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THE ORGANIZATIONAL PROPERTIES OF MONEY: GUSTAVO DEL VECCHIO'S THEORY

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December 2008

"MARCO FANNO" WORKING PAPER N.87

The organizational properties of money: Gustavo Del Vecchio's theory

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Abstract

Between 1909 and 1917, Gustavo Del Vecchio built a theory of money as a *medium of exchange* where organizational and social aspects were investigated in depth, first by means of a conventional static investigation and then by adopting a dynamic perspective. Del Vecchio believed that money, credit, accumulation, and crisis could no longer be theorised with time omitted, and this induced him to formulate dynamic statements which put forward claims about money as a *store of value*. The organizational and social dimensions of money, time and uncertainty were all important and interconnected aspects in his scientific research, for they all sprang from his conceptualization of money as a medium of exchange.

Keywords: economic organization, monetary services.
JEL Classification: B13, B31

* Department of Economics and Management, University of Padua. I wish to thank Pascal Bridel and the participants at the 6th Conference of the Walras International Association held in Kyoto, September 2008, for their useful suggestions. The usual disclaimer applies.

1. Introduction

Between 1909 and 1917, in various articles and essays, Gustavo Del Vecchio (1883-1972)[1] proposed a theory of circulation that has been considered one of the first attempts to integrate money into the Walrasian general equilibrium framework.[2] His early writings, in which he set out his thought on the utility and value of money, credit, the discount rate, banking and international payments were, in chronological order: *Principii della teoria economica della moneta* (1909), *Il capitale disponibile e la circolazione del capitale* (1911), *La teoria economica del credito* (1913), *Sulla teoria economica delle crisi* (1914), *Teorie dello sconto* (1914), *Lineamenti generali della teoria dell'interesse* (1915), and *Questioni fondamentali sul valore della moneta* (1917).

Reading all these articles together – which Del Vecchio (henceforth DV) considered to be a unitary work on the topic of money – may be assisted by some methodological notes on his overall approach to economics. First, each article combined theoretical features, such as the utility and value of money, with applied aspects such as the discount rate, the interest rate and credit, given that DV considered applied economics as providing 'proof' concerning the realism of more abstract theories.[3] Second, DV anchored his theories to the international debate on the topic discussed. He examined the most-debated proposals, comparing them with his own views. In this case, too, DV's criticism of other theories enabled him to clarify his ideas. DV did not merely cite his predecessors and contemporaries: he presented their theories and discussed them. He did so with L. Walras, A. Aupetit, E. von Böhm-Bawerk, C. Menger, I. Fisher, L. von Mises, F. von Wieser, J-B. Clark, J.A. Schumpeter, G. Cassel, A. Marshall, G.F. Knapp, and K. Wicksell, to mention only some of the authors writing on monetary topics whom he considered. Third, it should be noted that DV often made use of a

[1] Gustavo Del Vecchio was professor of economics and public finance at the Italian universities of Bologna, Milan "Bocconi", Trieste, Rome, among others. Editor of *Giornale degli Economisti*, he was Minister of the Treasury from 1947 to 1948 in the fourth De Gasperi Government, in which Luigi Einaudi as Vice-Prime Minister and Minister of Finance.

[2] The first of a series of unsuccessful attempts that led to acceptance, as stated by Bridel (1997, p. viii), that "there is no place for money in modern Walrasian general equilibrium models."

[3] As with L. Walras and V. Pareto (in the *Cours*) and, previously, nineteenth-century writers, recurrent in almost all of DV's works is the complementarity between pure economics based on equilibrium and applied economics. But whilst Walras conceived applied economics mainly in normative terms (van Daal 2006; see also Baranzini 2005), DV regarded it as a more realistic economics in which economic behaviours are influenced by extra-economic factors. Generally speaking, the distinction between pure economics and applied economics "reproduces," as C. Gini wrote (1943, p. 9), "the analytical sequence

rhetorical device whereby he expounded statements or theories which he then subjected to thorough analysis. Proceeding in this way enabled him to reach conclusions that did not seem definitive, in the sense that the hypotheses were not completely rejected or accepted. However, this was typical of DV's approach, whose main object was not to reach the "absolute truth" but rather to show the complexity of any issue pertaining to the economic world.

In short, DV built a theory of money as a *medium of exchange* where organizational and social aspects were investigated in depth, first by means of a conventional static investigation and then by adopting a dynamic perspective.[4] DV believed that money, credit, accumulation, and crisis could no longer be theorised with time omitted, and this induced him to formulate dynamic statements which put forward claims about money as a *store of value*. The organizational and social dimensions of money, time and uncertainty were all important and interconnected aspects in his scientific research, for they all sprang from his conceptualization of money as a medium of exchange.

