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THE ROLE OF WAGES IN THE MEXICAN ECONOMY AN APPLICATION OF THE RICARDIAN MODEL

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— *Abstract*—

David Ricardo, in his model of economic development, adopts the assumption of constant real wages, along with other premises such as declining soil fertility and zero technical progress in agriculture, to show that in the long run the product is divided between capitalists and landlords so that the latter are favored. In this paper the model of Ricardo is reviewed from its pre analytical view, before the *Essay*, until more complete version provided in the *Principles of Political Economy*. Research suggests that the preeminence of declining soil fertility eventually leads to a decline in real wages, not only of the rate of profit. The paper proposes a model application for a specific economy, such as Mexico. We show that the principles of Ricardo, related to capital accumulation and population growth, are satisfied empirically.

Keywords

economic development, real wages, income distribution, capital accumulation, population.

JEL: B12, E30, J30, N36, O11

This paper deals with David Ricardo's economic development model. In particular, it is important to emphasize the role of wages as an essential component of income distribution. For this purpose, the research goes through several phases, namely the pre-analytical phase of the *Ricardian* conception of development contained in Ricardo's correspondence prior to the publication of the *Essay*; the most elaborate notion of the latter, and the recovery of the theme that the author makes in the *Principles*. The analysis of the different stages allows to suggest that, given the premises of the model, the product's distribution does not only occur between the landlord class and the capitalist class, to the detriment of the second, but also in the long term the workers are also affected through a decrease in their real salary. This is a result that is reached from Ricardo's own premises in contrast to his belief that the decline in the profit rate depends essentially on the assumptions of the land's decreasing fertility, zero technical progress in agriculture and constant real wages. In an attempt to make an application of the model, the Mexican economy is chosen as the object of study with the purpose of verifying some of Ricardo's conclusions, in particular, the role of wages in Mexico's economic development in a long-term, 1940-2014

THE *ESSAY'S* PRE-ANALYTICAL VISION

Since Ricardo became interested in the subject of economics, one of the topics that caught his attention was the issue of wages. In general, he was concerned about identifying the component elements of the economic structure and the mechanism of its operation in the long term. His main theoretical reference was Adam Smith, but there were authors who he professed great respect, such as Malthus, Say and Sismondi, as well as other contemporary writer, such as Torrens.[1] His main contender was Malthus, not only because his ideas contrasted in several ways with his own, but because he somehow upheld Smith's point of view, author whose work Ricardo was interested in undergoing a critical review.[2] Say was also a supporter of Smith, but he had a more static approach than Malthus. [3]

1 See Ricardo's preamble in: Sraffa, Piero (1959). *Obras y correspondencia de David Ricardo,* Vol. 1, Principios de Economía Política y Tributación. Mexico, FCE.

2 Smith's defense of Malthus is evident in his Principles of Political Economy (1964), but is explicitly noted in his correspondence with Ricardo. See *Ibid*., Sraffa, Piero (1959). Vol. VI, Letters, 1810-1815.

3 Malthus' dynamic vision can be seen in his discussion with Ricardo. Sraffa, Piero. *Ibid*. Vol. VI. For the static view of Say see his *Traité d'economie politique* (1841).

Ricardo had a pre-analytical view about the economy's course in the long term, based on his knowledge of the food production conditions and England's trade policy regarding grains' foreign trade. He intuited (and this was the heat of his discussion with Malthus, prior to the publication of his *Essay*,[4]) a downward trend in the rate of profit.[5] As far as food production conditions were concerned, private land ownership prevailed at the end of the eighteenth century, which allowed landowners to maintain a monopoly position as well as influence in the English Parliament; in terms of trade policy, the landlord class favored maintaining restrictions on grain imports, as this meant significant income in terms of land rent. Such restrictions, by limiting food supply in the domestic market, raised its price. This was the ultimate result of the underlying economic mechanism the one Ricardo was interested in understanding.

The limitation of supply forced capitalists operating in the agricultural sector to use land less fertile or more distant from the market. The obtained profit in these lands was lower, either because to obtain the same quantity of product required greater capital advance, or because using a same amount of capital would obtain a diminished product.

Under free competition conditions among the capitalists operating in this sector, the rate of profit was determined by the capital employed in the last land put into cultivation. Competition implied that a capitalist who wished to use a more fertile land had to pay an income for his use, the amount of which was the difference between the net product obtained on that land and that resulting from applying to the advanced capital therein, the determined rate of profit in the less fertile plot, which did not pay rent. This way, it was indifferent to the capitalist farmer to use his capital in the less fertile land or in any other land, if the profit rate obtained in any case was the same. Whenever in the course of society it was necessary to supply food to the population, this implied incorporating less fertile land, with the same consequences on the rate of profit.

4 Ricardo, David. *An Essay on the influence of a low price of corn on the profits of stock*, in: Sraffa, Piero (1959), *Op. cit*. Vol. IV.

5 The pre-analytic view can be found in Sraffa, Piero (1959), *Ibid*., Vol. VI.

Such was Ricardo's pre-analytic vision. His formal approach, however, required some assumptions.[6] For example, the author was interested in demonstrating that in the long run the rate of profit presented a downward trend. To prove this, it was necessary to resort to the assumption of restrictions on the import of grain, a methodological resource that assumed that grain was the essential consumer good in the workers' basket. To simplify his argument, Ricardo reduces to grain the foods consumed by the workers, becoming therefore the model's basic product not only in the sense of the consumption, but also of the production. For the model to work, it was necessary to assume certain conditions of production in agriculture. The fact that the land was not equally fertile or had a different location from the centers of consumption meant that the agricultural performance had to be directly related to the land's fertility degree or to its proximity to markets. This circumstance in the land's fertility implied that in the long term the agricultural yield would decrease and with it the rate of profit, but this would only be so long as there was no natural or artificial force that would counteract the decreasing fertility. Indeed, in order to obtain more pure results on what he intended to demonstrate, Ricardo eliminated any possibility of technical progress in agriculture and proceeded to freeze any variation in wages. It required that the real wage kept itself constant, so that the agricultural benefit rate would not be affected by this cause, allowing then that the whole weight in the determination of said variable would fall under the conditions of agricultural production, that is, in the fertility from the earth.

