Reflections on the Quantity Theory: Pigou in 1917 and Pareto in 1920-21

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Abstract: In 1917, Pigou published his classic article on "The Value of Money" in the *Economic Journal.* In 1920-21, Pareto wrote a manuscript on monetary theory, 'Note Critiche di Teoria Monetaria', but it was not published until 2005 when some fragments of that manuscript were located by Fiorenzo Mornati. In both these papers the authors reflected on the quantity theory of money and both established the conditions that must be met for the theory to hold. Yet the rhetoric of Pigou in light of his analysis was very moderate, cautious and broadly supportive of the theory; whereas the rhetoric of Pareto in light of his analysis was far more direct, unequivocal and critical of the theory. In this study the analysis of Pigou and Pareto is compared and that analysis is used to explain the difference in their rhetoric pertaining to the quantity theory. It is concluded that this case is illustrative of a more general difference between Cambridge and Lausanne during the second generation of these two respective 'schools' of thought.

The names Pareto and Pigou are primarily united by their legacies in welfare economics, though the differences between the two scholars in this field are so significant that many, such as David Collard (2011), differentiate Paretian welfare economics from Pigouvian welfare economics. Indeed, the contrasts, and similarities, between Pareto and Pigou over aspects of welfare economics and income distribution have been the subject of recent studies by the present author (McLure 2010 and 2013).

For the history of economic ideas, it is also relevant that Pareto and Pigou were representatives of wider bodies of mainstream economic thought, with Pareto the second generation leader of the 'Lausanne School' and Pigou the second generation leader of the 'Cambridge School'. Of course, these schools have been contrasted at an even more general level, with Lausanne economics being primarily associated with Walrasian general equilibrium and Cambridge school's economics being primarily associated with Marshallian

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partial equilibrium (Hicks 1946, De Vroey 1999 Donzelli 2008). But within each of these two schools the relationship between money and the real economy was also of considerable importance. The Cambridge school's legacy in monetary economics is recognised as an episode of the first order of importance to the history of economics, with the subject well studied by monetary economists and historians of economics (Bridel 1987). The Lausanne school's legacy in this area has been far less influential, but is still of considerable importance. For example, by the 1930s the originality of Walras's approach was highlighted to the English speaking world by Arthur Marget (1931, 1935), was revived and critically considered by Don Patinkin (1965) and the relationship between money and Lausanne general equilibrium in the works of Walras and Pareto has been historically investigated by Pascal Bridel (1997, 2000).

The purpose of this paper is to extend the comparison and contrast of the work of Pareto and Pigou beyond the field of strict welfare economics and income distribution to a core issue in monetary theory: the validity of the quantity theory of money and the mechanisms for expressing that theory. The scope of the study is limited to near contemporary papers: Pigou's influential "The Value of Money" (Pigou 1917), which provides the first formalisation of the Cambridge equation for the demand for money in reaction to the quantity theory of money in its Fisherian form; and Pareto's manuscript 'Note Critiche di Teoria Monetaria' (Pareto 2005), which was drafted, but not published, in 1920-21 as a criticism of the quantity theory of money.[1]

Pigou's Illustration of the *Quantity Theory*

A. C. Pigou formally introduced, for the first time (Collard 2002, p. xxv), the 'Cambridge equation' for the demand for real cash balances. He did so in a form that could be readily reconciled with the Fisher exchange equation, and the associated quantity theory of money; and yet provide the apparatus for illustrating that the power of a unit of currency to purchase real goods changes in response to factors other than the quantity of money.

Given the purpose of this paper, it is useful to work backwards from the Fisher equation to highlight the difference between Pigou's approach and the standard presentation of the quantity theory of money. The simplified Fisher equation shows that the product of the quantity of money in terms of units of legal tender (M) and the velocity of circulation for money (V) is equal to the product of the nominal price level (P^n) and an index of the volume of transaction (T):

$$MV = P^nT \qquad (1)$$

[1] Fragments of Pareto's manuscript were discovered in the University of Lausanne archives by Fiorenzo Mornati, who published them in the final volume of Pareto's *Opera Omnia* in 2005.