There is a further recommendation that should be followed if DV's proposals are to be thoroughly understood: consider him to be a disciple of neither L. Walras nor V. Pareto. DV's monetary analysis, particularly when he introduced uncertainty and time, made him a forerunner of topics subsequently made famous by F. Knight, the Austrian School, and others. Even if these topics lead us to single out in DV's works a connection between the Walrasian approach and the Austrian method,[5] he was an original thinker whose ideas to date have not been sufficiently well known.

The history of economic thought places DV among Walras's followers. In particular, it considers him to be one of the scholars who first tried to develop Walras's monetary services approach (Schumpeter, 1954, p.1082; Marget, 1932a and 1935).[6] In pursuit this objective, DV addressed the age-old problem of establishing the causal connection between the utility and value of money without dissipating it. In fact, he was

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that is adopted by the most part of scientific disciplines in order to gradually solve problems, starting from general or more abstract aspects and then passing to more specific and actual ones."

[4] It should be pointed out that, for DV, the "value of money" had the common meaning of the "purchasing power" of money expressed by the reciprocity of the "price index." However, such definitions and measures did not resolve the issue of changes in this value of money.

[5] See Realfonzo, 2000.

[6] In previous works I have argued that Del Vecchio's theoretical originality is grounded in his effort to intertwine economics and history (see Tusset 2000 and 2004). Del Vecchio treated general economic

able to circumvent the problem by shifting from a static monetary theory to a dynamic one. This shift enabled DV to refine his most important contribution to the monetary debate during the early years of the last century: that is, introducing the problem of a monetary theory involving uncertainty into the debate.[7]

The originality of DV's approach also makes it necessary to provide a brief introductory overview of his notion of economic science. This overview is furnished in Section 2, where DV's conception of economics as a science of social organization is outlined. The subsequent sections are devoted to monetary topics, although organizational aspects continuously reappear. Specifically, Section 3 clarifies DV's position on quantity theory. Section 4 develops his notions of monetary utility from both the individual and social viewpoints. Section 5 is centred on the role of the rate of interest in both static and dynamic conditions, a crucial step towards full understanding of DV's overall theory of circulation. Section 6 describes his insights into time and uncertainty. Section 7 singles out DV's main statements about monetary services. Section 8 makes some concluding remarks.

2. Economics as the science of social organization

When we look at the spread of economic theory in Italy, DV's works represent a point of junction, if not synthesis, between the late-nineteenth century evolutionary approach, which in its turn was the result of classical, organic, and historical theories, and the equilibrium perspective mainly derived from Walras and Pareto's theoretical frameworks.

The distinctiveness of DV's approach derived from the fact that he viewed economic theory as a "theory of self-interest relationships among human actions" (1915, p. 316) but directed attention more to *relative* than *absolute* magnitudes, more to *titles* than *physical quantities*. Indeed, in DV's perspective, economics was nothing more than the discipline which analyses human beings in their relationships concerning goods and with goods: "there are not *things* but economic relations" (1967[1932], p. 9,

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equilibrium as the zenith of economic studies, but this does not mean that he was a mere disciple of Walras.

[7] From 1909 onwards Del Vecchio showed awareness that monetary facts require both static and dynamic methods (1909, p. 550), repeatedly stating that monetary circulation issues are mainly dynamic ones (see, among other works, 1914b, p. 135).

footnote). He was more interested in the relationships springing from wealth than in wealth itself.

The notion of "economic relationship" gives a touch of originality to DV's theory vis-à-vis traditional economic schools of thought. Whilst this attention paid to relative magnitudes and to entitlements was clearly indicative of the widespread advent of "Pragmatism" in Italy during the first decades of the century (Faucci, 1990, p. 200), the origins of this concept lay in organicism and recalled the German economic-law school of the mid-nineteenth century.[8] That the latter was well-known to DV is shown by his early essay *Beni immateriali e capitali immateriali* (1908).

An immediate consequence was that DV could not strictly adhere to the theory of commodity-based money and assert a direct utility of money as a commodity. Nor could equating the utility of money with the utility of goods purchased fully satisfy him. The focus, he argued, had be trained on entitlement and, more generally, on the economic relationships springing from money. Once economics was based on relationships, it would inevitably have to place organizational and subjective features at its centre. Never, as in this case, is money more a relational good than a commodity.