But freezing the wages implied another assumption. On one hand, the level of wages or the price of labor was determined by market forces, as was the case with any other commodity. Depending on the relationship between labor supply and demand, wages could rise, fall or remain constant. Ricardo assumed, for the long term, a uniform movement in the ratio between labor supply and demand in order to keep the labor market price constant.

On the other hand, it reduced the capital employed to only working capital (capital invested in labor). Thus, the increase in the capital advanced meant, in fact, the use of a greater quantity of labor, at a constant rate of salary. In other words, the capital invested did not increase because the labor price increased, but because a greater proportion of it was needed to produce the

6 The explicit approach is developed by Ricardo in the *Essay*.

grain. Thus, the decline in the rate of profit could not be attributed to an increase in wages, but to the land's lower productivity per unit of labor employed. The remainder of the product, after deducting the cultivation costs on the last land, was to constitute the benefit of capital in that land, which was, in magnitude, less than the profit obtained in the land previously cultivated.

The situation in the long term for the three social classes was as follows: for the landowning class (landlord class) income would increase as society turned to less and less fertile lands. In the most productive, from the largest to the previous to the marginal, income would increase each time the rateof profit in the marginal land decrease, because this rate would be applied to those by virtue of competition; this income was therefore the difference between the net product obtained in each land and the net product that resulted from applying the rate of profit determined in the last cultivated land. For the capitalist class, the income obtained by way of profit would be reduced each time the rate of profit in the marginal land fell, since this rate would be generalized to the rest of the agriculture, occurring therefore that each capitalist would see reduced its profit, regardless of the land he cultivated. In the long run the rate of profit would decrease to a minimum, and profits would be canceled and consequently all the remaining product, deducting the cultivation costs in each land, the income of the landowners, who would appropriate it in the form of income. Ricardo believed that long before this state of affairs was achieved profits would be so low that there would be no incentive for capitalists to continue to invest their capital, in which case accumulation would be halted. [7]

For its part, the working class would not be affected, under the assumption of constant real wages. Each worker would maintain his or her income level, but, as a whole, the working class would have a greater participation in the product, since in each period the amount of work employed increased while the product showed a downward trend.

The vision of development that Ricardo shows us in the *Essay* is evident. The struggle is between two specific social classes: landowners and capitalists. The former constitutes a parasitic class, which absorbs much of the product obtained by virtue of its legal status as owner of the land. A class which by

7 See *Essay*, *Op. cit.*, Vol. IV, pp. 7-8.

virtue of its status as landowner, benefits from the land's decreasing fertility, a fact which only occurs if restrictions are maintained on the grain's import. Hence the importance for this class of maintaining a restrictive trade policy in the field of foreign trade in the food sector. The capitalist class, for its part, is a thriving class, a class that risks its capital and whose profitability purposes are counteracted by the land's declining fertility. For this class, the cause of the decline in the rate of profit could be countered, provided that a free trade policy was adopted, since this would mean that the grain could be obtained from other countries where the conditions of production were more benign and, therefore, at a lower cost, thus meeting the food needs of a growing population. This means that by a freer trade it would not be necessary for England to resort to less fertile land, in which case it would not be necessary to invest additional capital and, consequently, the rate of profit would not fall.

To Ricardo, the landowning class constitutes an obstacle for the accumulation of capital, since in attempting to preserve its class conditions, that is to say, the conditions under which they can earn increasing incomes in the context of a restrictive trade policy, it forces the capitalists to use less and less fertile land, which ends up depressing the rate of profit. It is evident; therefore, that the obstacle does not come directly from the conditions of the fertility of the land, but from the political power that the landowners exert to influence the application of a protectionist commercial policy favorable to their interests.

Theoretically, Ricardo was interested in demonstrating the disadvantages of maintaining this restrictive policy. These disadvantages had to be reflected in the welfare of society, and by the time of the author, the contending classes were landowners and the bourgeoisie, both agricultural and industrial. The model showed that restrictive politics tended to improve the welfare of the landlord class by increasing their incomes while damaging the capitalist class by reducing their rate of profit and thereby curbing accumulation.[8]

8 *Ibid*., p. 8. Footnote. . Footnote. "This would be the effect of a capital accumulating constantly in a country that refused to import foreign and cheaper wheat."

THE *ESSAY'S* METHOD: REACH AND LIMITATIONS

From the previous section it is clear what the prediction is in rewards of the capital accumulation in the long run, the fundamentals of this prediction and the social class that benefits and which is harmed. As an explanatory model of English economic reality at the time of cereal restrictions, it is quite coherent. It emphasizes above all its abstraction level and the concatenation of its elements to identify causes and effects.

t is important to emphasize that Ricardo is very clear in the *Essay* its purpose is to underline the consequences of the capital accumulation (and for economic development) derived from the fact that, under conditions of the land's declining fertility, restrictions on grain imports and zero technical progress in agriculture would be implemented. In general terms, the model succeeds only if this objective is taken into account in the analysis.

A first step in Ricardo's method, which is very meritorious from the point of view of scientific abstraction, is to reduce the whole economy to one sector: agriculture. This is an important step in terms of simplification, which, on the other hand, forces it to incorporate even more abstract assumptions. For example, the agricultural sector must be self-sufficient. This means that agricultural capital is composed of wheat and that the product of the sector is only wheat.[9] It can already be seen that this assumption implies another, namely, the reduction of all capital to only working capital (invested in labor), which, in turn, presupposes that workers consume only wheat.

Together, Ricardo has eliminated the money from the scene and this is noticed from the moment that capital and product are measured in wheat.[10] Suppose the money had not been eliminated. Since what Ricardo intends is to demonstrate the downward trend of the rate of profit in the long term, one of the purposes of the investigation is to proceed to determinate said rate, in the first term. Ricardo does not care here to explain the nature of the

9 This interpretation has been suggested by Sraffa. See Introduction to the *Principios de Economía Política y Tributación. Op. cit*. A discussion of this proposal can be found in Hollander, S. (1973, 1983), Garegnani, P. (1983), Arjón, P. (2006).

