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The Original Construction of Lonergan's Exchange Structure Model

Michael Shute

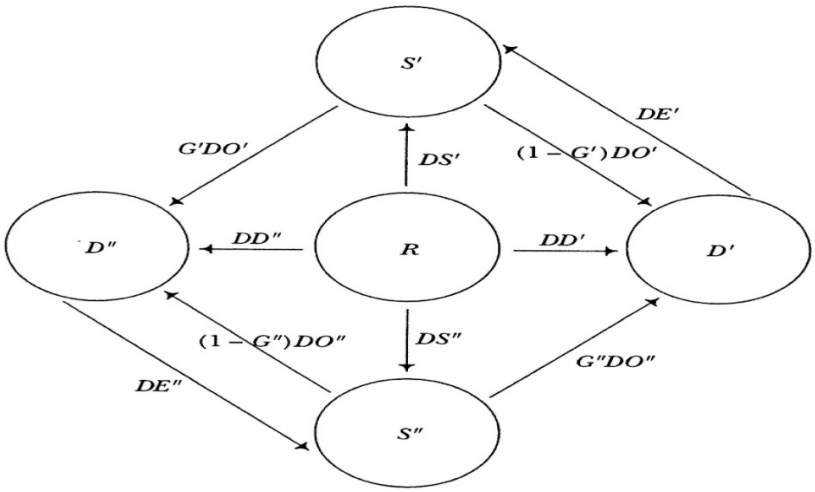

Figure 1Diagram from "For a New Political Economy"[1]

The key image for Lonergan's economics is the 'baseball' or 'circuit' diagram,' seen in Figure 1 above. The diagram first appeared in the 1942 essay "For a New Political Economy." With revisions in nomenclature it remained the central image of his macrodynamic economics. In this image Lonergan brought together all the significant variables relevant to monetary functions and flows.

[1] *For a New Political Economy*, ed. Philip McShane, *Collected Works of Bernard Lonergan* (Toronto: University of Toronto Press, 1998), vol. 21, 64. (hereafter, *CWL* 21). This is the diagram as it first appeared in the early essay "For a New Political Economy."

My purpose in this paper is to examine the steps of the construction of the diagram and the theory of the structure of the exchange process that follows from it, as it appears in the 1942 essay. Lonergan's account there is significant because it is the first expression of his theory of monetary circulation. Examining the details of the argument may contribute to understanding how Lonergan established the fundamental variables (and the relations among them) for his macrodynamic economics. In addition, the detailed explanation of the basic variables in "For a New Political Economy" differs in significant ways from the presentation in the 1944 "An Essay in Circulation Analysis," Attention to the earlier argument highlights more prominently how Lonergan solved the problem of constructing a fully dynamic model of monetary circulation.

I will move along in four steps. First, I briefly discuss the intention behind Lonergan's effort to construct a model of the economic exchange process. Second, I introduce Lonergan's argument for his version of the structure of the exchange process itself. Third, I review Lonergan's argument for establishing the dynamic equilibria of the structure. Finally, I conclude with some comments on the methodological significance of Lonergan's account of basic economic variables.

1 In Search of a Dynamic Model

At this point, a brief comment on Lonergan's use of economic models is germane. His notion of an economic model differs significantly from the standard practice of modeling in economics, which he encountered in the 1930s. Typically, the standard economic models left out elements of the concrete situation in order to isolate two or three factors that can be worked through by using a quasi-mathematical logic. The classic example is Ricardo's corn model in which corn stands on for all commodities and is the sole medium of exchange.[2] A contemporary instance of such reductive simplification is the IS/LM curve model found in most first-year macroeconomics texts. Keynes's model in *General Theory* suffers a similar shortcoming. According to Schumpeter, Keynes's system was made up of only four variables: quantity of money, consumption, investment, and interest rates. The variables are linked together by three relations, the liquidity preference function, the consumption function, and the investment function.[3] Such conceptualist models, often driven by

[2] The corn model is used, for instance, in Joan Robinson and Eatwell, *An Introduction to Modern Economics* (Maidenhead, Berkshire: McGraw-Hill, 1973).

[3] As Schumpeter remarks concerning "the success" of the Keynesian theory, "his simple system that considers only a few aggregates was easy to master and to manipulate." From lectures delivered in January 1948 at the School of Economics, University of Mexico, and included by the editors in Joseph Schumpeter, *History of Economic Analysis* (New York: Oxford University Press, 1954), 1144.

empiricist assumptions, do not strive for a concrete generalization of all relevant economic functions. Underlying them is a counter-positional view that the real is 'a sub-division of the already-out there now-real.' The desired simplification is achieved by reduction to what can be handled mathematically. Such an approach assumes that mathematics provides an adequate heuristic for understanding economics.[4]

Lonergan's approach to economic modeling anticipated his position on being in *Insight*: "The real is the concrete universe of being and not a subdivision of the 'already out there now.'"[5] Striving for the greatest degree of generalization, Lonergan's model aims to include *all* the functions relevant to an actual economy; nothing significant can be left out. Its 'simplification' resides in its heuristic function that anticipates the intelligible in the data.[6] Insofar as a model captures all the fundamental terms and relations, it provides a basis for developing further questions, formulating hypotheses, and for the application of results. Lonergan writes:

> Models, then, stand to the human sciences, to philosophies, to theologies, much as mathematics stands to the natural sciences. For models purport to be, not descriptions of reality, nor hypotheses about reality, but simply interlocking sets of terms and relations. Such sets, in fact, turn out to be useful in guiding investigations, in framing hypotheses, and in writing descriptions. Thus, a model will direct the attention of an investigator in a determinate direction with either of two results: it may provide him with a basic sketch of what he finds to be the case; or it may prove largely irrelevant, yet the discovery of this irrelevance may be the occasion of uncovering clues that otherwise might be overlooked. Again, when one possesses models, the task of framing an hypothesis is reduced to the simpler matter of tailoring a model to suit a given object or area. Finally, the utility of the model may arise when it comes to describing a known reality. For known realities can be

[4] Lonergan notes the "necessity of [the human sciences] having an elaborate conceptualization for their study *similar* to that which mathematics provides for physics." *Topics in Education*, *Collected Works of Bernard Lonergan*, vol. 10, ed. Robert Doran and Frederick Crowe (Toronto: University of Toronto Press, 1993), 141 (emphasis added). However, he goes on to say: "This need would seem obvious, but it has been greatly obscured by empiricist tendencies" *CWL* 10, 141.

[5] *Insight: A Study of Human Understanding*, *Collected Works of Bernard Lonergan*, vol. 3, ed. Frederick Crowe and Robert Doran (5th rev. and augmented ed.), 413 [page 388 in the older edition]. See William J. Zanardi, "Diagnosing Economic Realisms" in this volume for a discussion of basic positions as they apply to economics.