But Pigou's notion of price does not concern the nominal price level (P^n); rather, he treats the real price of money as the quantity of wheat that a unit of legal tender can purchase (P^w). In other words, wheat is the numeraire by which value within the real economy is measured, and (P^w) is the purchasing power of money, as represented by the quantity of the numeraire that a unit of legal tender can command. Consequently, Pigou's notion of price is the inverse of Fisher's, with $P^w = 1/ P^n$. Pigou also presents the real price of money as the dependent variable. Consequently, the Fisherian equivalent of the Pigouvian notion of the purchasing power of a unit of legal tender is:

$$P^w = \frac{T}{MV} \qquad (2)$$

But Pigou's basic contention is that P^w depends on the demand for real balances, where real balances are titles to legal tender (legal tender, deposits and notes issued by banks) which are measured by the product of: total resources enjoyed by the community at any given moment, expressed in terms of the numeraire good wheat, (R^w); and the proportion of those real resources that the community wishes to hold as titles to legal tender (k). Consequently, Pigou specified the real price of a unit of legal tender as:

$$P^w = \frac{kR^w}{M} \qquad (3)$$

But Pigou also demonstrates the equivalence of his approach with that of Fisher by suggesting that the right hand side of equation (2), and the right side of equation (3), both represent the value of real balances. This is because the value of real balances, (kR^w), is the equivalent of the ratio of T to V because the proportion of real resources that the community holds as titles to legal tender (k) is the inverse of the velocity of circulation[2] (V) and transactions (T) are the sum of real quantities of goods weighted by real value (i.e. the quantity of each good is weighted in the transaction index by the quantity of the numeraire good wheat that it could purchase). When equations (2) and (3) are expressed as percentage changes, and the value of the T to V ratio in equation (2) is constant between periods, and the real balances kR^w in equation (3) is constant between periods; and the quantity theory emerges.

$$\%\Delta P^w = -\%\Delta M \qquad (4)$$

That is, the relative change in the value of a unit of money is negatively related to the relative change in the quantity of money when: the value of real cash balances kR^w is constant between periods (i.e. when equation 4 is derived from equation 3); or, to say the same in another way, the ratio T/V is constant between periods (i.e. when deriving equation 4 from equation 2).

[2] Pigou notes that when people halve their holdings of titles to legal tender the velocity of circulation is doubled (Pigou 2002 [1917], p. 209).

Pareto's Illustration of the *Quantity Theory*

The form of Pareto's method of formalising the quantity theory is most closely linked to the Fisher equation, though it is unclear if Pareto had read Fisher's work on this subject and his inspiration appears to be Walras's early work on monetary theory (McLure 2012).[3] The similarity is due to Pareto, like Fisher, setting his equation in terms of nominal prices. The difference is that Pareto isolates the transaction price for the numeraire good from that of the transaction prices for all other goods. As a consequence, Pigou's focus on the purchasing power of money, and its relationship to the numeraire (wheat in Pigou's analysis), is also evident from Pareto's money equation.

Pareto starts his monetary analysis in his 'Note Critiche di Teoria Monetaria' (2005 [1920-21]) by attempting to derive the value of transactions from the following Walrasian equation of exchange of goods and productive services for an individual. However, he does so by isolating the numeraire good from other economic goods:

$$a_0 p_0 + \sum_{\tau=1}^{\mathrm{T}} (a_\tau p_\tau) = 0 \qquad (5)$$

a_0	quantity of the numeraire good
p_0	nominal price of the numeraire good
a_τ	quantities exchanged of goods and services 1, 2 ... T
p_τ	nominal exchange prices of goods and services 1, 2 ... T

To derive the value of transactions for the economy as a whole, Pareto: manipulates equation (5) to create an equality that shows the value of good acquired on the left hand side and value of goods supplied on the right hand side; aggregates the algebraically rearranged equations 5 for all individual entities in the economy (such as consumers, producers, savers, capitalists, banks, government entities); and, since economic goods represented by variable a are recorded twice (once as a receipt and again as a payment), the value of transactions is equal half the sum of the aggregate value of economic goods received plus half the sum of the aggregate value of economic goods supplied.