10 On this topic Malthus says to Ricardo: "You say correctly that sometimes it helps a lot to leave the money out of these subjects." Letter from Malthus to Ricardo of February 12, 1815. Saffa, Piero. *Obras*, *Op. Cit*. Vol. VI.

benefit, he takes it for granted, especially at a stage of the investigation in which he considers that this notion is not very different from the one that Smith has, and that authors like Malthus, Say and Sismondi, know well. Once the rate is determined, the next step is to explain the conditions for its generalization.

Suppose then that Ricardo proceeds to estimate the rate of profit using the money. In this case all the elements of fixed and circulating capital are estimated in money that is, taking into account the quantities of the various elements of capital and their corresponding prices. It also estimates the monetary amount of production from the quantity produced and its market price. The profit would then be determined by the difference between the value of the product and the value of the capital necessary for its production in monetary terms, whereas the rate of profit would be determined by the ratio of this difference to the value of the advanced capital, expressed in percentage terms.

The problem of following this procedure is that the profit rate thus calculated would have depended on the prices, which in turn depend on the rate of profit, thus incurring a circular reasoning. The second problem, but not least, is that Ricardo is interested in demonstrating the preeminence of the agricultural sector in determining the overall rate of profit.[11] The use of money for the calculation of the rate would have blurred that relevance, since any other sector could have same the prerogative or, in other words, no particular sector would determine the rate of profit by itself.

This is why Ricardo did not have the money to determine the rate of profit. The notion of money that the author has at the moment is unthinking; it is the fetishistic notion of which Marx talked about.[12] But dispensing the money does not mean giving up using a unit of measure, but replacing it with a unit more suited to its purposes. He chooses a particular good, namely, the same good that serves as a product in agriculture, the one used as a measure of capital: wheat. Ricardo does not adopt this procedure categorically, but tentatively, thinking mainly of the criticisms that could come from Malthus when using a procedure that he would describe as unusual or strange to political economy.[13]

11 This is a point that Ricardo had been holding since his correspondence with Malthus, prior to the *Essay*. See Richard's letter to Malthus of December 8, 1814. *Ibid*.

12 See Marx, C. (1975). El *Capital*, T. I, Vol. 1, Chap. 1.4, Mexico, Siglo XXI.

13 Ricardo thus synthesizes Malthus' attitude before his opinions. For example, in relation to a decrease in real wages caused by a greater facility in the production of goods that are indispensable for the

By reducing output and capital to different quantities of wheat, the author can proceed directly to the calculation of the rate of profit. The advantage of using this procedure is that the rate is determined in agriculture regardless of the prices, which allows the competition to generalize it to the rest of the economy, thus achieving the purpose of Ricardo.

THE ASSUMPTION OF HOMOGENEITY BETWEEN PRODUCT AND CAPITAL OR THE THEORY OF VALUE

From the reading of the *Essay*, an interesting and suggestive hypothesis follows: either we are facing two models, each with its own premises, or it is a model developed at two levels of analysis. The first model, or level of analysis, is the one we have already presented, consisting of an agricultural sector with peculiar characteristics and in which the rate of profit is determined from the Ricardo's assumption, according to which capital and product are quantities different from the same good (wheat). We have seen that this rate of profit is determined by marginal land and through competition is generalized to the rest of agriculture. In the process, and by virtue of the declining fertility of the earth, producing the same amount of good requires an increase in the advanced capital (measured in wheat), which translates into a diminished profit, on the one hand, and an increase in income, on the other.

In the second model Ricardo leaves aside the notion of homogeneous product and capital (homothetic model) and proceeds to introduce an incipient theory of value with still *smithianos* tones. Thus, the value of commodities is determined by the amount of labor invested in their production under the most difficult conditions. In the case of wheat, its value is determined by marginal land, since in the land the conditions of production, in terms of invested labor, are more difficult than in the intra-marginal lands.[14] In this perspective, Ricardo again proceeds to review the distribution of the product between landowners and capitalists. It states that the income or rent of the former is increased for two reasons: first, because the difference

worker, he says: "If I call this reduction of the real value of wages, I am told - alluding Adam Smith and Malthus – that I adopted a new and unusual language, irreconcilable with the true principles of science." See Sraffa, P. *Obras*, Vol. I, p.15.

14 See the *Essay*, *Op. cit.*, pp. 10 y ss.

between the product obtained in the intra-marginal lands and the marginal land increases, that is, the amount of wheat that the landowners appropriate in the form of income grows as less fertile land is used; secondly, it also increases because the value of wheat is determined by the amount of labor invested in marginal land, and this quantity is increased period after period. The situation of the landowners thus improves whenever less fertile land is used, while the situation of the agricultural capitalists is worsened by reducing the amount of wheat they obtain as a surplus by lowering the rate of profit on marginal land. If, as has been said, the value of wheat in this land increases, the capitalists may find themselves in an equal situation, relatively better, or worse, at time t compared to moment *t-1*, depending on whether the value of wheat would have increased in an equal, greater, or lesser proportion to the decrease in the quantity of grain received. This would be the situation assuming that the value of money remained constant.

THE QUESTION OF WAGES

In the pre-analytic view we have seen that for Ricardo the real wage remains constant. This is a strong assumption. It is noticed that in the *Essay* the author still does not dimension the importance of the subject. Let us assume that the ratio of capital to population in the long run remains unchanged. This would only keep the monetary wage constant, but for the real wage to remain unchanged it would also be necessary for the good price to be consumed by the worker to remain unchanged.

We have already seen that, according to the model of value theory, this is not possible, but rather increases in proportion to the difficulties of its production. Thus, an increase in the price of wheat, with constant market wage, would necessarily mean a real downward wage. It is evident then that the workers' situation would get worse.

