that the direct application of pure theories to solve practical economic problems would be misleading. Nevertheless, this does not mean that the insights of pure theories are useless: in order to be properly applied, these insights need to be mediated by a series of historical, ethical and social considerations that are specific to the problem at hand.

The same can be said of Jevons's theoretical economics, practical economics and his logic. Despite being different kinds of discourse, the theoretical branch of Jevons's economics can *illuminate* certain aspects of economic behavior and reality which can afterwards be used applied economists. An example can make this clear: one can abstractly consider a population of individuals whose economic actions can be explained by pleasures and pains and whose reasoning can be characterized as mechanical. Inside a concrete population, however, there might be groups that drink alcohol abusively (out of the pleasure they get from it). A statistician can then calculate the average consumption of alcohol in the whole population and determine (based on medical knowledge) the acceptable consumption of alcohol for members of the population. As we saw in subsection 2.2, a biopolitical government can then try to check excessive alcohol consumption by dint of prohibitions or by discouraging its consumption (e.g., using advertisements or raising taxes). These measures will increase the costs (equivalent to pains) of consuming alcohol.

Could Jevons's proposals regarding the government of economic agents be understood in a liberal sense? In order to check this hypothesis, let us now turn to the MSR, which is a collection of essays by Jevons published in *The Contemporary Review* during a period of 15 years (1867-1882), until his death by drowning in August, 1882. Most of the issues deal with more than economics: they grapple with subjects as diverse as the use (and abuse) of museums by the English, the nationalization of the railways, the post office and the cruelty to animals.

We chose to analyze some articles present in this book for two reasons: 1. due to the diversity of its subjects and how they intermingle with concrete economic phenomena; and 2. other applied works by Jevons are not likely to treat of specific *social* problems like the MSR do.²³

We could also have chosen for analysis the book "The State in Relation to Labor", where Jevons analyzes the concrete relationship between the State and Labor. There are, however, similar studies on MSR (for example, the chapter on "Industrial Partnerships" and "Trade Societies: Their Objective and Policy"). So, we believe that the MSR is the best possible choice for one to try to find how Jevons's applied work on economics is related to the government of people in a biopolitical way.

Because all articles were written with the intention to contribute to policy issues, none of them involves pure mathematical economics. However, when it comes to settle a controversy, Jevons usually

²³ For example, the "Coal Question", "A Serious Fall in the Value of Gold ascertained, and its Social effects set forth" or "The Solar Period and the Price of Corn" all touch on social problems, but are mainly technical articles whose focus are not the government of people.

appeals to the use of statistics – sometimes even in a slovenly way. In the articles about “Experimental Legislation and the Drink Traffic” and in the opening address as president of section F (statistics and political economy) of the British Association for the Advancement of Science (BAAS), Jevons begins by noticing that political economists are seen as “heartless misanthropes” (e.g., Malthus) once they find a true law of human nature. In this way, he presents the human conduct as determined by the application of some laws. However, he also recognizes that these laws are often difficult to determine:

“The existence of this Section is a standing recognition of the truth that the condition of the people is governed by definite laws, however complicated and difficult of discovery they may be. It is no valid reproach against us that we cannot measure, and explain, and predict with the accuracy of a chemist or an astronomer. Difficult as may be the problems presented to the experimentalist in his investigation of Material Nature, they are easy compared with the problems of Human Nature, of which we must attempt the solution. I allow that our knowledge of the causes in action is seldom sure and accurate, so as to present the appearance of true science.” (MSR: 123).

It is because of this difficulty in finding the “definite laws” that govern people’s actions in a population that applied economists need statistics. Applied economists do not deal with abstract, maximizing and supposedly calculative individuals. It is true that, as Silveira (1991) suggests, pure theory can *illuminate* the concrete phenomena we have at hand. But in concrete reality, there are a multitude of individuals with a myriad of different motivations (both economic and non-economic) and whose thinking is far from being exclusively calculative. If we cannot precisely pin down the behavior of each individual of a population, we should know at least how they behave in average and the dispersion of these behaviors around this average. Because of practical considerations when dealing with a heterogeneous population, Jevons uses the concept of “average man”. As we will see, in a biopolitical government, this concept will be of central importance: as we commented on section 2.2, this “average” represents exactly the most frequent characteristic of a population – it is what is considered normal and around which deviations will occur.