[6] This brings to mind Aquinas's arguments for the simplicity of God in *S.T.* 1a Q. 3.

> exceedingly complicated, and an adequate language to describe them hard to come by. So the formulation of models and their general acceptance as models can facilitate enormously both description and communication.[7]

Lonergan intended the model in "For a New Political Economy" to be relevant to *any* economic unit and to any kind of economy. Later, he developed the model of superposed circuits to account for such further complexities as international trade and government deficit financing. The superposed circuit model is an expansion of the basic model. Just as additional laws to account for friction etc. are developed once the law of falling bodies is established, so applications of the basic macro-dynamic model to concrete situations involve further developments of the initial model. One could design a further set of models to account for any stage in the cycle as well as for the distortions of the cycle such as are manifest in trade cycle phenomena.

In 1930 when Lonergan began his study of economics the standard model, the so-called 'great theory,' was a static model. It assumed a self-regulating and self-optimizing stable economic system existing in a timeless equilibrium.[8] Yet, "since technological change is the essence of the capitalist process and the source of most of its problems, this assumption excludes the salient features of capitalist reality."[9] At the least, then, the standard model could not account for the dynamic nature of the capitalist economy. A crucial challenge for Lonergan in 1930 was to figure out how to account for a dynamic economic system. Lonergan's reading of Christopher Dawson in the early 1930s encouraged him in the view that an economy is by nature fully dynamic.[10] In the most generally sense, Dawson argued that even in 'primitive cultures' the underlying dynamic of life was dynamic. He writes: "In reality all living culture is intensely dynamic. It is dominated by the necessity of maintaining the common life, and it is possible to ward off the forces of evil and death and gain life and good fortune only by continuous effort and social discipline."[11] In other words, it is not a significant change or development that establishes the dynamic character of human life; *life itself* is dynamic. As Lonergan put it in "For a New Political Economy": "The world process, the physical, chemical, vegetal, animal, and human potentialities of universal nature are ever stimulated, guided, aided by human effort to

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[7] *Method in Theology* (New York: Herder and Herder, 1972), 284-5.

[8] See George M. Shackle, *The Years of High Theory* (Cambridge: Cambridge University Press, 1967), 5.

[9] Schumpeter, *History of Economic Analysis*, 1144.

[10] See Michael Shute, *Lonergan's Discovery of the Science of Economics* (Toronto: University of Toronto Press, 2010), *passim*, but especially 43-47 (hereafter *LDSE*).

[11] Christopher Dawson, *The Dynamics of World History*, ed. J.J. Mulloy (London: Sheed & Ward 1957), 452.

the goal of human survival and enjoyment, of human achievement, waste, and destruction. All such human activity occurs rhythmically in a series of impulses, and the aggregate rhythm is a compound of many minor rhythms of varying magnitudes and frequencies."[12] Economic processes are counted among the set of minor rhythms constituting world process. However it is structured, explanation of the structure must use a dynamic model. Lonergan would subsequently attend closely to the recurrent human effort that transformed the potentialities of nature, including human nature, into goods and services.

Acknowledging that economic process is dynamic, while a first step, does not establish what the basic variables that govern the processes of production and exchange are. Initially, Lonergan worked on developing a methodology applicable to human process generally. Over a period of about four years he developed a philosophy of history, which would provide macrodynamic categories applicable to all human process and thereby applicable to economic analyses.[13] He named the method 'real analysis.' Lonergan distinguishes real analysis from logical analysis. The definition of the term 'rational man' is a logical multiplicity of genus and species.[14] By contrast, the periodic table in chemistry and Newton's method of approximation are instances of real analysis.

The method of approximation, through a series of steps, reaches the actual movements of the planet around our sun. The laws of motion establish that bodies move with constant velocity unless another force intervenes. This is a first approximation to the actual movement of the planets. This yields a circular motion of the planets around the sun. The addition of the law of gravity between the sun and the planets yields an elliptical orbit for the planet. Finally, the influence of the gravity of one planet on another reveals the perturbed ellipses in which planets *actually* move. Each approximation is an intellectual construct that on its own cannot account for the actually occurring perturbed ellipses. But the final model arrived at through a consideration of all three ideal constructs yields a scientific theory that can account for the actual theory and is verified in the empirical investigation of planetary motion. Lonergan approaches history the same way: Initially, he supposes an ideal line of historical development in which human beings always chose the intelligent course of action. Next he adds the effect of unintelligent choices and their consequences. Finally he considers the effect of grace-assisted efforts to reverse the deformations of the ideal line caused by unintelligent choices. A summation of all three approximations gives us an account of the actual historical situation. While human history is far more complex than the planetary movement, the same method of approximation applies.

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[12] *CWL* 21, 11.

[13] The history of this discovery is traced in *LDSE*, chapters 2-4.

[14] On real analysis, see "The Analytic Concept of History," *Method: Journal of Lonergan Studies* 11/ 1 (1993), 7-8. On real analysis and economics, see *CWL* 21, xvi, xxvii, n. 2, xxxi, 100, 333, and *LDSE*, chapter 3.

Lonergan attacked the problem of dynamic method in economics by employing a pure analysis that initially, at least, prescinds from the complexities of decline and recovery.[15] His analysis was a first approximation to an actual economy, an approach that he later identifies as classical method in chapter 2 of *Insight*. His questions were: What is the nature of an economy and how does it ideally develop? In this respect he emulated the analytic approach of his predecessor J.S. Mill: discover what economy is and then you can establish what it can do. Elementary differential calculus provided the key analog in Lonergan's solution to the problem of dynamic method in economics in particular. Reflecting on his approach Lonergan reports: "Now … my economic analysis … rests not on the inevitable procedures of the subject but upon objective argument; there is a model and an application of the model and the model comes from elementary differential calculus - *acceleration, velocity, and the constant of integration.*"[16] Lonergan first establishes the nature of the production rhythms that condition any exchange structure. He then organizes these various rhythms on an analysis of the *velocity* of basic goods and services that enter into the standard of living and their *acceleration* by higher levels of production. The task, he writes, "is to work out the correlations that exist between the velocity and accelerator rhythms of production and the corresponding rhythms of income and expenditure."[17] This makes perfect sense for, in an exchange economy, production is for the sake of a sale. The resulting model will be a dynamic structure that is composed of "a pattern of laws that stand to economic activity as the laws of mechanics to buildings and machines."[18]

2 The Structure of the Exchange Process

Let us turn now to the construction of the basic model. The limiting condition for the model is production governed by exchange. This would exclude a self-sufficient Robinson Crusoe working his garden and fishing with nets.[19] Nonetheless, Lonergan keeps his analysis as general as possible. He does not concern himself with any particular kind of economy, whether barter, medieval, mercantilist, capitalist, or communist.