Thus, on the one hand, in the homothetic model the real wage remains constant under the assumption of a proportional increase between the growth of capital and population. That is, the price of labor implicit in this assumption is determined solely by the relationship between supply and demand for labor. Thus, when Ricardo assumes that the real wage remains constant in the long run, it also means that the price of the goods that compose the worker's basket remains unchanged.

But this is inconsistent with the key assumption from which the main conclusions of the Ricardian model emerge, namely, the declining fertility of the earth. Indeed, under this assumption, the conditions of production in

agriculture are becoming increasingly difficult as land is added to the crop. This implies an increase in the amount of work invested and according to the author's theory of value (at this stage of his analysis), an increase in the value of wheat. Thus, the assumption of a constant real wage is inconsistent with the assumption of the declining fertility of the land. On the other hand, since the model is based on both assumptions crucially, the conclusions are not supported.

Hence, Ricardo's purpose of investigating the consequences of capital accumulation based on the assumptions of constant real wages and declining fertility of the earth is not attained, since what he hopes to demonstrate is that the distribution of the product, once paid the labor at a constant real wage, is done only between the landlord class and the capitalist farmers, but when due to the same assumption of decreasing fertility the price of the product increases, this necessarily has consequences on the distribution of the product between the three classes.

Under free market conditions, an increase in the price of wheat will imply a decrease in the real wage. If this should remain constant the monetary wage would have to increase proportionally. But the monetary wage will rise as long as the labor demand moves faster than supply. This contrasts with Ricardo's hypothesis that capital and population increase proportionally. Thus, the monetary wage cannot be increased and the real wage will have to decrease every time the price of wheat increases.

Thus, the constant real wage assumption is inconsistent with declining fertility. This assumption is only maintained if the product’s price also remains constant, but this is impossible with decreasing fertility. Ricardo claims that the validity of the constant real wage assumption depends only on the constant proportionality between capital accumulation and population growth. He does not notice that it is the monetary wage and not the real wage that depends on this proportionality.

It is apparent that Ricardo is clear about what he means by constant real wages. It is the monetary wage that allows the worker to maintain the same standard of living in the long run. His notion of real wages is noted in the fact that he explicitly states that the remnant of the product once discounted from payment to labor is distributed only between landowners and capitalists. Ricardo, then, starts from a constant real salary, but his own premises lead him to a real descending salary, a result that ends up affecting the conclusions to which he is above. Ultimately, the product is not distributed in an inverse relationship between capitalists and landlords, where the former get less

and less participation and the latter more, but workers also see their participation in the long term diminished.

We must point out yet another observation that has to do with the dynamic process and, therefore, with the long-term development of this Ricardian model. If, as we have seen, the real wage decreases, this decrease will be reflected later in a decrease in the labor supply. If accumulation continues to advance, this decline will be offset by an increase in the monetary wage, which can again bring labor supply back to its former position of proportionality with capital accumulation, in which case wage money will remain constant, and the real wage will decrease as a result of decreasing fertility.

On the other hand, if the rate of profit falls as a result of the same cause, the rate of accumulation will also fall, and if the labor supply decreases as the real wage decreases, the monetary wage will remain relatively constant. In any case, declining fertility will continue to prevail, raising the price of wheat and lowering real wages. This reinforces the result to which we had previously arrived.

Ricardo's conclusion is inconsistent. The distribution of income occurs not only between landowners and capitalists, but also workers involved. On the other hand, the decreasing fertility of the soil conditions the whole process. Not only are the capitalists affected in the long run, but also the workers.

It should also be added that this result is reached by virtue of the fact that Ricardo introduces in his second part of the *essay* his incipient theory of labor value, because it was derived from this theory that the price of the product increases, causing, through the mechanism described above, the decline of real wages.

THE *PRINCIPLES* APPROACH

This is the theory of economic development of Ricardo that comes from the *Essay* in relation to the salary. We may ask whether this theory remains in the *Principles*,[15] a work that the author wrote to expose the ideas of the *Essay* in a more finished way and to clear with it the criticisms that

15 *Political and Taxation Economy principles, Op, cit.*

he had received, in the sense that this work was obscure and abstract.[16] In *Principles*, Ricardo leaves aside the first approach that he presented in the Essay that is, the homogeneity between capital and product, and concentrates on the second one, which incorporates the theory of labor value, explicitly, dedicating the first chapter of the work.

In addition, the author no longer insists on his claim that the agricultural benefit rate determines the overall benefit rate. This time adopts a different approach. He drops the *Essay's* unisectorial model (agricultural model) to propose a two sectors model: agriculture and manufactures. On this occasion the theory of value has a predominant place; although the principle of diminishing returns continues to prevail in agriculture.

Something particular about this model is that Ricardo shifts his attention from agriculture to manufacturing, which is evidenced by the application of the theory of value to manufacturing production under conditions of different ratio between fixed and circulating capital, where the latter is fundamentally represented by disbursements in labor. Thus, after affirming that the relative value of a commodity is determined by the relative quantity of labor necessary to produce it, Ricardo proceeds to verify this assertion, using three branches of manufacturing production with different composition of capital. In the first case, the capital-labor ratio is greater than the average, represented by the second branch, while in the third, the ratio is lower. To verify the validity of the theory of value, Ricardo relies on a structure of the commodity such that, given a rate of profit, the value of a commodity would be given by:

$$Kf + Kc + g = V$$

Where *Kf* represents fixed capital, which according to the theory of value constitutes the quantity of indirect labor contained in the means of production, *Kc* represents the working capital or capital invested in labor and, therefore, constitutes direct labor (for the case in hand represents wages paid), *g* is the capitalist's profit calculated according to the usual rate, in Ricardo's words[17].

16 As for the exhortation to write the work see Ricardo's letter to Say of August 18, 1815, in Sraffa, Piero (1959). *Obras, Op, cit*, Vol. VI; in regard to the Essay's obscure character, see Malthus's letter to Richard of March 10, 1815. *Ibid*.