If we postulate that economics "studies certain processes instead of making the inventory of wealth" (1908, p. 235), we can understand DV's interest in the processes by which markets and enterprises are organized, and in social competition. Hence DV's monetary theory must be examined in light of his assumption that economics is a science of economic organization,[9] where the latter is defined:

> As the less visible side, but also the side that is nearest to political economy, since organization, in the strict sense of the word, is the main object of economic theory. (1933, p. 45)

Therefore, because "organization is essentially a dynamic economic aspect" (1908, p. 268), the task of economics is to investigate market transformations in light of economic dynamics. Although the next two sections focus on monetary features, they confirm that DV's view of monetary functions must be interpreted according to the attention that he paid to their organizational features.

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[8] The German economists had developed a theory of economic goods which was grounded on four types of "relationships": first, as goods unrelated to economies, i.e. non-economic goods; second, as goods which are economic according to their origin but not to their use, i.e. non-trade goods; third, as goods in the opinion of some but not of others; and, fourth, as economic goods (1908, p. 231). In this regard, DV paid close attention to von Hermann's perspective (1832[1870]).

[9] Federico Caffè, a Del Vecchio's pupil, stressed this point (1983, p. 15).

3. Money as an organizational technology

From the first pages of the *Principii della teoria economica della moneta* (1909), DV's best-known article on monetary topics, he reaffirmed his adherence to the neoclassical principle that money performs a unique function as a *medium of exchange*:

> Money […] is money if it deserves to be exchanged, only during the exchange is it useful, and even if we can affirm that it is useful since it has value […] certainly it is useful when it is exchanged; in less abstract terms, we can say that its utility coincides with its exchangeability. (1909, p. 509)

The stress on 'exchangeability' did not contrast with DV's above-mentioned idea of 'money as a relation' backed by transactions. On the contrary, the weight that DV attributed to 'relations' requires us to put 'exchangeability' at the centre of his monetary theory and therefore to conceive DV's money, first of all, as a *technology of exchange*,[10] which raises questions about the organization of the productive and consumption economy.

DV's discourse started from his criticism/rejection of the neoclassical dogma *par excellence*: the *quantity theory*. From the outset, he detached himself from such a broadly accepted theory (1909, p. 258), introducing new concepts in order to confute the explanatory power of the quantity theory. In particular, he replaced the velocity of circulation of money with the *effectiveness* of money, *E*, (1909, p. 261), a notion expressing the relation between the quantity of goods exchanged and the quantity of money, which DV suggested was equal to the reciprocal of the velocity of circulation of money (1909, p. 263)

This was not only a terminological adjustment, because by means of the effectiveness of money DV pointed out that the velocity of money could not be treated as a constant, as in mainstream thought, because it changed according to the type of economic organization and to individual behaviours. DV reiterated this point in 1925, when he underlined his refusal to apply average values to the quantity theory. He argued that magnitudes such as velocity of circulation of money and mass of money could not be assumed as averages, owing to their changeability according to the development of the country or the region. In his words:

[10] Pascal Bridel first suggested this interpretation of DV's conception of money as medium of exchange.

> We must replace our considerations on *one* mass of commodities, *one* mass of money and *one* level of price, etc., with *many* heterogeneous masses of commodities, *many* heterogeneous masses of money and *many* levels of prices […] We must obtain a scheme more complex than that given by the quantity theory of money. ([1925]1967, p. 314)

Briefly, he historicized the quantity theory, and consequently the demand for money, by making them depend on the behaviour of the social or productive groups prevailing in a given society ([1925]1967, pp. 317-18). Hence DV proposed a theory of money which was neither micro- nor macro-founded but constituted a *meso*-theory built on the organization of a given economy in productive/social groups. According to DV, money accounts more for organization than for prices.

DV made reference to the volumes of spending among the main components of the economy (landowners, entrepreneurs, farmers, workmen, domestic servants, and so on), as R. Cantillon did in his *Essai sur la nature du commerce* (1931 [1755]) when treating of monetary circulation.[11] Neither the individual nor the country, but the productive (or social) group becomes the subject expressing demand for money according to the quantity of goods exchanged. Put briefly, the demand for money depends on the quantity of homogeneous goods produced and exchanged by social groups. Hence, if a society comprises three social groups, *A*, *B*, and *C*, producing respectively three quantities of goods, Q_A, Q_B, and Q_C, the demand for money in that economy depends on the goods produced $Q = Q_A + Q_B + Q_C$, taking into account the effectiveness of money, *E*:

$$M = M(Q, E). \qquad [1]$$

The function must be introduced because *M* follows the variations of *Q* according to productive conditions. In fact, DV linked the effectiveness of money to the efficiency of the productive groups in the society. If we posit that *A* is the "main group," the goods produced by *A*, Q_A, sustain the demand for money by the country as a whole, *M*, to an extent varying with both the characteristics of the main group and the number of other groups. In a certain sense, the 'main group' fixes the demand for money by the country as a whole.