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[15] Lonergan will factor in economic decline in his discussion of various maladaptations to the pure cycle. See *LDSE*, 174-178 for a discussion of the trade cycle in this context.

[16] From the Question Session of the 1978 Lonergan Workshop, transcribed by Nicolas Graham and available from the Lonergan Research Institute, Toronto.

[17] *CWL* 21, 42.

[18] Ibid.

[19] I examine Lonergan's economic analysis as it might function in a non-monetary economy in "Real Economic Variables," *Divyadaan: Journal of Philosophy and Education*, Volume 21 (2010).

He takes "the exchange process in its greatest generality and attempt[s] to deduce the human adaptations necessary for survival."[20]

An exchange economy, however, makes it possible to measure the exchange value of a transaction for every exchange that includes a buyer and a seller. The result of the exchange is *income* for the seller and *expenditure* for the buyer. *Price* measures the exchange value of the goods bought and sold. The exchange value is simply the agreed-upon value, the "coincidence of decisions to exchange."[21] Just as there is a flow of production DA, where A stands for economic activity and D stands for its rhythm, so too there will be a flow of exchange units (money) in transactions at some rate, that is, 'so much every so often.' Lonergan designates this with the symbol P.DQ where 'P' stands for price and DQ denotes the rate. Thus,

$$DA = P.DQ \qquad (1)^{22}$$

This means the total flow of economic activity in an exchange economy (DA) is equal to the price (P) multiplied by the rate of the flow of money (DQ). It is clear that, because an exchange is between a buyer and a seller, a study of an exchange economy includes a rate of expenditure and a rate of income. Assuming a uniform system of measurement, we can conclude that

$$DA= P.DQ= DE= DI \qquad (2)$$

This means that the rate of economic activity is equal to the total flow of economic activity in an exchange economy. Furthermore the rate of both is equal to the rate of expenditures and to the rate of income, which are equal to each other. This simple equation establishes a set of dynamic relationships. One and the same thing is at the same time "(1) the value of production, (2) the multiplication of quantity by price, (3) an expenditure, and (4) an income, according as it is considered (1) in itself [DA], (2) in its components [DA = P.DQ], (3) relative to buyers [DA=DE], and (4) relative to sellers [DA =DI]."[23]

This basic equation is a *pure theorem*, having complete generality with respect to any exchange economy. However, actual exchanges take place in markets, and there are different kinds of market. In "For a New Political Economy" Lonergan distinguishes three markets: transitional, final, and redistributive.[24] Transitional and final markets have exchanges

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[20] *CWL* 21, 43.

[21] *CWL* 21, 31.

[22] To facilitate comparison with the original essay "For a New Political Economy" the equation numbers are as they appear in *CWL* 21.

[23] *CWL* 21, 43.

[24] In "An Essay in Circulation Analysis" Lonergan distinguishes initial, transitional and final operative payments. See *CWL* 21, 249; see also Lonergan,

related to production. These are the *operative exchanges* of "An Essay in Circulation Analysis." Transitional markets have exchanges related to the production of the goods and services for sale to the consumer. For example, the farmer sells milk to the dairy, which eventually becomes the carton of milk bought in the grocery store. The exchange between the farmer and the dairy is transitional; the sale of the milk to you at the grocery store is final. Furthermore, there are two sets of transitional markets and final markets corresponding to the primary (basic) and secondary (surplus) circuits, DA' and DA''. Each set is independent of the other. The transitional surplus market is not transitional to the final basic market. In either case, the consumer pays all the factors when he or she pays the retailer in the final market. When we purchase milk at the grocery store, *all* the costs must be covered or, in the long term, the circuit will fail. The retailer depends on his income from final sales to pay to the wholesaler. The wholesaler depends on his income from retailers to pay the dairy, and so on down the line to the farmer. The farmer needs income to pay for his costs of production. When we calculate the rates of income and expenditure in the two circuits, we do not need to count all transactions from start up to final sale because the exchange value of the entire production process is captured in the final sale.

The figure below gives a greatly simplified diagram of the payments for a single liter of milk sold to a consumer.[25] To reduce its complexity I have assumed that there are only two inputs, the milk itself, and the waxed paper of the carton. In fact, the carton side of the process is hugely compressed, but should be enough to clarify the main points. Initial payments, by the farmer (15), and for the materials for the carton (3), are on the left. Two identical numbers on either side of a double bar show each exchange. An example is 90 | | 90. The 90 cents on the right is the receipt from the final stage in the process, the ultimate Consumer. The left-hand 90 cents is the same amount viewed as a receipt by the Retailer to meet his or her expenditures to date. This means that we are treating that enterprise's profits as just being a 'wage' paid its owners. The final exchange is shown on the right, the final payment being the 90 cents, printed in bold type. Milk Collection, Treatment, Packaging, Paper Manufacture, and Carton Production are the tasks of the transitional enterprises. In each of the transitional steps, the total expenditure is again split into two parts. One is what pays the previous enterprise, and the other is the total of *outlays* (to labor, management, owners, capital use, etc.). At all exchanges, the payments, from the next stage, are shown as being equal to expenditure so far. The outlays are shown boxed. Payment amounts are in cents. For reasons of pedagogical clarity, I have made all

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Macroeconomic Dynamics: An Essay in Circulation Analysis, *Collected Works of Bernard Lonergan*, vol. 15, ed. Frederick Lawrence, Patrick Byrne, and Charles Hefling (Toronto: University of Toronto Press, 1999), 42 (hereafter, *CWL* 15).

[25] The diagram was developed by Tom McCallion.

payments different in amount.

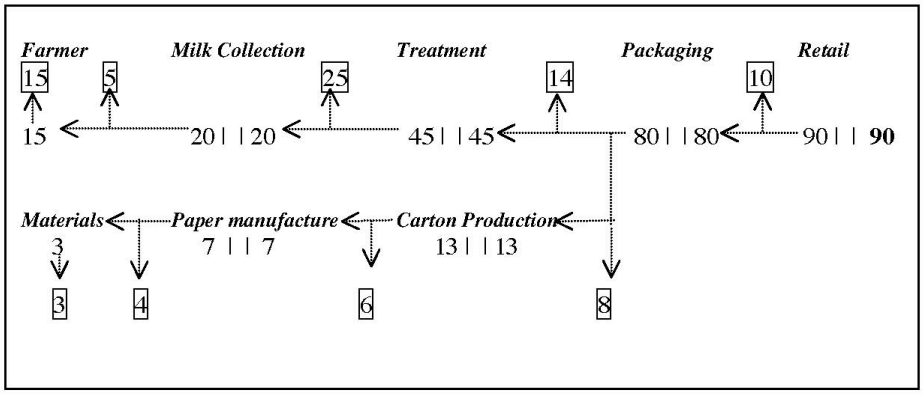

Figure 2

There is a precise sense in which it can be said that the final amount (90 cents) given by the consumer pays for everything. Indeed, this is true as well for each of the transitional receipts. In each case they exactly pay for all previous outlays (if necessary counting both 'arms'), e.g., the receipt of 45 cents by the Treatment plant equals [25 + 5 + 15.]