17 This is another curiosity about Ricardo. On the one hand, he refers to a long-term benefit rate that is declining because of declining fertility. This rate can move in a range of 50 to 11%. See the *Essay*

Presumably it is the part of value that the capitalist appropriates in the form of profit by risking his capital in a productive activity. [18]

Given this structure, Ricardo's hypothesis is that changes in wages result in changes in the relative value of goods produced under different conditions, as regards the ratio of fixed to working capital (capital and labor). In the case of the three productive branches, an increase in the wage will imply a reduction in the relative value of the product of the branch with a higher proportion of fixed capital, and an increase in the relative value of the product of the branch with a smaller proportion. Ricardo recognizes that under a different proportion of capital between branches, the relative value of goods is altered when the wage is modified, this being an additional cause for the determination of the value of the commodity. However, in their view, the relative amount of work remains the determining cause.[19]

The point in question for our purpose is the fact that in manufacturing the rate of profit falls when the monetary wage increases. This is important, the rate of profit does not fall because it increases the amount of labor employed, as in agriculture, since in Ricardo manufactures assume constant conditions of production, but given an initial rate of profit, an increase in wages monetary policy will bring with it a decrease in profit and, consequently, a lower proportion of the same in relation to the capital employed (including *Kc*), i.e. a fall in the rate of profit.

But, What is the reason for the increase in the monetary wage and, therefore, the decline in the rate of profit in manufactures? This reason must be sought in the conditions of agriculture production where it deprives the declining fertility of the land. According to the theory of value, as accumulation proceeds and the population grows, it becomes necessary to resort to land of inferior quality or less fertile. Under such circumstances, producing the same amount of product will require a greater amount of work invested (both direct

chart. In his analysis about the rise of the wage effect on the profit rate, according to the composition of the capital, it uses a range of 10 to 3%. The latter is the lowest level the rate can reach before the accumulation stops. See chapter one of Principles, section IV. In the short term and in equilibrium, the rate of profit oscillates around 10%. *Ibid*. Also, ch. XXIX.

18 Principles, Op cit., Cap.. VI, p. 94.

19 *Ibid*., Cap. I, secc. IV, p. 27.

and indirect). As the value of a commodity is determined by the amount of labor invested under the most difficult conditions; in agriculture the value of cereals will be determined by the last land put into cultivation or marginal land. And if the difficulty of production increases when less and less fertile land is used, then the quantity of labor necessary for its production will increase, and so the value of the cereals will increase.

Since workers consume cereals only, an increase in their value as a result of production difficulties in agriculture will entail an increase in the monetary wage. However, such a rise is necessary if the real wage is to remain constant, but under competitive conditions, the monetary wage will be a function of the conditions prevailing in the labor market. In the *Principles*, unlike the *Essay*, Ricardo makes no proposition regarding the conditions of proportionality between the accumulation of capital and population growth; but introduces a concept of salary that constitutes an important reference in its model of development. It is the natural wage[20] whose notion is already found in *Smith's Wealth of Nations*[21] and according to which all merchandise, including labor, has its natural price and its market price. The natural price is the price that corresponds to the quantity of labor necessary for its production, while the market price is the price determined according to the supply and demand conditions in the corresponding market.

Since labor is a commodity that is bought and sold, like any other, it will also have, then, its natural price and its market price. The natural price in this particular case comes to be the price that allows the working class to remain without increase or decrease. In other words, a wage level that in the long run keeps the working population at a constant level.

Earlier we pointed out that Ricardo made no statement on the proportionality between capital accumulation and population in relation to real wages. Now, however, we must realize that this assumption is contained in the notion of natural wages. Indeed, the fact that this wage keeps the population without increase or decrease, is the same as saying that the worker receives a salary such that allows him to maintain the same level of consumption (the

20 *Ibid*., Cap. V, p. 71.

21 Smith, Adam (1987). *Investigación sobre la Naturaleza y Causas de la Riqueza de las Naciones*. Mexico, FCE., cap. VIII, pp. 63 y ss.

same basket) regardless of the components price of that basket, and this is nothing other than a constant real wage. Then, when Ricardo speaks of an increase or decrease in the natural wage, depending on whether the price of food increases or decreases, it refers to a natural wage that corresponds to a certain real wage.

When analyzing the situation of the manufacturing sector, it was emphasized that the fall in the rate of profit was caused by an increase in the monetary wage. It should be clarified now that this wage is none other than the natural wage, since an increase in the price of food demands an increase in the natural wage, such that the population remains constant.

Let's see how the process unfolds. The population increase and the greater need of food consequent, obliges that in the agriculture recourse to lands of lesser fertility. This circumstance will require a greater capital advance in terms of embedded labor. According to the theory of value this will imply an increase in the value of the cereal and, therefore, of its price (assuming that the value of money remains constant). The greater capital investment with decreasing returns will, in turn, translate into a decrease in the rate of profit in agriculture, a decline that curiously Ricardo does not emphasize in the *Principles*, as he did in the *Essay*.[22] As can be seen, this rate is not determined independently of prices, which on the other hand speaks of the underlying implicit circular reasoning in the determination of the rate of profit and that the level of abstraction of the *Principles* is inferior to that of the *Essay*.

In manufacturing, the rise in the price of food impacts the rate of profit through the inverse relationship wages-benefits, a result that is achieved by virtue of the fact that production conditions remain constant in that sector. Accordingly, the rise in food prices translates into an increase in the monetary wage, an increase that is necessary to maintain the real wage at the subsistence level, or what is the same, to raise the natural wage.

22 *Principios, Op. cit*. See ch. II on Income. Ricardo is careful not to mention explicitly the decline in profit as a result of declining fertility. The subject will deal with it in ch. VI on Utilities, where it will link declining fertility with the decline in the rate of profit in manufactures, through the rise of the monetary wage derived from the greater amount of work necessary to produce cereals, an important component of the basket. This rise in wages will also be the cause of the decline in the rate of profit in agriculture. See also, chap. VI., P. 88. Thus Ricardo detaches himself in the Principles from any allusion to a rate of physical profit in agriculture (and hence a homothetic model), from which, and through competition, the rate is determined of general benefit. *Ibid*., P. 92.