[11] Cantillon's analysis concerned exchange by means of money among the main social groups in eighteenth-century France. See Cantillon, 1931[1755], p. 120 ff. On these topics see Brewer, 1992 (Chap. 6). Previously, Petty and Locke had discussed the same problem of the proportion between exchanged goods and circulating money.

But, what does "main group" mean? Although DV was not clear on this point, one may suppose that the main or most efficient group is that in which one unit of money exchanged moves the greatest quantity of goods.

> [The main] "group" will be determined for each period of time; after that, a unit of money can be used to make another exchange: if this period is very long we would have a very high value of money; if the period is very short, we would have a very small value of money.[12] (1909, p. 162)

Accordingly, one unit of money moves a greater quantity of goods, i.e., the effectiveness of money increases. Since the monetary relations established by the most efficient group tend to spread among the other groups, we can say that the demand for money by the main group determines the entire demand for money.[13]

Bearing in mind that, according to the intermediary function of money alone, the value of money is the reciprocal of the level of prices, we can conclude that the more competitive the market, the lower the prices, and the higher the value of money. But DV sought a definition of value of money which was independent from the *many* levels of prices. He stated that the value of money, V_M, is equal to the ratio between the *mass* of goods produced by the most efficient group, Q_A, and the *mass* of money, M, times the effectiveness of money, E:

$$V_M = \frac{Q_A}{M} E \,. \qquad [2]$$

In conclusion, DV's argument appears more consistent if we read the ratio between quantities of goods and money as expressing both the efficiency of the main group and its capacity to make valuable use of money.

This analysis also recalls the distinction drawn by Walras (1954[1926], p. 380) between a "periodic" market and a "continuous" market. The former is characterised by large groups and by a reduced number of transactions; the latter by small groups and by many transactions. Consequently, the demand for money grows with the number of transactions; the latter in its turn depending on the characteristics of the market. The larger the social groups or sectors are, the fewer the transactions (1909, p. 263).

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[12] The idea of *group*, as stated by Del Vecchio, recalls the relation between the amount of goods sold and the share of goods not produced for the market. Marget, among others, subsequently discussed this point (1932b).

[13] In a certain sense, by determining the quantity of money and implicitly guaranteeing the exchangeability of money, the 'main group' took the place of the Walrasian auctioneer.

Summing up, the quantity of circulating money depends on the structure of the economic system, while it is independent from the value of money. By contrast, the value is determined by the most efficient group, by demand, and by the effectiveness of the circulating money. The most plausible conclusion to this analysis is that DV posited a different value of money according to the productive structure (that is, economic organization) of the country. This prevented him from also building a general theory of the value of money where money has mainly an intermediary function.

4. Individual and social utility of money

According to advocates of the utility of money, DV sought to insert money into the utility function of the agent, in that this would mean integrating money into the theory of value. But he never stated that the value of money is determined by its marginal utility (see also 1956b, p. 278). On the contrary, as we will see in the next section, it is the *final* utility of goods that affects the rate of interest, which, in its turn, influences the value of money. But let us dwell for a moment on the utility of money, which, as in the case of goods, is always a *final* utility. This is because DV thought that the utility of money must involve two dimensions: *mass of money* and *time* (1967 [1932], p. 15). Only the notion of final utility encompasses both the mass of money (or of goods) and the time until money (or goods) is spent (or consumed). Money has an incremental utility equal to the difference in utility perceived by the individual as a consequence of time passing or of change. DV proposed the following comparison:

> We think of money as a means of transport […] the final utility of which is not the utility of the less useful merchandise it has carried, nor the utilities of the two less useful goods carried in the double direction, but is the sum of the differences between the utilities at the final point and the starting point: so the final utility of money is the addition of the differences between the utilities of the goods purchased and that of the goods not purchased. (1909, p. 518)

DV stressed the importance of the final utility of money in accordance with its time dimension, thereby distinguishing himself from Wieser and the other scholars of the marginal utility of money. But in 1909, it was clear that DV did not accept the Walrasian notion of *service* either. At most, he re-interpreted the notion. However, there is a case in which he accepted monetary service *per* se: when money produces a service independently from the goods it allows to be purchased, that is, when money has a *social* utility. This is an aspect subsequently dropped by DV , but it is nevertheless

worth mentioning because it represents further proof of the organizational character that DV ascribed to money.