For consistency of comparison with Fisher and Pigou in this paper, it is assumed here that *T* indicates a transaction (i.e. ½a in Pareto's own equations) and the numeraire good is

[3] To date the author has found no reference in Pareto's works to Fisher's classic *The Purchasing Power of Money,* and it is uncertain if he ever read it. By 1911, Pareto had devoted himself almost entirely to sociology and was, to a considerable extent, isolated from developments in the English speaking world. This is one of the reasons why Mornati's discovery of fragments of Pareto's unpublished 1920-21 manuscript is so important for scholars investigating the development of Pareto's ideas on economic matters.

taken to be wheat. On that basis, Pareto's estimate of the value of transactions may be represented by:

$$T^w p^w + T^o P^o \qquad (6)$$

T^w	aggregate quantity of wheat transactions in a period.
p^w	nominal price of wheat during the period.
T^o	vector of aggregate transaction quantities for all economic goods other than wheat.
P^o	vector of nominal transaction prices for all economic goods other than wheat

Pareto then posits that the quantity of money is obtained by multiplying the nominal value of transactions, given in a reduced form by equation (6) above, by the proportion of the total value of transactions that are actually undertaken with money (α) and dividing by a coefficient that represents the velocity of circulation (V).

$$M = \frac{\alpha\left(T^w p^w + T^o P^o\right)}{V} \qquad (7)$$

Prima facie, Pareto's equation is very close to the Fisher equation, with the sum of $T^w p^w$ and $T^o P^o$ equating to the Fisherian notion of PT, with M and V having the same meaning in Fishers and Pareto's equations.[4] The only difference being that Pareto introduced the coefficient α, which has a superficial similarity with the k from Pigou's Cambridge equation. Pigou's k is the inverse of Fisher's *V*. Consequently, if Pareto's α was also the inverse of velocity of circulation, his equation would be over-determined with velocity included in the denominator and the inverse of velicity included in the numerator. But what Pareto had in mind here for α is the proportion of all exchanges that are not mediated by means of money in any way (so no provision needs to be made for money to settle such exchanges). The gifting of presents is one example, unremunerated activities could be another. Specifically, Pareto explicitly recognises that only a proportion of all transactions influence the quantity of money.

To illustrate the quantity theory of money, Pareto undertook analysis of the change in the quantity of money, prices and transactions between two periods. To facilitate his investigation of that relationship, Pareto introduced two relative coefficients: a real transaction coefficient labelled (v), which is the ratio of (value weighted) output in year n to

[4] Pareto actually used the Greek letter σ, for the quantity of money *M*, and lower case *v*, for the velocity of circulation *V*; but for convenience of comparison with Pigou and Fisher, and to avoid the confusion associated with Pareto assigning two different meanings to *v* in his manuscript (velocity in the context of the exchange equation, and as indicating a real transaction coefficient when investigating change between periods), the letters *M* and *V* have been utilised in this paper when discussing Pareto's equations.

(value weighted) output in year $n+1$; and (ii) a nominal price coefficient labelled (μ), which is the ratio of nominal prices in year n to year $n+1$. Pareto does not label ν and μ, he just refers to them a coefficients. Nevertheless, he gives illustrative examples which make their respective meaning clear by noting that there is: no growth or contraction in the real economy when $\nu = 1$; the real economy grows when $\nu < 1$; and, the real economy contracts when $\nu > 1$. Similarly, again between the same periods, there is no change in nominal prices when $\mu = 1$; nominal prices rise when $\mu < 1$; and nominal prices fall when $\mu > 1$. Consequently, when g indicates the rate of growth in the real economy and π indicates the rate of price inflation, his coefficients can be labelled and defined as:

ν, a 'real transaction' coefficient: $\nu = \dfrac{1}{1+g}$

μ, a 'nominal price' coefficient: $\mu = \dfrac{1}{1+\pi}$

Pareto's illustration of the relationship between these coefficients and monetary theory is undertaken with direct reference to equation (5), but the coefficients may be inserted directly into equation (7) to give the quantity of money in period n +1.