4.2 The importance of statistics for applied economics

Jevons is aware of the fact that the economic behavior of each individual in a certain group is idiosyncratic, but he argues that the aggregate behavior of the community is not so, and will vary according to the laws of economics. The idea is that the idiosyncrasies of individuals would be cancelled out in the aggregate. So, in order to represent the aggregate behavior of the community, Jevons creates an average of the economic behavior of the individuals in the group. He then considers the average and aggregate economic variables to be equal, so that one can quantify them and find correlations and regularities between different economic aggregates. Because of the equality between the aggregate and the average, a “trading body” could be seen to act as an individual member of the group does – so long as that individual has also an “average behavior” – as we have already pointed out in subsection 3.2.

The idea of an “average behavior” of an individual naturally leads to the idea that there must also be an “average man” that embodies this behavior. Fortunately for Jevons, the blueprint for the statistical study of characteristics of men in society had already appeared in 1835 with the publication of “Sur l’homme”, of Belgian statistician Adolphe Quetelet. And, in fact, as Mosselmans (2005: 573) shows, Jevons makes several references in the PS to Quetelet’s work. Quetelet wanted to build a “Science of Man” based on the quantification of moral and physical facts of humankind. This quantification would lead, in turn, to an “average man”, “which should precede every other investigation of society” (Mosselmans, 2005: 568). As Jevons notes, when the capacities, tastes and habits of people are very diverse, this “average man” might not exist in fact – it only represented the behavior of an average individual in that specific society and time (in Jevons’s jargon, the numbers that represented his behavior should be a “fictitious mean”). The explicit

comparison made by Quetelet and Jevons was between the “average man” and the center of gravity of a material body.

As Schabas (1990: 18) and Mosselmans (2005: 570) note, Jevons also had a project to construct a “science of man”, and this project has similarities with that of Quetelet’s, in that they both intended to present men as quantifiable entities. However, it is important to notice that, in order to be applicable, the characteristics presented by this average man would be subject to historical and cultural influences, something that Jevons acknowledges. As the next section will show, Jevons’s efforts in the MSR will show that the use statistics in issues like the industrial partnerships, the problem of married women in factories, the drunkenness of the Irish and the question of charity may be useful to help see how biopolitical measures can be implemented with the aid of Jevons’s researches.

4.2.1 Charity in the MSR

Despite the difficulty in finding causes for human action, Jevons believes that indiscriminate charity for poor people should be “swept away”, because they can develop bad habits. The idea that people would develop bad habits if given charity is attached to his view of man as acting on the basis of pleasures and pains:

“Nothing so surely as indiscriminate charity tends to create and perpetuate a class living in hopeless poverty. It is well known that those towns where charitable institutions and charitable people most abound, are precisely those where the helpless poor are most numerous”. (MSR: 125)

It is important to say that Jevons wants to keep only charity that might not develop bad habits in people, that is, habits which would prevent them from being assertive and energetic, trying to find an occupation. When he says that it is “well known” that towns where there are many charitable people are the same where there are many poor, he means that there is factual evidence for that (although he does not present it in the article). That is, he says he could collect data that will confirm his hypothesis that a place with many charitable institutions is a place where there are many poor people. One can imagine that, if the basic principle of human nature is the search for pleasure and the avoidance of pain, a person who would get money from charity could escape scarcity without making any painful effort. Therefore, they would not work, and would remain poor and dependent forever on charity. Statistical data would then confirm or not confirm our hypothesis. Economic science would give us the causal relationship, and then a policy regarding charity might be designed.

Here is a good example of the possible application of liberal biopolitical measures regarding charity. Based on the principle that effort is a bad, Jevons’s applied economics could be used to change the social environment of towns where charity might lead to idleness. Stricter rules on charities should have the impact of making people more industrious and capable of fending for themselves. If this actually happens, this objective change could be identified by new statistics showing that the number of poor people has diminished alongside the indiscriminate giving away of charities. At the same time, people should subjectively change: they should see themselves as industrious workers and not as poor and needy.