In the 1909 *Principii*, DV attempted to determine whether a *social* utility of money exists besides its *individual* utility. Although in static conditions money performs a unique function, the intermediary one, this does not rule out the possibility that money furnishes a "further and additional service" (1909, p. 270). In fact, DV hypothesized that money may be held "because hoarding it represents the satisfaction of a need that is different from the need to purchase" (1909, p. 513), and thus opening a new perspective on social utility:

> The individual point of view must be distinguished from the social point of view; it is necessary to know the relationships between the two perspectives and to replace the notion of utility with that of service; finally, studies must be focused on these two aspects: the services offered by money to individuals and those given to society as a whole. (1909, p. 514)

DV wrote that only thus is it possible to explain the common tendency of individuals to hold money, although it seems contrary to "the economic principle." To understand this point, it should be borne in mind that DV treated circulation in a different way from production. Whilst the sum of individual productions is equal to the aggregate amount of production itself, the sum of the quantities relating to circulation is not equal to the corresponding aggregate one. Social utility is greater than the sum of individual utilities. This is because individual phenomena assume a form (*forma*) different from that of social phenomena (1909, p. 515, footnote no. 1). The reason for this lies in the additional contribution that money makes to the economic organization. Del Vecchio wrote:

> […] for the factors of organization, the principle according to which the total utility exceeds the utilities of the individuals […] is true. (1909, p. 517, footnote no. 1)

Although money is neutral, in its social dimension it furnishes a *service* that is a factor in *economic organization*. It therefore has a social utility that is different from its value; or better, a social service that differs from individual ones. Because individuals are aware of this social service, they hold liquidity. At this point it is also clear that the individual utility of money is different from the utility of the goods that money makes it possible to purchase.

Moreover, the organizational properties of money clarify why DV preferred to treat his proposal as a theory of circulation and not of money in the strict sense. For the same

reasons, we cannot assert that DV rejected every kind of direct utility of money.[14] Social utility is a direct utility, and monetary service also exists in stationary conditions. It is true that such utility is inseparable from exchanges, even when they do not occur, but individuals, on perceiving both the individual and social role of money, decide to hold it.

5. The psychological rate of interest

Now introduced is another pillar supporting DV's monetary construct: a *psychological conception* of the *rate of interest*.

As he wrote in 1909: "The monetary theory should be built as an application of the theory of interest" (1909, p. 519), meaning that there is a relationship between the value of money and the interest rate. DV thus accelerated his transition from a static monetary theory to a dynamic one by integrating the monetary function of medium of exchange with that of *store of value* for future payments.

The crucial point in this shift was growing attention to the interest rate, which is a variable that casts the shadow of money into the future. In this regard, ever since the *Principii*, and all the more so in the subsequent essays, DV sought to anchor the value of money to the interest rate.[15] It should be stressed that DV did not consider the interest rate to be a monetary variable clearing savings and investments; on the contrary, he regarded it as a psychological variable which influences the monetary market. The interest rate thus lost its objective character, typical of the discount rate, and became a relative variable. If the "terms of interest must all be subjective" (1915, p. 292), it is clear that aspects such as habits and expectations gain the upper hand.

Recall that individuals exchange on the basis of comparisons between the final utilities of goods, and that the interest rate springs from a subjective comparison between utilities of goods. In our example, if group *A* produces *a* and purchases *b*, a member of this group can express the final utility of one good in terms of another:

$$U_A = \frac{U_b}{U_a} \qquad [3]$$

[14] In this regard, Realfonzo pointed out the absence in DV's works of a clear theory of both direct and indirect utility of money (2003, pp. 50-1).

This is the *final comparative utility* of an individual in group *A*, or of group *A* if homogeneity among members of that group is admitted.

A member of group *B*, which produces *b* and purchases *a*, can do the same by giving U_B, etc. Hence DV defines the rate of interest, *i*, for that individual (or that group) as (1909, p. 536):

$$i = \frac{U_A - U_B}{U_B} \qquad [4]$$

In deciding to hold money, individuals compare the utility of money with the utility of the goods whose purchase is delayed:

> Each individual holds money in such a quantity and *for some time* till he obtains from the last quantity of money held and *for the last period of time* during which he detains money an increment of utility equal to the decrease in the utility of the goods that he will purchase. (1909, p. 521 ff.)

DV stated that each individual forms his own idea of the (real) interest rate according to his needs, the availability of goods, and the historical time. In 1909, and then in his 1915 *Lineamenti generali della teoria dell'interesse*, DV spoke of an *individual psychological rate of interest* that may differ from the *market rate of interest* determined by the length of the productive process (1909, p. 519, footnote 1; 1915, p. 327); and from this we may assume that it is equal to the discount rate, *d*.[16] Each individual psychological rate of interest *tends* to the market rate of interest, but it is not necessarily the same. Thus, individuals take decisions about (future) transactions on the consumption of goods according to their subjective costs of holding money, to their habits, and to their expectations.