If, as Ricardo himself admits, there is a natural wage and a monetary or market wage, the wage that prevails in the long run will depend on the underlying forces under free market conditions. In fact, to say that when the value of food increases as a result of decreasing fertility must also raise monetary wages, is to make prevail in the long term the natural wage compatible with a constant real wage. But this must be an outcome that is reached through the play of market forces.

The fact that Ricardo insists on constant real wages in the long term (in the present case, through the notion of natural wages), suggests that the working class retains its share of the product, while the remainder carried out between landowners and capitalists, exactly as their initial proposition in the *Essay*.

APPLYING THE RICARDIAN MODEL IN MEXICO

Applying Ricardo's model in Mexico's case implies recognizing the existence of a labor market where the supply and demand interaction determine the labor price. The supply depends on the population growth rate, and the demand for the growth rate of the economy. Following Ricardo (and consequently Malthus as well, at this point[23]), population growth depends on the level of the real wage, and this on the prices of the basket and the monetary wage. The economic growth rate, on the other hand, depends on multiple factors. First, the growing demand, both internal and external. That is, the demand for consumer goods, investment, and exports. We could go a little further analyzing the determinants of consumption and investment, but this would lead us to incorporate other theoretical aspects. In order to remain within a Ricardian framework, we will limit ourselves to taking the economically active population (EAP), the wage (based on Mexico's minimum wage), the Gross Domestic Product (GDP), cgrowth rate, as a proxy for accumulation of capital, and the level of prices as measured by the national consumer price index (INPC, spanish acronym).

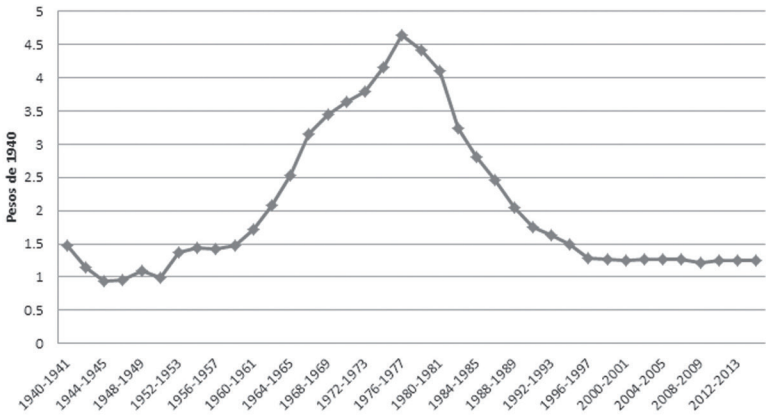
While in his model Ricardo claimed that wages maintained a passive role (constant real wages) and where the cause of the decline in the rate of profit and income growth was due to the decreasing fertility condition, in Mexico real wages have not been constant, nor the rate of profit has been downward;

23 Malthus, T. R. (1985). *Primer Ensayo sobre la Población*. Barcelona, Ediciones Orbis, S. A. Caps. 2 y 16.

while today a landowner class does not exist properly in the manner of Ricardo, although under the tenure of Mexican land leases occur. But the conditions of production are essentially capitalist, while the ownership of the land is borne by the same enterprises that exploit them on the basis of profit maximization. [24]

The real wage, based on the minimum wage, has had the behavior shown in Chart 1.[25] The rise wage period corresponds to the Mexican economic boom period, period in which the GDP growth rate was on average 6.3 percent during the years 1940-1981. [26]

Chart 1. Real wage in Mexico. 1940-2014.



Source: Own elaboration based on Nacional Financiera, CONSAMI and Banco de México's INPC and INEGI data for different periods

24 In such conditions income is confused with profit. "For income I always understand the remuneration given to the landowner by the use of the inherent productive force of the land. Whether the capitalist landowner invests in his own land, whether the capital is in it by an earlier lease, at the expiration of his lease, he can obtain what is rightly called a major rent; but a part of it is obviously paid for the use of capital. The other part is paid only for the use of the land-producing force. "Ricardo, D. *Essay, Op. Cit*. Footnote, p. 10..

25 Compare the section of this graph for the period 1940-1965, with the graph presented by Saul Trejo in his calculation of the share of wages in income for a similar period, in Trejo, R. Saul. (1973). *Industrialización y Empleo en México*. México, FCE. p. 26.

26 In contrast, real wages grew at a rate of 4.2% in that period (if the 1950-1981 period is taken, wage growth is 5.0% yearly). The growth rates of wages and GDP over the entire reporting period (1940-2014) are those that result from the adoption of a semi logarithmic model at a 95% confidence level. (See Gujarati, Damodar N. (2003), Econometría, Mexico, Mc Graw-Hill.). The historical series on real wages and real GDP is self-made, adjusting the data to a single base year (1940). With information from Nacional Financiera, CONSAMI and INEGI for several years. See Annex, Table 1 and charts A.1 and A.2.

Both variables maintained a positive relation in the period.[27] The increase in real wages is explained by the fact that in the boom period, monetary wages grew faster than the prices of the workers' consumption basket.[28] But the same increase in money wages reveals a great dynamism in investment, as a result of real profits obtained by companies and higher expectations of growth, in conjunction with a slower growth of the EAP. [29]

The fact that the rate of profit was increasing at this stage reveals that there were no decreasing yield constraints, neither in agriculture nor in the industrial (and services) sector, which would have implied a greater use of labor. On the contrary, yields were increasing in both sectors, and this was a factor that increased the labor demand, with the consequent increase in the monetary salaries, and therefore, in the real ones.[30]

As favorable conditions for growth were easing, the Mexican economic process was reversed in such a way that investment and consumption declined, as did exports. The salary begins to fall when the development model followed up to that date is exhausted. Indeed, 1982 is the turning point of Mexican economic growth; from that year until 2014 economic activity measured by GDP maintained a growth rate of 2.9 percent, half the dynamism recorded in the previous period. [31]

For a time economic policy cushioned the impact of the negative effects of such factors. This was possible thanks to a policy of increasing public

27 The correlation coefficient between these variables for the mentioned period was 0.94. See Annex, Table 2.

28 While the former grew at an annual rate of 11.1 percent, the latter rose at a rate of 6.9 percent. See Annex, Table 1 and Charts A.2 and A.4.