It is worth keeping in mind that, even in what appears to be a relatively straightforward flow chart of payments, that there is always indeterminacy with respect to the future. Transitional payments, for example, are made with the final payment in mind; however, there is no guarantee that a final payment will occur. For example, the air conditioning system on the truck delivering a shipment of milk may breakdown, the shipment is spoiled and the milk is not sold. For this reason all production and sales and thereby all economic process is fundamentally indeterminate.

So far we have identified the operative payments in the basic and surplus circuits that are linked directly to the production process. There is a further class of payments that occur in the redistributive markets. Redistributional markets, however, are resale markets and are not part of the primary (basic) and or secondary (surplus) circuits: there is no obvious concomitant variation with either circuit. For example, the sale of a new house is an operative exchange. It adds one more unit to the standard of living. However, the house may be resold any number of times. While the resale involves both expenditure and income, except for the sale commission and other service fees, the resale of the house does not add another unit to the standard of living. It is only a change in property ownership. For this reason redistributional activity is not included in DA' or DA". Lonergan designates the symbol * to indicate this redistributional activity. We have, then, in total three sets of markets; the relations in each represented in terms of the basic equation (2) as follows:

$$DA^* = P^*.DQ^* = DE^* = DI^* \qquad (3)$$

$$DA' = P'DQ' = DE' = DI' \qquad (4)$$

$$DA'' = D''Q'' = DE''= DI'' \qquad (5)$$

Finally, while the primary and secondary circuits are distinct, they are also related. A certain portion of primary or basic income is spent in the secondary or surplus markets. Similarly, a certain portion of secondary income is spent in the primary markets. These transactions are the crossover flows between the two circuits. Therefore, when we consider the two circuits together, the equality between income and expenditure is spread over the two circuits, that is,

$$DI' + DI'' = DE' + DE'' \qquad (7)$$

Overall, income must equal expenditure. However, the equation does not set the proportion of basic to surplus income or expenditure on either side of the equation. Thus basic income and basic expenditure may be unequal and basic expenditure and surplus expenditure may be unequal. Yet in the total equation income and expenditure will equal out.

As mentioned above, a key problem for Lonergan was working out how to account for a dynamic system. The first part of the puzzle is solved by thinking in terms of *flows*, whether production or monetary flows. Each flow has a *velocity*. Relevant categories are expressed in terms of rates, that is, "so much every so often," whether of income and expenditure, sales or production value.

With respect to any flow, it is essential to establish *the conditions of continuity*. Lonergan establishes the full integration of his model in a series of steps. At this point in the argument, the issue is as follows: Given that the terms designate *any given instance*, how do we establish the continuity between one given instance and the next? If continuity is the equality of sales at the final markets in successive instances or turnovers, then the necessary and sufficient condition of continuity is that $DA' = \underline{DA}'$ and $DA'= \underline{DA}''$ where DA' and DA'' represent the first instance and $\underline{DA}'$ and $\underline{DA}''$ the next instance. This means simply that, in any given turnover, all income from production is spent in the next turnover. However, because income from each circuit is spent in both circuits it is necessary to consider the effect the flow of income and expenditures that begin in one flow and end in the other, that is, the *crossover flows*. For example, in a pizza business a certain proportion of income obtained in the primary or basic circuit is spent in the repair and replacement of equipment such as the pizza oven or the cash register. While the income comes from the basic circuit, such expenditure is in the secondary or surplus circuit. Lonergan designates the fraction of DI' that flows as crossover payments from the primary to the secondary circuit as G'. Likewise, a proportion of income that comes from such purchases will go to pay for workers. The workers' income, while coming from the secondary circuit, will in the main be spent in the basic circuit. Lonergan designates the similar crossover payment fraction from the secondary to

the primary as G". It follows that primary (basic) income DI' is divided into two parts: G'DI' moves to secondary expenditures $\underline{DE}$" and (1-G') DI' moves to primary expenditures $\underline{DE}$'.[26] Likewise, secondary income is divided so that G"DI" goes to primary expenditure $\underline{DE}$' and (1-G") DI" goes to $\underline{DE}$". Thus,

$$\underline{DE}' = (1-G')\,DI' + G''DI' \qquad (6)$$

And

$$\underline{DE}'' = (1-G'') + DI'' + G'DI' \qquad (7)$$

When we add these two equations together the crossover flows, G' and G", disappear, so that

$$\underline{DE}' + \underline{DE}'' = DI' + DI'' \qquad (8)$$

In other words, the sum of expenditure in both circuits must equal the sum of income.[27] The cancellation of the crossover flow defines the condition of continuity. The main point is that the theorem of continuity requires that all income (basic and surplus) be spent on each turnover and that this condition includes consideration of crossovers between the circuits. That the crossovers cancel each other out points to a second requirement that income moving from the primary to the secondary circuit must balance income moving from the secondary to the primary circuit. By dividing the equation DA'= P'DQ' = DE' = DI' by the equation of the secondary market DA"= P.DQ" = DE" = DI" we get,

$$DA'/DA'' = P'.DQ'/P''.DQ'' = DE'/DE'' = DI'/DI'' \qquad (10)$$

Lonergan refers to this set of equalities as the normative proportion. For convenience of reference, this name is also given to the numerical value of each of the ratios in the proportion.

In the long run, the normative proportion, DA'/D", will be increasing.[28] This is because it is also equal to the second of the above ratios, which can be re-written as (P'/P"). (DQ'/DQ"). Since it is unlikely

[26] As an aside, note that it is a somewhat unnoticed assumption here that the two fractions are G' and (1-G') [that is, that they add to 1 (unity)] that enables us to arrive at the eventual result shown as equation 11 below. It implies that all of DI', and no more than DI', moves to total expenditure in the next turnover.

[27] I would note in passing that equation (11) on its own is not enough to give the continuity for equation (8). Equality of two sums does not imply the equality of their individual parts.