4.2.2 Drunkenness among the Irish

Jevons does give us data when he wants to show that the high rate of mortality in some English towns is related to the bad habits (drunkenness) of Irish immigrants (MSR: 131-3; 138-9).²⁴ Because, according to Jevons, plain facts cannot be suppressed, supposedly there might be some characteristic in Irish people’s

²⁴ The issue of the supposed racism in Jevons has been discussed by White (1993) and Hutcheson (1994).

nature that would make them choose alcoholic beverages as entertainment (= search of pleasure), and that would lead to bigger mortality rates among the Irish population (= a cost). This would imply that the Irish would have little foresight regarding their future. As Jevons observed in a passage in the TPE dealing with anticipating future utility:

“That class or race of men who have the most foresight will work most for the future. The untutored savage, like the child, is wholly occupied with the pleasures and the troubles of the moment; the morrow is dimly felt; the limit of his horizon is but a few days off. The wants of a future year, or of a lifetime, are wholly unforeseen. But, in a state of civilisation, a vague though powerful feeling of the future is the main incentive to industry and saving.” (TPE: 44).

Therefore, we have a non-economic notion – race (Irish Celts versus Anglo-Saxons) or class (poor or unemployed versus the rich) – influencing the economic choices of people, and this could be ascertained by means of statistical inference. This shows that -- contrary to what happens in Jevons’s pure economics -- in practical economic matters, cultural factors must be factored into the analysis.

If in the charity case Jevons did not provide data to confirm his hypothesis, here the data seem to confirm the relationship between the percentage of Irish immigrant in English cities and the city’s morality rate. Based on his pure economics, Jevons might suggest ways to change Irish people’s environment so that it would change their views regarding “the wants of a future year” and then diminish their alcohol consumption. Although Jevons does not adopt a position for or against the prohibition of alcohol, he does say that

“What we want, as it seems to me, is a carefully regulated and limited [drink] traffic, controlled by a well-enforced law, administered by a body of magistrates or other men who will ignore altogether the interests of the publicans, and look steadily to the infinitely greater object of the public good” (MSR: 119).

The change in the environment could be accomplished with a “carefully regulated and limited traffic” of alcohol, “controlled by a well-enforced law”. These governmental measures might alter the conduct of Irish immigrants in England regarding their health.

As the previous paragraph made clear, here again is another example of a discourse that could be used in medical, security and economic biopolitical apparatuses: it deals with the level of poverty due to alcoholism in the population and the risks to people’s health associated with the overconsumption of alcohol. As we observed at the end of subsection 2.1, we can see that Jevons’s applied discourse traverses economics and medicine in a form of government that can be considered liberal.

4.2.3 Married women with children in factories

The other occasion in the MSR where Jevons approaches biopolitical government is the analysis of married women in factories – but this time in a non-liberal way: according to Jevons, there should be a *prohibition* against married women with children working in factories. There are two reasons for this prohibition: the first is that children would be home alone and this could increase children mortality, due to lack of care. On the other hand, their husbands, with more money in the house, might be tempted to spend the extra-income on liquor (or “idling away their time”, as Jevons put it (MSR: 110)). Behind these explanations, the calculative and maximizing behavior of individuals is considered: women aim at making an effort (equivalent to pain) to increase the family’s income (equivalent to pleasures). Men, on the other hand, tend to “idle away” since they can use the extra income to increase their pleasure by drinking.

Jevons upholds the idea that, if there is a significant correlation between the mortality of infants and the work of women in factories, then this prohibition should be enforced, no matter what abstract philosophical rights or axioms of economic theories advise:

“Philosophers will urge that we are invading abstract rights, and breaking through the teachings of theory. Political economists might, no doubt, be found to protest likewise that the principles of political economy are dead against such interference with the freedom of contract. But I venture to maintain that all these supposed natural entities, principles, rules, theories, axioms, and the like, are at the best but presumptions or probabilities of good (...). If we find that freedom to work in factories means the destruction of a comfortable home, and the death of ten out of twelve of the offspring, here is palpable evil which no theory can mitigate”. (MSR: 113).

This is an example that moral principles are more important in applied economics than the laws of pure economics. In fact, Jevons’s pure and applied economics works against a background of Victorian morality that is taken as given. As Mosselmans (1998: 142-3; 2007) comments,

“[Jevons’s] ‘representative individual’ is based on Jevons’s image of the Victorian middle class: the laborer in Jevons’s theory would, in the absence of other motives, devote all energy to the accumulation of wealth. Since this definition does not fit in the case of lower class people, Jevons’s description of character and class behavior relaxes his ‘*ceteris paribus*’ definition of the labourer”.