29 Such expectations were supported both by the economic situation around the Second World War, and by the economic policy implemented by the State in the context of such a conjuncture. This policy fostered an industrializing process. See for example, Solis M. Leopoldo (1999). The evolution of the Mexican economy. Mexico, El Colegio Nacional. Chap. VII, pp. 251-256; Vernon, Raymond (1965). The Dilemma of Mexico's development. Cambridge, Massachusetts. Harvard University Press. Chap. 4. It should be noted that in the period 1940-1981, while economic activity grew at an annual rate of 6.3 per cent, the EAP did so at a rate of 2.9 per cent. This restriction of labor supply partly explains the increase in the monetary wage in this period. See Annex, Table 1 and Charts A.1 and A.3

30 Saúl Trejo reports an elasticity of annual growth of industrial production in relation to the GDP of 1.24, for the period 1950-1967. Trejo, R. Saul (1973), *Op cit.*, pp. 26-28.

31 The real wage in this period decreased at a rate of 2.8%. See Annex, Table 1 and Chart A.2.

spending and the favorable conjuncture that meant the discovery of important oil fields. [32] But the public finance crisis, which stemmed from an expansionary fiscal policy on the expenditure side and a contraction one on the side of non-oil revenues, was compounded by the energy crisis in the international market, which caused a severe fall in the price of raw. [33] In fact, such circumstances meant that the State was not in a position to counteract the effect of a slower pace of growth stemming from weakened effective demand. The consequence of this incapacity was a fall in the labor demand that had repercussions on lower monetary salaries, which in conjunction with the increase in basket prices in the period of higher inflation (140% in 1987[34]) meant a fall in real wages. This situation was further aggravated by the fact that labor supply continued to grow (as a result of the increase in real wages in the previous stage), albeit at a slower rate. [35] Thus, real wages fell continuously over twenty years (1980 to 2000). Its level from this last year and until 2014 is practically the same as that prevailing in 1950. Mexican economic history reveals that the *principles* of wage regulation are met, according to Ricardo, for a long period.

FINAL COMMENTS

Under Ricardo's premises, in the long run the income distribution is unfavorable, both for the capitalist class and for the working class, with the landowning class being the only beneficiary as a result of restrictions on the food importation. What ultimately decreases the real wage is the slower rate of accumulation (which depresses the monetary wage) and the rise in the food price.[36]

32 Public spending increased significantly in the administrations of Luis Echeverría and José López Portillo. In the case of the latter, the expenditure policy was backed by significant discoveries of oil deposits in the Mexican subsoil: proven reserves rose from 16 billion barrels in 1977 to 72 billion in 1982. See Annual Report of Banco de Mexico, 1982.

33 El precio medio del barril en el mercado internacional pasó de 33.19 dólares en 1981, a 28.69 en 1982, The average price of the barrel in the international market went from 33.19 dollars in 1981, to 28.69 in 1982, reporting a fall of 4.5 dollars from one year to another. Likewise, exports of other petroleum products, such as natural gas and petrochemicals, also declined in value over the previous year. Pemex. *Anuario Estadístico* 1990.

34 Arjón, L. Pedro (2012). *La inflación y el comercio exterior en México*. Mexico, Editorial Itaca., p. 20.

35 During the 1982-2014 period, the EAP grew at an annual average rate of 2.5 percent (barely four tenths below the rate recorded in the 1940-1981 period). See Annex, Table 1 and chart A.3.

36 With regard to the assumption of a constant real wage Ricardo circumstantially diverts from his scientific approach to admit that real wages can descend. See for example *Principios, Op. cit.*, cap. 6, p. 96.

As regards the application of the Ricardian model to an economy such as that of Mexico, it is observed that for a long period there is an interaction between the accumulation of capital and the labor force movement represented by the economically active population. The interaction between the two variables determines the level of the monetary wage. In turn, the relationship between this wage and the general price level determines the real wage. In Mexico from 1940 two well-defined periods have been distinguished. In the first of these (1940-1981), with a monetary wage growing at an annual rate higher than that of prices, real wages increased sharply; in the second (1982-2014), particularly in the sub-period 1982-2000, the slower economic growth pace combined with a slightly higher growth rate of the EAP implied that the monetary wage increased lagging behind in conjunction with a significant growth in consumer prices was reflected in a real wage return at its 1940 level. It is interesting to note that given the differences in the growth dynamics of the variables in the first period, a positive correlation between real wages and economic activity, and that the former has observed a significant increase, it is evident that workers did not share the benefits of development equally. This is even more serious for the second period, where, even as economic activity grew at a slower pace (an obvious sign of a long-term recessive phase), the fact that real wages have shown a negative growth rate of 2.8 percent, reveals that the business class continued to reap profits, some of which constituted a significant transfer of income from the working class. Thus, in the case of Mexico and within the framework of an essentially capitalist production system, the distribution of income takes place particularly between two broadly defined social classes: the business class which holds capital (and organizer of production) and working class, distributed in the different branches of the production in different categories and with different degree of qualification. The distribution takes place in response to the dynamics between the accumulation of capital and the labor force, on the one hand, and the incidence of prices on money wages, on the other, all of which reveals that the *Principles* of classical economics having relevance as an explanatory framework of economic development in the long term.