[28] 'In the long run' assumes economic growth, which Lonergan handles in the pure cycle. The pure cycle, however, includes a static or stationary phase in which growth does not occur. See below pages 87ff.

that the selling price indices P' and P" would vary much in relation to each other, then this depends essentially on the second part, DQ'/DQ". This latter can only be increasing in the long run, as otherwise the whole process of capital investment would not make sense. Who, for example, would advocate switching from manual potato production to plough making if in the long run one had fewer potatoes? This means that DI'/DI" is also increasing. By simple arithmetic, this implies that (DI' + DI")/DI" is also increasing. (This new fraction is just DI'/DI" with 1 [unity] added) This in turn can be re-written as stating that DI/DI" is increasing, where DI is total income. Thus DI" is an ever-falling proportion of total income. The underlying assumption is that new technologies develop and result in more efficient production. Production can also decrease for any number of reasons, but at this point Lonergan is only considering the ideal case and, in the ideal case, human beings choose more efficient production.

However, there is investment that, using instruments of finance such as credit, increases the flow of money to the circuits and creates the anticipation of profit among investors. This results in a surplus income that is an excess of the selling price over the cost price. This reminds us of Kalecki's adage that 'capitalists get what they spend; workers spend what they get.'[29] Surplus income is "a flow of income beyond all cost of living, all taxes and charities, all maintenance and replacement: it is a net surplus, an excess profit that can spent only by being invested."[30] It is distributed to both circuits, and this sets up the problem of how to maintain equilibrium between the circuits in a growing economy. Surplus income is typical of a capitalist or surplus expansion. It is during these times that there is a massive increase of wealth accruing to a small percentage of the population. One might think of Bill Gates and Warren Buffett.

Lonergan contrasts his approach to exchange equilibrium to that of Walras. According to Walras, equilibrium is a function of the relationship between demand and potential supply, and it is maintained through market forces. This is the same as Lonergan's observation that the flow of income equals the flow of expenditure (DI = DE.) However, Walras's account is static and does not take into account the production phases nor does it differentiate primary and secondary markets.[31] For Walras there is no

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[29] The quote is attributed by Joan Robinson to Kalecki though not cited. See Robert Blecker, "Kaleckian Macro Models for Open Economies" in *Foundations of International Economics: Post-Keynesian Perspectives*, eds. Johan Deprez and John T. Harvey (London: Routledge, 1999), 143, n.8.

[30] *CWL* 21, 50.

[31] At the 1978 Lonergan Workshop at Boston College, Lonergan made the following comments about the static nature of equilibrium theories: "General equilibrium means total equilibrium as in Walras and Wicksell. All the prices and all quantities are determinate through an appropriate number of simultaneous equations. And if they are determinate, they are fixed by those equations; and you have something that is immovable. You have to drop some of the equations and then you no longer have an equilibrium. Marshall did not hold general but only partial equilibrium. All his economic thinking is in terms of

problem of continuity. In any instance, all markets clear. For Lonergan, with each phase, the kind of exchange equilibrium is effected by the "curvature of the exchange equations"[32] that occurs with each stage. In the capitalist phase or surplus expansion, the secondary rhythms are expanding. Surplus income is expanding and "to make a large profit is, in the general case, inevitable. It would occur even if all the attempted new enterprises were blunders. For if there is surplus expenditure, there cannot but be net surplus income."[33] In the materialist phase or basic expansion, the secondary rhythms are widening and deepening the primary rhythms but the secondary rhythms themselves are not increasing. Thus, now that the economic setup has been transformed by the new means of production, more goods are produced (widening) or the same quantity of goods is produced more efficiently (deepening). The greater the widening, the greater the maintenance requirement and surplus income tapers off. In order words, profits fall. "No matter how intelligent and efficient traders may be, S [surplus income] cannot but be decreasing; for with surplus expenditure decreasing, net surplus income cannot but follow suit."[34] This is so because investments have paid off and the envisaged new setup is in place and producing. In the static phase, there is no more widening and or deepening because there is no new setup to invest in. There is no more expansion of business; surplus is confined to maintenance repair and replacement.

The point that the phases have a certain nature which decision-makers must take into account. Because equilibrium requirements are different for each phase, shifts in phases require shifts in the proportion of funds going

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partial equilibrium i.e. the balancing of supply and demand through a varying of one factor at a time, other factors remaining constant. If you increase the number of workers how much bigger will your product be? If you took out this machine and put in this other machine how much bigger would your profit be and so on. That is partial equilibrium and there is no problem about partial equilibrium in my paradigm. A dynamic notion of general equilibrium as is pictured by Joan Robinson is a dog running along behind a man on a bicycle; how do you get movement into it? Well, you can have a series of sets of simultaneous equations but it is just linked from one set to the next, you have no account for what goes on in between. If it were really dynamic you would be using differential equations and not just ordinary ones for things like prices and quantities. And Joan added, the mathematics does not tell us what happens when the dog catches up with the bicycle and bites the tires. So to have motion and satisfy general equilibrium is to have two sets of simultaneous equations; one set for position one and another set for position two, and no general equilibrium for the movement from one position to the next. And that is a dynamic notion of general equilibrium." From the transcription of Discussion by Nicolas Graham. Available from the Lonergan Research Institute, Toronto.

[32] *CWL* 21, 51-53.

[33] *CWL* 21, 52.

[34] Ibid.

to each circuit. Just as profits rise in the capitalist or surplus expansion, they will inevitably fall off in the materialist or basic expansion. However, the cycle does not mean an overall decrease in the flow in the circuits. In a static or stationary phase, the primary rhythms continue at the new higher level. In other words, as already indicated, the normative proportion is in the long run an increasing quantity. Developments from 'hunter and gathering' societies to agriculture society to the industrial age illustrate this. The rise and fall is in pure surplus income, not in overall flow. By contrast, in the trade cycle the rise and fall is of the economy as a whole. Thus, in a recession or depression, the fall in surplus income slows the economy as a whole. To maintain the profit levels of a surplus expansion during the basic expansion eventually means that the flow in the primary circuits will contract. Businesses fail because fewer (and larger) businesses reap what profit is left to be had. If the slow-down in surplus income were properly understood however, a recession or depression might be avoided. Steps would be taken to encourage the basic expansion that naturally exploits a surplus expansion. The problem of continuity in an expanding economy, then, is at the centre of the financial problem. Lonergan identifies the financial problem as centrally finding an effective ways of sustaining the long-term finance necessary for the transformation and exploitation of new ideas implemented economically in the surplus and basic expansions of the pure cycle. [35] As is evident from the continued proliferation of periodic economic crises, this problem has yet to be effectively addressed.[36]

Maintaining equilibrium throughout the cycle requires observing the normative proportion with respect to crossovers in light of the exigencies of the phases. The normative proportion, as in equation (10) above, is DI'/DI". The condition of continuity demands that the two crossovers should balance, and so be numerically equal, that is, G"DI" = G'DI'. By simply transposing this we see that G"/G' must be equal to the normative proportion. Lonergan calls G"/G' the *crossover ratio*. Lonergan presents a chart that is worth reproducing here as it shows the effect of the mal-distribution in the flows. G' and G" are the two variables of the chart. The columns represent the corresponding values of DI'/DI", that is, the proportional flow of income in each circuit.[37]

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[35] See *CWL* 21, 100-106.