This did not mean that Jevons’s did not care about “lower class people” or that they should be counted out of Jevons’s theory.²⁵ The urgent problem we have at hand is: how should the behavior of lower class people be brought closer to the behavior of a middle class Victorian? This is not only a problem, but a *governmental problem*, as defined in section 2.2: how can authorities conduct the conduct of lower class people so that they end up behaving closer to middle class Victorians? In the case of women in factories, the testimony of Jevons’s widow in the MSR, Harriet Jevons, shows the obvious biopolitical character of Jevons’s work and how it again traverses the apparatuses of sexuality, economy and medicine:

“I can only say here that he [Jevons] had most carefully examined into the statistics of infant mortality in every town of every county throughout England and Wales, and that he told me that he thought from this exhaustive inquiry he should be able to give most convincing proof of the influence which the absence of the mother at work has upon the death-rate of the children, and of the urgent need which exists for legislation upon the subject”. (MRS: 114).

The emphasis on statistics, population and the “urgent need for legislation” shows that we are openly dealing with biopolitical apparatuses. The apparatuses of medicine are touched when mortality rates of children are mentioned. The apparatus of economy is also included because the problem is the employment of mothers in factories and the consequences thereof. Finally, the problem also touches the issue of sexuality, since it might interfere with the capacity of reproduction of human life, as section 2.1 clarified.

²⁵ In fact, as Hutchison (1988: 385) notes, the young Jevons had “profound social sympathies and a warm concern about the problem of poverty”, and also “earnest social concern and commitment” (1988: 389). He was raised in an Unitarian family in Liverpool. Jevons also believed in God, and also that the principles of religion did not contradict the principles of science: both aimed for the truth. However, scientific reflection on “higher notions of creation” would fatally end up in confusion (Mosselmans, 2007).

4.2.4 Industrial Partnerships and Union Trade Societies

Let us finally analyze how a liberal biopolitical government can appear in Jevons analyses of “Industrial Partnerships” and “Trade Societies”. In the first article, he studies the possible associations between workers and capitalists, trying to understand how they should work together in order to increase the product. In the second article, he defends the free association of workers in trade unions, as long as they do not try to artificially determine the level of wages. As we can see, Jevons’s proposal is also compatible with a liberal biopolitical government.

First of all, it is necessary to notice that in union trade societies, we are far from finding an atomistic view of humans – a view that is usually associated with Jevons’s pure economics. He also recognizes a possible class conflict between workers and employers:

“(…) I must contend that the workman has a right to guard his own health, convenience, comfort, and safety, and this *he cannot efficiently do while he remains an isolated individual*. The reason is evident; the employers form a small class, between whom communication and concert are much more easy than between their men, and who have usually a strong disinclination to alter, for the benefit of their men, any custom or regulation which seems to be for their own advantage.” (MRS: 69, our italics)

At the same time, Jevons supports the unions in that they improve their health conditions at work: “A second and more distinctive function or duty of Unions consists in their efforts to shorten the hours of labour, to render factories more wholesome and safe, and generally to improve the condition of the workman.” (MRS: 68).

These are obviously characteristics that can be seen in a liberal biopolitical government: the freedom to associate with each other mainly to improve their health and safety at work. However, when it comes down to the determination of wages, Jevons prefers to leave it to the market (MRS: 77), although opening the way for what he calls *Boards of Conciliation*, in case of open conflicts between labor and capital. In section VII of the article on “Trade Societies”, he adds some statistical data in a rather careless way, trying to show that Unions did not help to increase wages of all workers. What happens, according to Jevons, is that some trades get raises at a cost for other trades. When there is a real increase in the wage rate, it can be explained mainly by the liberation of free initiative of capitalists:

“The liberation of industry and trade from many mistaken restrictions, the removal of Government protective duties, and the progress of free trade, in many countries, have thrown manufactures into a state of progress more rapid than was ever known before”. (MSR: 74).

Here is another sign that we are dealing with a liberal type of government.