—ANNEX—

Table 1. Mexico. Dynamics of fundamental economic variables 1940-2014

VARIABLE	PERIOD	GR[1]	INFERIOR LIMIT[2]	SUPERIOR LIMIT[2]	F[3] CRITICAL VALUE
Real minimum wage	1940-1981	4.18	3.69	4.67	3.8615 E-20
	1982-2014	-2.77	-3.36	-2.17	9.2444 E-11
Nominal minimum wage	1940-1981	11.1	10.5	11.6	6.4047 E-35
	1982-2014	14.3	11.8	16.9	1.4196 E-12
GDP (1940=100)	1940-1981	6.29	6.17	6.4	9.8174 E-51
	1982-2014	2.92	2.75	3.09	9.4002 E-27
EAP[4]	1940-1981	2.86	2.77	2.95	1.2656 E-41
	1982-2014	2.52	2.35	2.68	5.4250 E-25
NCPI[5]	1940-1981	6.89	6.24	7.55	1.7994 E-23
	1982-2014	17.26	14.11	20.41	2.1138 E-12

1 Annual growth rate: variable's coefficient in percentage, obtained by the regression of a semi logarithmic model.

2 Limits of the interval containing the variable's coefficient, at a 95 percent confidence level, using the distribution *t*.

3 F critical value below 0.05 which allows us to accept the hypothesis of a non-zero value for the growth rate.

4 Economically Active Population. Based on EAP's historical series built with data from NAFINSA, Banco de Mexico, ENE and ENOE (INEGI, Mexico).

5 National Consumer Price Index. Based on the historical series of the consumer price index, constructed with data from IGPMCM and INPC (INEGI, México).

Table 2. Correlation coefficient between the gross domestic product and the minimum wage

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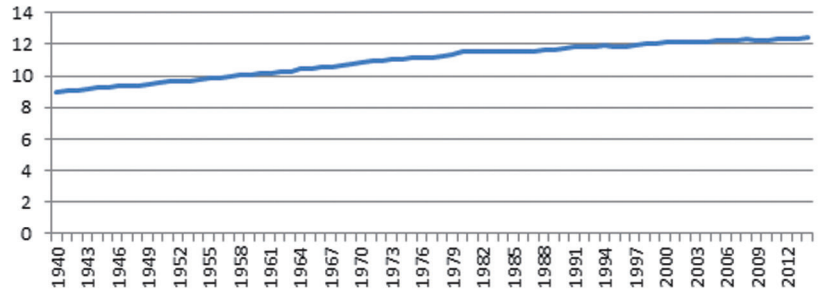
1940-1981		
	GDP	*MW*
GDP	1	
MW	0.944461353	1

1982-2014		
	GDP	*MW*
PIB	1	
MW	-0.888111499	1

Source: Own elaboration based on the natural logarithm of GDP's historical series and minimum wages prices of 1940, built from data of CONSAMI, Banco de México e INEGI.

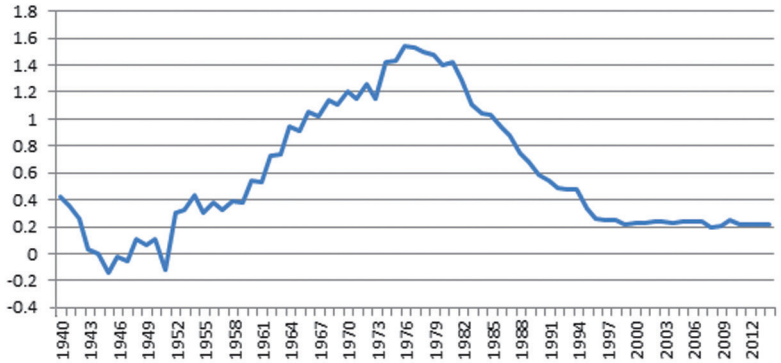
Chart A.1 Gross Domestic Product Evolution[1]



Source: Own elaboration based on GDP's historical serires on 1940 prices built on data from Banco de Mexico and INEGI

1 In natural logarithms.

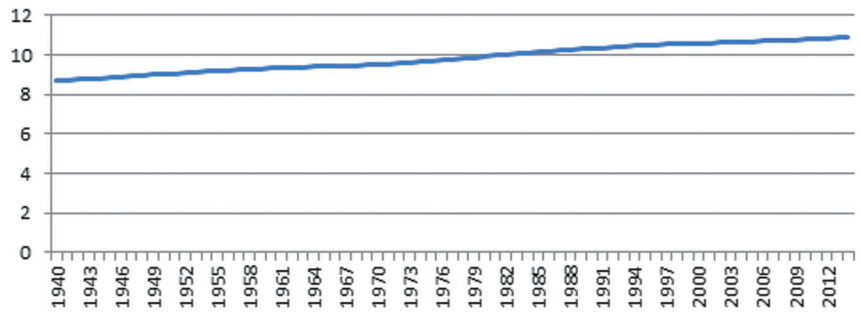
Chart A.2 Minimun Wage Evolution[1]



Source: Own elaboration based on daily minimun wage's historical serie according to 1940 prices, built on data from CONSAMI, INEGI and Banco de Mexico.

1 In natural logarithms.

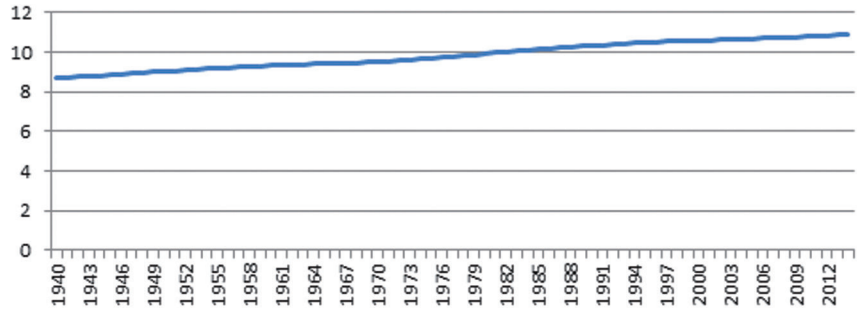
Chart A.3 Economically Active Population Evolution[1]



Source: Own elaboration based on EAP's historical series, built on data from NAFINSA, Banco de Mexico, ENE and ENOE (INEGI, Mexico)

1 In natural logarithms.

Chart A.4 Consumer Price Index Evolution[1]



Source: Own elaboration based on historical series of the consumer price index, built on data from IGPMCM and INPC (INEGI, Mexico)

1 In natural logarithms.

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