[36] The classic work on the subject is Joseph A. Schumpeter, *Business Cycles: A Theoretical, Historical, and Statistical Analysis of the Capitalist Process* (Cambridge, MA: Harvard University Press, 1939).

[37] The diagram is from *CWL* 21, 55.

G"	G'	50%	20%	10%	5%	1%	0.1%
50%		1	2.5	5	10	50	500
80%		1.6	4	8	16	80	800
90%		1.8	4.5	9	18	90	900
95%		1.9	4.75	9.5	19	95	950
99%		1.98	4.95	9.9	19.8	99	990
100%		2	5	10	20	100	1000

Table 1

What the chart shows is that variation in G' (crossovers from basic to surplus) is much more significant. If, for instance, G' were 10% and G" 90%, the normative proportion is 9. If G' is increased by 10% to 20%, then the normative proportion drops to 4.5. The result will be an overproduction or insufficient purchasing power, which effectively cuts economic activity in the basic circuit by about one half. We can see that efforts to maintain prevailing profit margins as the phase shifts to the basic expansion can have a drastic contracting effect on the economy as a whole.[38]

The first stage in the construction of the model is now complete. Lonergan has established that there are two related flows of operative exchanges with related rates of income and expenditure (DI' and DE' and DI" and DE") connected by two crossovers (G'DI' and G"DI"). He has shown that any model must take into account economic phases and that the crossover ratios are a key to maintaining dynamic equilibrium in an economy. The cancellation of income crossovers establishes the provisional continuity of the structure, because, taking into account the movement of money between the two circuits, the sum of expenditures in both circuits equals the sum of income in the next instance. He now moves to complete the construction of the model by establishing the relation between monetary circulation and the rhythms of the production process and by integrating redistributional exchanges into the structure.

[38] The 'one half' is approximate. See *CWL* 21, 55 n. 2. There is an element of selectiveness to make a point in Lonergan's construction of this chart. One could prepare a more complete table, drawn up to show all possible values of G' and G" (from 0.1% to 100% in each case). The chart given by Lonergan would then just appear as a particular quarter of this and the internal values would appear less unique. The particular selection of the present chart is based on the economic expectation that one would expect that G" (which reflects the share of surplus income that would be spent on basic goods) would be high, and G', the share of basic transferred to surplus be small. Nonetheless, his point is clear. Variation in crossover flows from the basic to surplus circuits has a disproportionate effect on economic well being than variation in crossover flows from the surplus to basic circuit.

2 Dynamic Equilibria of the Exchange Process

Production transforms the potentialities of nature into products and services for human use. In an exchange economy, production is for eventual sale. Money, whether in the form of cash or credit, circulates to make this possible. Funds lie in anticipation of various kinds of exchanges. Circulation is the instantaneous and reciprocal movement of exchange between various funds. Exchange equilibrium is, however, not rigid. For a while, we can take out more from accounts or reserves than is received. However, "no fund can permanently give more than it receives, for funds, like rivers, can be permanent principles of flow only on condition that they permanently are fed by tributary streams."[39]

There are then, different kinds of funds to be balanced. First, we can distinguish the funds in the main circuit from redistributional funds. Changes in redistributional funds are merely changes in ownership. Changes in the primary and secondary circuits may also be changes in ownership, but they also move forward the primary and secondary rhythms of the production of goods and services.[40] In other words, the funds in the main circuit correspond to production rhythms, but there is no obvious correspondence between redistributional exchanges and production. Second, in the main circuits there are two distinct final markets with a distinct series of transitional markets linked to them. Third, while we can link transitional markets with their final markets, with respect to final markets we distinguish between supply functions and demand functions. These are primary and secondary producers and consumers. We can now identify *five* types of balances: redistributional balances (R), a primary trader balance (T'), secondary trader balance (T''), primary consumer balance (C') and a secondary consumer balance (C'').[41] Redistributional balances are funds held in anticipation of redistributional exchanges. Examples include loans, insurance premiums and payouts, stock market sales, and the purchase of second–hand goods. Trader balances are funds held in anticipation of outlay by producers. Every trader or dealer faces a financial gap between the start of a turnover and its

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[39] *CWL* 21, 58.

[40] I would suggest that much commentary on the 2008 financial crisis suffers gravely from a failure to adequately differentiate operative and redistributional exchanges. See Michael Shute, "The Two Fundamental Notions of Economic Science and the Economic Crisis," *The Lonergan Review,* Volume 2, 2010: 95-106.

[41] In the original version of "Essay in Circulation Analysis" Lonergan drops the terms trader and consumer and calls the main circuit balances basic and surplus supply and basic and surplus demand. See *CWL* 21*,* 258. In later versions, Lonergan designates the supply and demand balances as basic and surplus outlay and basic and surplus income. See *CWL* 15, 55. The differences are nominal. Trader balance = supply function = outlay and consumer balance = demand function = income.

completion. For example, material for production and salaries to workers are paid before goods produced are sold. This requires circulating capital. As we would expect, trader balances are divided into primary trader balance and secondary trader balances. Finally, there are consumer balances. These are the funds individuals and firms hold in the form of cash or credit with a view to purchasing goods and services at the final markets. Again, as we would expect, these are divided into primary and secondary consumer balances. In the general case, there must be equilibrium in the movements between each of these balances and the others.

Economic expansion requires the creation of funds to finance the expansion. Lonergan places the credit creation function in the redistributional field. Funds can move from the redistributional balances to both trader and consumer balances in both circuits. A withdrawal from a line of credit for a business in the secondary circuit is a movement from R (the redistributional fund) to DI" (surplus income). Payment on the line of credit is a movement from DE" (surplus expenditure) to R. A consumer loan for a new house is a movement from R to DI' (basic income), and repayment of the loan is a movement from DE' (primary expenditure) to R.