$$M_{n+1} = \frac{\alpha_n \left\{ \dfrac{T_n^w p_n^w}{\nu\mu} + \dfrac{T_n^o P_n^o}{\nu\mu} \right\}}{V_n} \qquad (8)$$

The barracked term of the numerator in equation 8 represents the nominal value of wheat transactions plus the nominal value of all other transactions for the period n +1. The proportion of total transactions facilitated through the payment of money, α; and the velocity of circulation, V, both remain unchanged in period n +1 relative to the previous period, n. Consequently, when Pareto analyses 'between period' movements in the quantity of money he deliberately sets aside variations in the proportion of transactions undertaken with money and variations in the velocity of circulation of money. Equation (8) may be simplified to the form shown below, which Pareto presented in his manuscript:

$$M_{n+1} = \frac{M_n}{\nu\mu} \qquad (9)$$

For comparison with Pigou's equation and its relation to the quantity theory of money, it is useful to consider the relationship evident from Pareto's equations concerning the rate of change between periods in the: quantity of wheat that can be purchased with a unit of legal tender (i.e. the change in Pigou's P^w); and the quantity of money (M).[5] The

[5] The percentage change in the quantity of wheat that can be purchased with one unit of currency {equation (10)} depends on the relation $P_n^w = T_n^w / p_n^w$ in period *n* and relation $P_{n+1}^w = (T_n^w \mu) / (p_n^w \nu)$ in period *n+1*, which

underlying relationship between these 'between period' rates of change can be made explicit through the introduction of logarithms and with due regard to the earlier noted definitions of Pareto's real transactions and nominal price coefficients.[6]

$$\%\Delta P^{w} = \left(\frac{\mu}{\nu} - 1\right)\cdot 100 \tag{10}$$

$$\begin{aligned} &\approx \left\{\mathrm{Log}(1+g) - \mathrm{Log}(1+\pi)\right\}\cdot 100 \\ &\approx (g-\pi)\cdot 100 \end{aligned} \tag{10a}$$

$$\%\Delta M = \left(\frac{1}{\nu\mu} - 1\right)\cdot 100 \tag{11}$$

$$\begin{aligned} &\approx \left\{\mathrm{Log}(1+g) - \mathrm{Log}(1+\pi)\right\}\cdot 100 \\ &\approx (g+\pi)\cdot 100 \end{aligned} \tag{11a}$$

Consequently, the quantity theory of money holds when the real growth rate, g, is zero, which means that Pareto's real transaction coefficient must be one i.e. $\nu = 1$. In that case, equations (10a) and (11a) approximate to –π100 (percentage change in the purchasing power of money) and +π100 (percentage change in the rate of monetary emissions) respectively, which is the quantity theory result represented by equation (4) from Pigou's analysis.[7] It may be concluded, therefore, that equation (4) holds within Pareto's framing of monetary theory on the condition that Pareto's real transaction coefficient is 1, which means that real growth must be zero (for whatever reason).

Pigou and Pareto: their concerns with the 'Quantity Theory'

Interestingly, both Pigou and Pareto used their monetary equations of exchange to point to circumstances when the conditions necessary for the quantity theory of money to hold are not met, but they focused on different factors when considering violations of those considerations. Pigou was primarily concerned with the effect that a variation in the proportion of national resources held as real balances, and the implications of that for the inverse nexus between the purchasing power of a unit of money and the quantity of money. Conversely, Pareto's equations suggest that the breakdown in the quantity theory is primarily due to the economic interdependence between the level of real transactions and

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are derived from equations (7) and (8). The percentage change in the quantity of money (equation 11) is derived directly from equation (9).

[6] I thank Ken Clements for suggesting the use of logarithms to relate Pareto's analysis of the rate of monetary emissions to g and π.

[7] Alternatively, if Pareto's coefficients are retained, when $\nu = 1$ the same result is obtained because equations (10) and (11) reduce respectively to:

$$\%\Delta P^{w} = (\mu - 1)100 \text{ and } \%\Delta M = \{(1/\mu) - 1\}100$$

the quantity of money, with the real transaction coefficient applying to activity in the real economy (transactions) and the quantity of money.