Although the rate of interest has an individual character, it is possible to consider a *prevailing* psychological rate of interest, *i*, which depends on the utility of goods and has a fully subjective character. It may be said that this rate of interest depends on belief, trust, habits, forecasts prevailing at the particular moment according to economic trends and social customs. Only apparently do organizational concerns remain in the background, because any change and "unification" of markets influences the rate of

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[15] On DV's distinction between the discount rate as monetary variable and the interest rate as financial variable, see Realfonzo (2003, pp. 53).

[16] DV used the term "psychic" rate of interest in a sense analogous to the "psychological" rate of interest, as subsequently defined by M. Allais in 1974 (1974, pp. 286-7), that is: the rate of interest "used by the collectivity to discount the future."

interest (1915, p. 395). This confirms that, even from an individual or micro viewpoint, DV's theory of money continued to be a theory of economic organization.

Considering that the demand for money depends on the consumption of goods, the rate of interest, *i*, indirectly affects the circulating money (and therefore the value of money). The greater the rate of interest, the more delayed the consumption will be, and the smaller the demand for money. Considering the psychological rate of interest only, we have:

$$M = M(i). \qquad [5]$$

Integrating [1] into the [5] yields:

$$M = M(Q, E, i). \qquad [6]$$

DV believed that, in economic equilibrium, which is also a stationary equilibrium, the discount rate, *d*, influencing the purchase of capital goods must be equal to the interest rate, *i*, conditioning consumption choices:

$$d = i \qquad [7]$$

Hence:

$$M = M(Q, E, d). \qquad [8]$$

But out of equilibrium, that is, given dynamic conditions, this equivalence is not necessarily respected (1956b, p. 254).[17]

DV implicitly stated that changes in the interest rate, by influencing decisions about goods, *cause* changes in the value of money. There thus gradually emerges a theory of circulation where the money rides on the interest rate: the higher (lower) the interest rate, the smaller (larger) the amount of goods purchased and, thus, the smaller (larger) the demand for money.

In dynamic conditions, given that the interest rate influences the composition of liquidity, it also affects the circulation of money, which cannot be postulated, in line with the interpretations of the quantity theory predominant in DV's time:[18]

[17] In equilibrium, the interest rate must be interpreted as the Wicksellian natural rate of interest.

[18] The interest rate "represents the economic boundary" of monetary circulation (1909, p. 526). DV attributed to the notion of *monetary circulation* a meaning that sums up all the aspects concerning the use of money. For example, the postponement of consumption is part of this theory because it is influenced by the real rate of interest. Similarly, institutional decisions concerning the discount rate affect the circulation of money. The theory of circulation is therefore broader than the theory of money, strictly speaking.

> […] by determining the cost of money, the interest rate regulates purchases […] if it decreases, the amount of transactions grows and, consequently, the value of money increases; conversely, if the interest rate increases the opposite occurs. (1909, p. 537)

The obvious conclusion to this reasoning is that variations in the value of the "service" furnished by money follow changes in the interest rate:

$V_M = V(i)$, but taking [2] into account we have:

$$V_M = \frac{Q_A}{M} EV(i). \qquad [9]$$

On including money as a store of value for future payments, the value of money loses part of the objective character expressed in [2] and acquires a subjective dimension.

Contrary to neoclassical thought, also savings are mainly determined by social and psychological factors, such as individual ambitions, and only partially by economic factors such as wages, profits and wealth (1915, p. 306 ff.). Finally, the interest rate does not matter, because it never equalizes savings and investments. Clearly, organizational aspects crop up again and again.

Summing up, the value of money, when money is stored for future transactions, is conditioned, if not determined, by at least two interest rates:[19] the psychological rate of interest, *i*, and the current interest rate determined by the discount rate, *d*.

Out of equilibrium, that is, in 'normal' or 'current' conditions, $i \neq d$, [9] is rewritten as follows:

$$V_M = \frac{Q_A}{M} EV(i,d). \qquad [10]$$

According to the early DV, we may state that the value of money is simultaneously determined by the demand for and the supply of money, where demand mostly depends on *psychological* factors (habits, preferences), whilst supply is affected by institutional determinants such as the discount rate or banking rules.[20] At first sight, DV replaced the objective meaning of the value of money with a more subjective concept. But it is also true that he did not fail to point out that "changes in the psychological rate of interest do

[19] DV's analysis of the role of the rate of interest sometimes seems to place his theory closer to the theory put forward by Marshall in *Money, Credit and Commerce* than to Walras's. Marshall (1923, p. 14) wrote that "the 'value of money' […] at any time is the rate of discount, or the rate of interest for short period loans charged in it."