How, then, does monetary circulation correspond to the underlying rhythms of production? As we have seen, in a stationary economy the routine of production is constant over any given period. So much in goods and services is produced and that production is divided between primary production, which enters the standard of living, and secondary production, which through maintenance, replacement, and repair maintains the rate of basic production. Monetary circulation required for a stationary economy is likewise constant. There is no need for investment funds for new production beyond normal maintenance. Therefore, a constant rate of circulation keeps the economic structure going and balancing crossovers between the primary and the secondary monetary circuits maintain equilibrium. An economic expansion, however, requires credit, the source of which Lonergan places in the redistributional field. We now envisage the possibility of an excess movement of funds created by credit moving into the primary and secondary balances. Lonergan designates an excess movement of funds into the secondary trader balance as DT", to the primary trader balances as DT', to the secondary consumer balance as DC', and he designates the primary consumer balance as DC'. When redistributional balances are in equilibrium with the other four balances, then

$$DT' = DT'' = DC' = DC'' = 0 \quad (12)$$

However, there is such a thing as the expansion and contraction of credit. Let DM designate this monetary flow then

$$DT' = DT'' = DC' = DC'' = DM \quad (13)$$

where DM can be positive, zero or negative. This gives us three monetary phases: Monetary expansion when DM is positive, monetary continuity where DM is zero, and monetary contraction, where DM is negative. Is there a correspondence between these monetary flows and real (production) flows? Does a real expansion mean a corresponding monetary expansion? Does a static or stationary phase postulate economic continuity? Does an economic contraction postulate a monetary contraction? The answer to all these questions appears to be yes. Monetary expansion or contraction is not normal in the static or stationary phase, while real expansion is not possible without a corresponding monetary expansion: there must be money beyond that required to maintain current flows to pay for the work of expansion. Given the demand of continuity, how else would you pay for the production of new equipment? How else do you explain the development of financial technique if there were no need of monetary expansion in a real expansion? In sum, real expansion means monetary expansion. The velocity of money in the main circuits is tied to the increase and decrease of sales so that expansion and contraction in the real circuit and in money flows are concomitant. The *velocity* of monetary circulation must meet the demands for sales in the circuits so "monetary velocity is connected to a real velocity."[42] This requirement does not, however, apply to velocity of redistributional exchanges. There can be a high volume of trading on the New York Stock Exchange, but this trade is not connected to production. We can say the same thing about the velocity of betting in Las Vegas casinos. In both cases, ownership changes hands but the change in ownership is not itself a contribution to production costs. However, an increase or decrease in sales of goods and services does involve a corresponding increase or decrease in the velocity of money. There is, then, a *strict* correspondence between the static or stationary phase and monetary continuity, between real expansion and monetary expansion, and between a slump or recession and monetary contraction.

Having established a strict correspondence between production flow and monetary flows in the main circuit, and having established the link between the redistributional zone and the main circuits, Lonergan can now specify the formula for the main circuits and connect them to the movement of money to and from the redistributional balances. All the elements are established. There are five balances, with a set of flows between the balances. The distributions of funds from the balances are accelerators of the flows. A fraction of expenditures in each circuit is spent in the circuit in the transitional and final markets that facilitate the production of *new* goods for sale in each circuit. Note that we only consider new goods because the second-hand market is not operative but redistributional. In addition, a fraction of expenditures in each circuit is

[42] *CWL* 21, 61.

spent in the other circuit. For example, money moves from the basic expenditure to surplus income for maintenance, repair, and replacement while dividends and salaries earned in the surplus circuit are spent in the basic. These are the crossover flows. Finally, there is a flow of money that moves back to the redistributional zone for paying debts, saving for retirement, and so forth. With this we have all the elements of the basic diagram, from "For a New Political Economy" as illustrated in Figure 1 at the head of the article.[43]

We now move to Lonergan's consideration of how we maintain continuity in the various ideal phases of an economy, that is the pure cycle. In a static economy, there is a condition of continuity and current rates of flow are maintained. In a capitalist (surplus) expansion, surplus trader and consumer balances are positive and basic trader and consumer balances are at continuity. In a materialist (basic) expansion, there is a drop in the acceleration of surplus trader and consumer balances and a positive acceleration in basic trader and consumer balances. Money from the redistributional zone supplies the needed credit for expansion with positive DM to surplus and basic trader balances as appropriate.

There is a relationship between the various transfers from R and the circuit flows. The following parallel can illustrate this. Imagine that an employer has been paying staff once a month. However, employer and employees reach a new agreement in which the employees will instead be paid every two weeks while retaining the same total annual salary. It is easy to see that this represents an improvement for the workers. They can now reduce the average 'transactions' balances they normally had to hold in their bank accounts to meet their regular flows of disbursements. Therefore, the difference between the old and new transactions balances could be withdrawn as a once-for-all windfall, to allow them to give themselves a treat! Now imagine the salary frequency changing repeatedly, sometimes higher and sometimes lower (over the dead bodies of the leaders of the union!) There would in the first case be an opportunity for outward and in the second a need for inward flows to maintain the necessary level of the balances. ('Bonuses' and whatever the contrary of these would be called.)

In general, therefore, we would expect in any situation where a flow rate is not completely constant that it will be necessary to introduce what might be described as 'perpendicular' transfers to meet requirements for greater or lower transactions balances because the amounts and velocities in the flow vary over time. As we have seen, despite the fact that the total annual salary remained constant, it could consist of smaller payments more frequently or larger ones less often. If an outsider did not know which situation applied there would be no way of predicting the required flows out from or into the balances. This means that there is no simple relation between the annual salary and the monetary requirements of the accounts. Using a fairly complicated microeconomic argument, however,

[43] See page 69 above.

Lonergan is able to show that by considering the turnovers of the productive process and their monetary requirements the amounts required are still fully determinate and in principle determinable.[44] Some perfectly measurable variables do exist. The circuit is not just a flow of 'money', but is tied to a flow of real payments and their real frequencies. We can now reverse the argument. As changes in the flows give rise to cushioning transfers, so such transfers can act as spurs to accelerations in the flows. Notice that the transfers are not flows (of income, say) but just amounts of money.