Pigou's equation (3) is only a simplification of his approach: it provides an indication of the demand for 'real cash balances', where the real economy is scaled by k to indicate the proportion of real balances demanded, but recognises that only a proportion of this constitutes the demand for real cash balances because of the way that the banking system works. Specifically, Pigou resorts to the notion of a representative person who holds real balances in two proportions: one proportion being the share of real balances held as titles to legal tender and held in notes and coins, (c); and another proportion being the share of real balances held as bank balances by bank customers $(1-c)$. As bank deposits are the source of loan funds, titles to legal tender only contribute to the demand for money in terms of the proportion of customers' balances that banks choose to retain as legal tender against the balances held by customers, which is designated by the letter h. As a result, Pigou's approach represented by equation (3) is extended to equation (12):

$$P^w = \frac{k\{c+h(1-c)\}R}{M} \qquad (12)$$

When R is assumed to be independent of the quantity of money, Pigou's approach suggests that the quantity theory of money requires the relation $k\{c+h(1-c)\}$ to be constant between periods. Consequently, if the quantity of money is unchanged, the real value of money (the amount of wheat that a unit of currency can purchase) varies in response to variations in: the proportion of real balances, (k); the proportion of real balances held as legal tender (c), such as notes and coins, and bank deposits, the variable $(1-c)$; and/or the proportion of deposits that banks retain as legal tender against the balances held by bank customers, (h).

Pigou (1917 [2002], p. 203-204) indicates that k varies in response to changes in: the convenience individuals gain from holding real balances; the opportunity cost of holding such balances, such as forgone income from not investing in the production of future commodities; and forgone satisfaction from not undertaking current consumption. For example, periodic fluctuations in 'the expected fruitfulness of industrial activity' may cause k to change. Expectations are important in that regard: expectations of deflation increase people's desire to hold money and expectations of inflation decrease people's desire to hold money, other things being equal.

The share balances held in notes and coins (c), or otherwise $(1-c)$, also alters with the distribution of income because "the rich scarcely pay for anything in coin" (Pigou 1917 [2002], p.207). This also implies that a general increase in real per capita income increases the proportion of real balances held in bank deposits, even in the absence of a change in the distribution of income. Related to this is the extent of the banking system. More generally

the share of real balances held as bank deposits increases as the extent of the banking system grows, such was when cheque facilities are increased or the period of credit offered by shopkeepers and traders is increased.

The deposits that banks retain as cash against their customers balances (h) will also vary in response to a number of economic factors similar to those that affect the demand for real balances k. Factors specific to the bank sector include internal organisation of banks, including cross bank arrangements such as clearing houses, the proportion to which bank liabilities held across different types of accounts, with reserves associated with accounts that place cash in the hands of foreign depositors (who may need to withdraw legal tender for currency conversions) and the general public (savings accounts), which is sometimes higher than in the case of operating or other accounts (from which withdrawals are facilitated by cheques, bank notes or other instruments designed to transfer funds from one account to another). Of course, (h) must also be large enough to account for changes in sentiment about the viability of the banking system in the face of panic.

To the extent that changes in the general resources of the community, R, are considered, it is in the context that it affects k, with the increase in R from industrial expansion increasing the share of resources held in real balances because the poor cannot afford the luxury of money in hand. In that case: "the same cause that brought about an increase in R, will have affected the variable k in the same sense." (Pigou 1917 [2002], p. 215).

The end result of Pigou's analysis is that it does not support a very strict application of the quantity theory as the factors that he associated with a potential breakdown of the quantity theory (primarily variations in k, c and h) are extensive. As David Collard has observed, Pigou's 1917 article demonstrates that:

> "...without simplifying assumptions, the demand for real cash balances will not in general be constant and the dichotomy between the real and monetary sectors disappears."
>
> (Collard, 2011, p23)

Pareto also concludes that there are no real and monetary sectors that are related. His analysis does not support the dichotomy between the real and monetary sectors as there is no *a priori* reason to expect his real transaction coefficient to be 1, because the real and monetary sectors are interdependent with each other. Indeed, he rejected the quantity theory result because he regarded its validity as being predicated upon the real value of transactions being unrelated to, and independent of, the quantity of money, which he regarded as erroneous.