[20] Mention has been made of Cantillon, who, in 1755, wrote that prices – and consequently the value of money – can change because of individual psychological reactions.

not always influence the current interest rate" (1914b, p. 404), which had a strictly monetary basis.

6. Time and uncertainty

Given that a time gap exists between the selling and the buying of goods, DV stressed the need to pay general attention to the uncertainty surrounding every decision on the cash to be held for consumption. Time, and therefore uncertainty, became important factors in defining the value of money in DV's theory.[21] Since the interest rate is treated as the variable that gives expression to time in that theory, subjective elements consequently increase their influence on monetary circulation.

In this regard, DV criticised von Wieser's proposal (1909, 1914b) that the value of money should be deduced from past economic transactions. On the contrary, he believed that the value of money is determined by future economic transactions, by the interest rate and, finally, by individual forecasts (the notion of expectations in embryonic form). In 1917 *Questioni fondamentali sul valore della moneta*, DV wrote that "a category of dynamic facts springs […] from the differences between expected and real events" (1917, p. 167).

> […] we can observe that expectations (*attese*) of higher prices increase the velocity of circulation of money and, indeed, forestall the effects deriving from a growth of the stock of money. Expectations of lower prices produce opposite effects. (1917, p. 173)

The importance of (future) time had already been adumbrated in 1909, but it acquired a primary role only in 1917, after DV had written about crises (1914a), the discount rate (1914b), and the interest rate (1915).

Time and dynamic features are not merely additional, because they mould the functions attributed to money:

> The fundamental element in our treatment of the value of money is not a static fact, neither is it deducible from current conditions nor does it depend on the past phenomena. Essentially, it hinges on the future conditions and most precisely on those among them that influence the current judgements. (1917, p. 159)

Thus, prices, and indirectly the value of money, are determined by expectations about future transactions. Money is useful as a medium during exchange, but also

[21] Federico Caffè wrote that Frank Knight recognised Gustavo Del Vecchio's primacy in studying the relation between time passing and uncertainty (1963, p. 706).

before it, when an individual decides on the basis of the interest rate and of his expectations.

At this point, the current value of money is grounded on "predicted future conditions" influenced by psychological perturbations (1917, p. 121). Dynamic facts associated with uncertainty are here represented by the parameter *z*. We may thus rewrite [10] as follows:

$$V_M = \frac{Q_A}{M} EV(i, d, z) \qquad [11]$$

Although uncertainty seems to condition the value of money, DV never claimed that this would endanger the exchangeability of money. Quite the opposite: exchangeability was a guarantee against the uncertainty surrounding individual choices. We can thus understand how the 'exchangeability of money' is a source of economic organization.

Subsequently, DV defined the difference between dynamics in economics and dynamics to be found in mechanics and other exact sciences on the basis of the conception of time adopted:

> We can modestly recall that the use of *time* in mechanics is possible because it is reduced to space, whilst in economics we have to deal with a real and not abstract (psychic and non-physic) time that cannot be treated with the instruments used in physics. (1956b, p. 248)

We may say that time in economics does not flow independently of the individual's perception of his relationships and of economic changes. The *psychic or psychological time* evoked by DV can be translated as *expectation time*, a notion implied by DV in his works on the interest rate and crises even though in the early years of the twentieth century the concept of *expectation* had not yet been introduced into the economic literature.

Summing up, in comparison with the 1909 *Principii*, in the 1917 *Questioni* DV seems aware that the value of money depends on market forecasts: "money is worth today what it will be worth in the future without limitation of time" (1917, p. 132). Consequently, the pivotal role attributed to the interest rate is clear. In addition, as we know, in dynamic conditions the equivalence between the discount rate and the interest rate does not necessarily hold.

7. Monetary services

We are finally able to define the exact meaning of the additional or secondary, or also dynamic, services that DV attributed to money.[22] As stressed by G. Demaria (1961: XVIII), DV seemingly espoused the neoclassical principle that money performs a function only when it is used as a medium of exchange. Nevertheless, from 1909 onwards he admitted that money furnishes "secondary" services as a consequence of being held, even if it is not immediately used for transactions (Zanni, 1989, p. 143). Finally, this additional function improves the economic organization of the system.