In the end, Jevons urges workers not to despise capital, but to associate with it, becoming themselves capitalists with the passage of time. It is a different sort of capitalism, though, because in Jevons’s proposal workers become owners of capital in a cooperative way (MSR: 76). From a biopolitical point of view, this means that the economy should be managed so that it allows people to freely associate – as workers and capitalists – so as to profit from this association. This would entail an objectively different assessment of workers (they would not receive wages anymore; they would not have bosses; and they would not be classified as employees in statistical analysis). But it is important to notice that this kind of economic society can only properly function as long as workers also change subjectively: they should see themselves perhaps as more calculative of the costs and benefits in their economic transactions. Perhaps they should also acquire subjective characteristics of Victorian middle-class men. As Jevons quotes a former professor – Mr. Cobden - - at the end of his article on Union Trade Societies:

“I wish to see the great mass of the working-classes of this country elevate themselves by increased temperance, frugality, and economy. I tell you, candidly, that no people were ever yet elevated except through their own advancing wealth, morality, and intelligence; and anyone who tells the working-men of this country that they may be raised in the social scale by any other process than that of *reformation in themselves*, is interested either in flattering or deceiving them.” (MSR: 78; our italics).

5. Concluding Remarks

This article proposed a novel reading of the relation between Jevons’s logic, theoretical economics and applied economics. Instead of focusing mainly on Jevons’s pure economics and logic, we tried to find a respectable place for Jevons’s applied works. The focus on his applied works has the advantage of showing that Jevon’s economic thought is *not* confined to self-interested, asocial and maximizing economic actions of individuals, but also deals with ethics, politics and social problems. The focus on the logical structure of Jevons’s pure theory by Jevons’s scholars seems to downplay the richness of his applied contributions: they are seen as minor, imperfect or contradictory in relation to the precepts of his pure theory. While he tries to make his pure economics devoid of any politics or ethics, these subjects are overtly considered when he deals with practical economic matters.

What the traditional reading of Jevons seems to leave out is the question of how practical or theoretical economics are effectively *used* in concrete societies. The adoption of the foucauldian concepts of biopolitics and government allowed us to identify the *specificity* of each kind of discourse – theoretical, logical and applied – and the *function* they might have in different biopolitical apparatuses. In biopolitical apparatuses, pure economics would only illuminate economic phenomena in a certain perspective and would not be directly applicable. According to Silveira, this illumination is important in that it sheds light on certain categories of economic phenomena – in our case, pleasures and pains that have origin in the physiology of our brains and whose proxies (in the forms of relatives prices) can be mechanically calculated. Once humans are seen within this perspective, a *different* discourse can then be used: applied economics, which can mix with other disciplines and can be applied in the solution of an urgent problem, like extreme poverty, for example.

In our article, we found that Jevons’s practical proposals are, broadly speaking, of a biopolitical liberal character (with the exception of the case of mothers working in factories). They are biopolitical because they have the maintenance and protection of life as their target. They are liberal because they do not interfere directly in the conduct of people, but try to govern people’s actions largely indirectly, by means of changes in social or environmental variables.

One can say that Jevons is one pioneer of this kind of liberal biopolitical practices in Victorian England – so, we can say that the birth of liberal economic biopolitics in Victorian England begins at around the end of the 19th century. Before this time, one of the most important English political economists, J. S. Mill, would treat people’s actions and thinking differently: for him, concrete social influences, by changing the pattern of mental associations of economic agents, *could also change people’s character and economic behavior*. Governmental actions would not have as focus hard-wired biological properties of human individuals. What J. S. Mill’s sixth book of his *System of Logic* tried to illuminate was the importance of the proper association of ideas.

This is different for Jevons, because his “laws of thought” are mechanical and economic behavior is biology-based. Once we know the laws that govern people’s thoughts and economic behavior, the most that social or environmental influences can do is either to repress or make room for these in-born, natural human propensities. They may, perhaps, hinder the expression of these propensities, but cannot change them.

Government, in this case, consists in identifying these biological propensities so as to influence them. If effective, these influences will likely make people act according to the desired political ends.²⁶

6. References

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²⁶ One can see the long life that this form of governing people's lives have nowadays: words like "incentivize" are common currency among economists. Popular books by "Nudge" (2006), by Sunstein and Thaler, use the idea of "libertarian paternalism" to design policies that nudge people into acting in a given way.

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