Why is the Rhetoric of Pigou and Pareto on the 'Quantity Theory' so Different?

Notwithstanding the fact that both Pigou and Pareto spilt a lot of ink writing on the conditions that must be met for the quantity theory to hold, and made it quite clear that those conditions often won't be met, their rhetoric when drawing conclusions from their analysis is very different. This is evident from the following quotations:

> *Pigou on the 'Quantity Theory'*: "At the outset I insist that, tho the machinery that I shall suggest in the following pages is quite different from that elaborated by Professor Irving Fisher in his admirable *Purchasing Power of Money*, and, as I think, more convenient, I am not in any sense an 'opponent' of the 'quantity theory' or a hostile critic of Professor Fisher's lucid analysis."
>
> (Pigou 1917 [2002], p.199)

> *Pareto on the 'Quantity Theory'*: "One has a theory, complete, simple, beautiful. A shame it does not accord too much with the facts. ... The reality is that there is only a relationship of interdependence and to know the particulars [of the relationship between the quantity of money and prices] considerations other than monetary circulation and prices are needed."
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> (Pareto 2005, p. 264).

There are three substantive reasons for this difference in rhetoric.

The first substantive reason is that Pigou and Pareto consider the quantity theory from two different points of reference. Pigou's focus contrasts two distinct 'machineries' of monetary theory that may be used to illustrate the quantity theory i.e. the Fisherian equation of exchange and his alternative demand for real cash balances equation. The proposition that changes in the quantity of money are neutral to the real economy is secondary to the basic question of how the machinery of monetary theory can best establish the conditions necessary for that theory to be met and the identification of influences that may act to prevent those conditions from being met.

> "The 'quantity theory' is often defended and opposed as tho it were a set of definite propositions that must be either true or false. But in fact the formulae employed in the exposition of that theory are merely devices for enabling us to bring together in an orderly way the principle causes by which the value of money."
>
> Pigou (1917 [2002], p. 199)

In contrast, Pareto considered the machinery of monetary theory as nothing more than a device to identify the conditions necessary for changes in the quantity of money to fully

explain nominal price levels, without altering relative prices;[8] and remain neutral with respect to activity in the real economy. His formulation of monetary exchange is essentially Fisherian, but Pareto was not, like Pigou, responding to Fisher's careful analysis of the quantity theory. Instead, he was, to paraphrase Pigou, setting out to investigate the quantity theory as a "set of definite propositions that must be either true or false".

The second substantive influence on Pigou's and Pareto's rhetoric is the result of an important difference in analysis within their equations that define monetary theory. Pigou generally takes the real sector R as given and examines monetary questions with respect to changes in the particular portion of the real economy (the portion that corresponds to real balances). When variations in activity in the real sector are considered, it is in the context of what that means for changes in the proportion of resources retained in real balances. Pareto's analysis of the monetary question, however, sets variations in proportions aside (i.e. he formally recognised that proportion of real transactions undertaken with money will vary, but, for analytical purposes, he treated that proportion as if they it was constant). Instead, his focus is overwhelmingly on variations in the level of real economic activity, which he considered in relation to variations in nominal prices and the quantity of money.

The critical point here is that Pareto's analysis of variations in real activity and variations in nominal prices do not follow any causal direction. Moreover, he saw no general regularity associated with the interdependence between the real and monetary sectors because growth in the real transactions could be concurrent with rising prices; falling prices; unchanged prices; or all three at the same time (i.e. the price of some goods may rise, others may fall while and others are left unchanged). The same can be observed in the case of a decline in the real economy. As such, he held little hope that a formalised mechanism could identify systematic and uniform relations between the real and monetary sectors that could be confirmed empirically. The formal mechanism that he employed only served to highlight what is missed by the quantity theory. As a consequence, Pareto's did not consider that a formal mechanism, such as a monetary exchange equation, had a significant place in monetary theory.