In detail, on exploring all the roles that can be attributed to money in this context, DV recognised at least three further utilities. Money is an *instrument of accumulation* when:

> […] in certain historical conditions, it cannot be invested in other movable or immovable assets. (1917, p. 170)

Money is also a *static reserve* or a *dynamic* one:

> […] no fund decreases below a stated level in order to avoid inconveniences. This is the static utility of money. In a real dynamic economy, this level should be higher, because of the greater amplitude of the variations and the smaller capacity to forecast them. This is the utility of money as a dynamic reserve. (1917, p. 170)

Finally, money is a *reserve for credit*:

> […] since credit partially substitutes money as intermediary instrument; however, it needs a monetary base. (1917, p. 170. See also 1914b)

DV regarded the discount rate as a variable whose short-term changes have monetary rather than real consequences. The 'real' interest rate conditioning investments depends on psychological aspects, like the interest influencing consumption, while the discount rate depends on monetary facts alone (1914b, p. 404).

Returning to monetary services, although DV did not give them functions of equal importance to the intermediary one, he acknowledged other activities or services that must be evaluated pragmatically with regard to the value of money. If these services increase the demand for money, the value of money will rise (1917, p. 171).

Such functions (judged "of the greatest importance" when related to "a long enough period") shed light on a theory of money open to reformulation. Yet additional

[22] Some decades later, Eraldo Fossati stated that the integration of money into a general economic equilibrium scheme needed a dynamic analysis. Money is a source of uncertainty that can be analyzed

monetary services exist. And they do not appear in dynamic perspectives alone, as the maintaining of a static reserve in order to avoid inconveniences demonstrates.

At this point, DV had all the components with which to build a heterodox (non-neoclassical) theory of money based on linkages between the organizational properties of money and the uncertainty surrounding individual choices: the *meso*-level approach, the interest rate, an early theory of uncertainty, and the thesis that money furnishes a service *in itself*. Unfortunately, however, DV did not rigorously formulate such a theory.

Instead, in the case of his monetary theory as well as others, his "complex" view of economic phenomena prevented him from focusing his analysis on a few specific determinants. DV looked for an all-inclusive dynamic theory, and this led him, like other scholars in that period,[23] towards a more sociological than economic analysis.[24] He bound himself to a dynamic methodology which required attention to be paid not only to applied economics but also to sociological and political aspects. DV was not satisfied with one or a few determinants of the value of money.

The outcome was the "composite" constructs characterising DV's subsequent dynamic reasoning.[25] This composite approach certainly represented an interesting proposal, but it also impeded the understanding and diffusion of his monetary theory.

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only by assuming a dynamic perspective. See Fossati, 1957, Chap. XI. On this point see Kuenne 1963, p. 301 ff.

[23] Among others, V. Pareto and G. Borgatta.

[24] DV proposed a socio-psychological theory of capitalistic accumulation. In fact, he singled out the effort to emulate others as the impulse that induces individuals to change their "habits" and to invest. He considered saving to be an instrument of social mobility. Saving is a means to achieve individual progress in the social scale: when it is correctly invested it can move the individual up the hierarchical scale. Thus, since credit exists, "saving is not at the disposal of the leisured classes alone, but also of the most dynamic groups" (1915, p. 387). Consequently, DV built a theory of accumulation (or a theory of the distribution of wealth over time) grounded on psychological factors like ambition.

[25] By means of his "complex" approach to economic phenomena, DV established a hierarchical order in the influence of such factors on the value of money. He defined such a method as *infinitesimal order* (*ordine degli infinitesmi*). This infinitesimal order allowed the establishment of a hierarchy of dynamic variables or factors acting on the phenomenon, while also accounting for the reciprocal influences among all of them. The higher the infinitesimal attributed to a factor, the smaller its influence on the variable studied. Hence, whilst DV could therefore claim that in dynamic conditions the discount rate, *d*, only partially influenced the demand for money, it was indubitable that the psychological rate of interest, *i*, can synthesize all these factors.

8. Concluding remarks

On considering the history of monetary theory, we may ask where DV should be placed in it. He was a heterodox neoclassical scholar who seemed to adhere to the marginalist school but refused to link the value of money to its utility. He undertook monetary analysis by looking at groups as well as individuals and by exploring the organizational properties of money. But he did so at the cost of disregarding the relation between money and prices. He revived the Walrasian notion of service, but introduced into the debate a subjective perspective on the rate of interest determining expenditures and accumulation according to habits, expectations, and economic organization.

But it is precisely these apparent contradictions that highlight what can be considered DV's most important contribution to this area of economic analysis: the links between organizational features and the uncertain nature of both the demand for money and the value of money. The introduction of uncertainty into monetary analysis, perhaps without DV being fully aware of its theoretical outcomes, did not contradict his stress on the intermediary role of money. Exchanges need time, and they occur in time: which is the basis on which DV was able to justify the additional service of money and, finally, the subjective value of money.

DV may perhaps be reproached for not translating his statements on the subjective determinants of the demand for money into more formal or mathematical terms. But it should not be forgotten that the works analysed here were written between 1909 and 1917.

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