Pigou overcomes the hurdle that Pareto refuses to jump by treating the real sector, R in his equation, as essentially exogenous, rendering money as neutral to the real economy. As such, instead of emphasising interdependence between the monetary and real sectors and a resulting independency between changes in prices, real transactions and the quantity of money, he is effectively imposing a specific direction of causation, with changes in the real sector flowing through to monetary arrangements and cash balances.

[8] In his manuscript, Pareto extends his analysis of monetary exchange from that presented in this paper to one in which two categories of transaction are considered beyond the numeraire good: a category of commodities whose prices do not change (or change modestly) in the presence of a change in the quantity of money; and a third set of commodities whose prices change more than the general price change. That analysis, which is predicated on the view that real-monetary interdependences are not uniform across all commodities, is overviewed in McLure (2012).

The role for interdependencies is largely limited to the quantity of money, price levels and proportions of real resources related to cash balances k, c and h. On that basis, the interdependence between a change in quantity of money and a change in the real sector is set aside, implicitly relegated to a second order issue. If that is a legitimate theoretical framing, then the mechanism of monetary theory – associated with equations like Fisher's and Pigou's – does indeed open up the possibility of identifying general, albeit qualified, relations between changes in the quantity of money and the real value of money.

The third reason for the difference in rhetoric between Pareto and Pigou concerns the reason behind Pareto's wish to retain the possibility of nominal price rises (μ <1) being observed in conjunction with both an increase in real economic activity (v <1) and a decrease in real economic activity (v >1) under different social circumstances. The reason is related to his conviction that sociological influences, such as the impact of government initiated redistribution in the face of diverse sentiments, impact on the relationship between money and the real economy. In that regard, in his *Trattato di Sociologia Generale*, Pareto infers that there is interplay between what may be loosely termed fiscal and monetary illusion:

> "Money is an instrument of exchange and as such is studied by economics. But it is also an instrument for levying taxes without suspicion on the part of the public at large that it is being taxed; and in that connection the study of money belongs to the various branches of sociology."
>
> Pareto (1916 [1935], p. 1408, para 2016)

He again returns to this issue in his article 'Economia Sperimentale', his final article published in the *Giornale degli Economisti*[9], by drawing attention to Irving Fisher's suggestion, in paragraph 7 of 'Some Contributions of the War to our Knowledge of Money and Prices' (1918, p 258.), that post Work War I inflation in the wake of the Government issuing vast quantities of bonds during the war was a disguised tax on fixed income bond holders and savers generally. In response, Pareto noted: "if one accepts this point, and it is difficult not to, how can one formulate a theory of money while ignoring its sociological connections?" (Pareto 1918 [2007], p. 315). Pareto was writing during the World War I and he fully appreciated the relationship between a high rate of monetary expansion and price inflation in such circumstances. But he also observed the uneven distribution of the relative costs and benefits of inflation on different groups in society, especially when monetary policy is undertaken as a means of enhancing government's funding of public activities. To Pareto, the economic point was that the combined effect of monetary/fiscal transfers should typically result in the 'destruction of wealth' (i.e. v >1) because the economic effects of such a policy are not uniformly distributed across all members of a society; but the

[9] The *Giornale degli Economisti* was, among other things, the journal of Pareto and his school (see McLure 2007, pp. 50-84). It is also the journal in which almost all of Pareto's original major contributions to economics were first published.

matter does end there. The sociological point is that such monetary and fiscal policy actions are influenced by variable human sentiment, which falls outside the scope of his strict definition of logical action, and, as such, the expected 'economic' destruction of wealth may be either accentuated, avoided or even more than offset by the sociological forces.

In short, when monetary phenomena are influenced by sentiment, and that sentiment acts as a variable force upon human action, Pareto suggests that sociology cannot be ignored. In regard to the equations that Pareto used to interrogate the implications of the quantity theory in his 1920-21 manuscript, it is the interdependence between the real sector and the monetary sector that opens the door to sociological analysis. More specifically, the range of possible relationships between Pareto's nominal price coefficient, μ, and his real sector coefficient, v, is diverse because of the influence of factors that Pareto treated sociologically, such as: the propensity of governing elites, and their supporting economic elites, to use monetary policy to the benefit of *rentiers* ('timid' economic actors who value long period benefits and seek low but very secure returns) or speculators (risk taking economic actors who act on the potential for a high rate of return in the short period); and the character of the reaction to any consequent redistribution facilitated through monetary policy by subsidized parties (e.g. speculators in periods of rising inflation) and by subsidizing parties (e.g. *rentiers* in periods of rising inflation). Pareto's *Sociologia* suggested that the economic consequences of redistribution – whether the effect on the real economy is positive, neutral or negative – implemented through government action, such as monetary, fiscal or trade policy, is related to the character of the prevailing social equilibrium. [10]

Conclusion

At one level, the difference in emphasis by Pigou and Pareto in their analysis of the quantity theory is symptomatic of the broader clash between Cambridge, which emphasised realistic theory that utilises the 'other things remain the same' assumption to set aside distracting second order issues, and Lausanne, which emphasises the broad economic system and its various interdependent linkages, including sociological as well as economic interdependencies.

If the influence of sociological forces on monetary policy is set aside completely (i.e. if the interdependent relationship between the real sector and the quantity of money is

[10] Important aspects of Pareto's social equilibrium include the proportions of people with a high propensity for reordering arrangements within society, relative to the proportion of people with a high propensity to preserve existing arrangements – with the differences in those proportions between the elites and the masses being particularly significant – and the accommodation of *rentier* and speculator activities by political elites. The Paretian treatment of politically instigated redistribution by fiscal means has been previously investigated in some detail by the present author (McLure 2007).

replaced by a presumption that the demand for real cash balances derive from the given size of the real sector) then it is possible to derive a credible formula that represents the machinery of monetary theory. That theory also lays a foundation for the consideration of the short run and long run implications of monetary theory for prices and the real economy.[11] But even in terms of strict economic analysis, Pareto was still less interested than Pigou in subtly assuming 'other things being equal'. If the quantity theory holds in very strict microeconomic as well as macroeconomic terms, then the relative prices of economic goods should be unchanged if demand and supply conditions are unchanged as the general price level changes in direct proportion to the rate of monetary expansion. That was a sign to the mature Pareto that something was wrong with the theory. The two main problems with the quantity theory to Pareto were the presumption that money is neutral with respect to the real economy, as he saw no grounds for such an assumption, and the emphasis in the theory on a causal relationship running from the quantity of money to prices, as he considered that a relationship of interdependence could be ascertained in the relationship between the real sector, prices and the quantity of money.

This explains the difference in the force of Pigou's and Pareto's rhetoric when commenting on the conditions they identify for the quantity theory to hold. Pigou accepts that, as a means of approximation, it is reasonable to assume away some difficult problems of interdependence by accepting a casual influence running from the real economy to the value of real cash balances. Pareto, however, was unwilling to impose a direction of causation under any circumstance. Indeed, he appears to search for every possible interdependent relationship to heighten our understanding of the complexity of the relationship between the monetary and real sectors. Overlaying the economics of money with the sociology of money is the obvious example.

In terms of rational history, the fundamental question is whether Pigou's attempt to orient monetary theory around the machinery of an equation that is partial, in that it imposes a casual relationship from the real economic to the demand for real balances, gives a better understanding of the general regularities of the relationship between monetary and real economics than Pareto's perspective, which has the potential to overstate the importance of interdependencies. In terms of a historical reconstruction, this issue may be viewed another way. This is yet another aspect of the relative emphasis in Cambridge on economics that generates 'light' (theory) that can create 'fruit' (assist policy makers); and the relative emphasis in Lausanne under Pareto's leadership on generating light under which scholars can simply consider the full range of economic and social interdependencies associated with action.

[11] As Thomas Humphrey (2004, p 4) has noted, while Alfred Marshall supported proposition that there is a unidirectional causation between money and prices and that money is neutral with respect to the real economy in the long run, he regarded money as non-neutral with respect to the real economy in the short run. In terms of Pigou's equation Marshall's proposition implies that variation in k, c and h offset each other in the long term and R is not influenced by M, whereas in the short run such variations may not offset each other.

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