We designate by C' and C" the fraction of their incomes that basic and surplus consumers respectively actually spend in their own circuit. Thus, if C' is less than 1 (unity) then basic consumers are not spending all that they earn. They must be saving, or what is equivalent, repaying earlier loans. Alternatively, if C" is more than 1 (unity) then they are spending more than they earn (an expedient that necessitates either borrowings or drawdowns from savings, but that in any case is unlikely to be sustainable for any significant period.) We refer to C' and C" as *the consumer multipliers*. Similarly, traders in either stage can of course be spending just what they receive. But with the incorporation of the possible transfers from R this need no longer be the case. They could spend more as a result of such draw downs, or less if the net transfer is negative. These are the *trader multipliers* designated by T' and T", the multiples that basic and surplus traders respectively are spending out of what they get in receipts. For example, surplus traders will disburse T"DI", where T" may be less than, equal to, or more than 1. Obviously the values of T' and T", as those of C' and C', must have some determinate but fairly complex relationship with the Redistributive transfers, DT', DT", DC' and DC". Finally it will be convenient to name the other two fractions, G' and G", which we have already seen, as *the distributor multipliers*. These too must depend in some complicated way on the Redistributive transfers. The six multipliers form an interlocked set. There can be an amount of arbitrariness in the values that can be given to any small subset of them, but once this is done the possible values of the others become more and more restricted. By including the two trader multipliers, then allowing for the crossover by way of the distributor multipliers, and finally permitting a consumer multiplier to apply, one arrives at the following two equations which connect aggregate receipts, DI' and DI", with the aggregate expenditure *in the next turnover*. The underlining of $\underline{DE}'$ and $\underline{DE}"$ serves to remind us that we are speaking of the turnover *after* that in which the two aggregate income amounts were received.

$$\underline{DE}' = C' [(1-G') T'DI' + G"T"DI"] \qquad (14)$$
$$\underline{DE}" = C"[(G' T'DI' + (1-G")T"DI"] \qquad (15)$$

[44] *CWL* 21, 134-48.

Equation (14) expresses the fact that in any given turnover in the basic circuit, the rate of expenditure in the primary circuit is equal to the new rate of basic income (1-G')T'DI' plus the new crossover flow, G"T"DI", multiplied by the consumer multiplier C', which in the static or stationary phase is unity (1). Likewise, (15) says that in any given turnover in the surplus circuit, the rate of expenditure is equal to the new rate of surplus income (1-G")T"DI" plus the new crossover flow G'T'DI' multiplied by the consumer multiplier C", which in the static or stationary phase is again unity (1). We now have all the terms and relations necessary to present the diagram as it appeared originally in the essay.

How shall we understand the above equations? Let us concentrate on the basic case. Lonergan shows that consideration of the surplus gives us exactly the same results, so that it will suffice to consider only one kind.[45] We begin by considering the distributor multipliers, which affect the crossovers. Primary trader outlays amount in total to T'DI'. As a general continuity rule we should therefore expect that primary consumers should receive the same amount. Because of the crossovers what they actually receive is (1-G') T'DI' + G"T"DI". On the basis of the continuity constraint, therefore, we can write:

$$T'DI' = (1-G')\ T'DI' + G"T"DI"$$[46]

This can be rearranged using simple algebra to give

$$DI'/DI" = G"T"/G'T' \qquad (16)$$

Notice that the left-hand side is just what we have previously called the normative proportion. Under the simpler conditions of what was called the provisional condition of continuity, where accelerations were not considered, we showed previously that the normative proportion had to be G"/G'.[47] Equation (16) reveals the modification (essentially just a multiplication of the crossover ratio by T"/T') that must apply in the more general case. T" may be large (after a war that has destroyed vast swathes of industry, say, or in the example Lonergan uses, during the Industrial Revolution), and T' be small (since the manufacturing resources clearly cannot yet supply the desirable increase in basic consumption). For the given objective situation, which is specified by the normative proportion, DI'/DI", the large T" must require a smaller G" and the small T' needs a larger G'. For these movements are at least in the right directions, in that the large value of T"/T' is in principle capable of being compensated for by the small value of the crossover ratio. Unless such a compensation

[45] *CWL* 21, 66.

[46] As it is equivalent to (16) which follows, Lonergan does not number this equation.

[47] Page 79 above.

occurs, the objective composition of the economy will not actually permit it to do what it is being attempted.

Equation (16) can be rearranged to read:

$$T'DI'/T''DI'' = G''/G' \qquad (16A)^{48}$$

Here the right hand side is the crossover ratio, and we have already seen[49] how extremely sensitive a realistic economy will be to small variations in the two distributor multipliers that will affect its value greatly.

We now wish to turn to the role of the two trader multipliers as they appear in equation (14). We will make two suppositions. The first will be that G' and G'' are observing the normative proportion, in that (16A) applies. We shall also assume that the two consumer multipliers are 1 (unity). Consumers are spending all, and no more than, their full incomes.

Substitution of (16A) [in the more convenient form G'T'DI' = G'T''DI''] into (14) gives us

$$\underline{DE}' = T'DI'$$

[A similar application with respect to (16) gives

$$\underline{DE}'' = T''DE'$$

It will be sufficient to discuss the basic case. All that is said below applies *mutatis mutandis* in the surplus case.]

The primary circuit will then be increasing, staying at the same level, or decreasing just as T' is greater than, equal to, or less than 1. One may summarise by saying that T' accelerates the primary circuit if T' is greater than 1, and decelerates it if it is less than 1. In a somewhat similar manner the distributor multipliers G' and G'' behave as accelerators. The zero acceleration is defined by (16A). If the crossover ratio is greater than this value there will be an acceleration in the surplus circuit and a deceleration in the basic one, and *vice versa* if its value is less. More still needs to be said. If in effect C' and C'' are both unity, as was the assumption above, then both kinds of "consumers in the aggregate are nodding approval to whatever phase the traders are giving them; and this approval consists in translating potential effective demand entirely into actual effective demand."[50] That consumers should spend what they get applies in this case to both primary and secondary consumers. Lonergan writes: "In the aggregate neither primary nor secondary consumers should save; if they do, they exchange a rate for a mere quantity, an income for an equal lump sum, a dollar a day for a dollar; moreover, they change a real expansion into a static phase, and a static phase thence into economic decline. The

[48] Lonergan does not number this equation, so I have assigned the number 16A. See *CWL* 21, 68.

[49] See Table 1 on page 83 above.

[50] *CWL* 21, 71.

slogan is, then, Spend what you get or you won't get it to spend."[51] In the primary circuit, C' (consumer or basic purchases) tends to be "a passive factor in the economic process. It is disastrous for primary consumers to spend less than they earn, and, on the whole, it is impossible for them to spend more."[52] C" (surplus purchases) above unity, however, has the greatest potential for harm. In an expansion, excess demand from surplus consumers, encourages a movement of investment funds from the redistributional balance to increase the rate of expansion. This, despite the fact that a surplus expansion can be accomplished with C" at unity. Thus, when C" is above unity the expansion is expanded and C" has to remain there "only a relatively short time for the economic process to be careening along after the fashion of a drunken youth on a motor highway."[53] This is the boom phenomenon. However, when the surplus expansion shifts inevitably to the basic expansion, the rate of net surplus falls, investment stops, and "this drop of C" below unity wipes out aggregate net surplus. Sooner or later the secret will leak out, and then the stock market crashes."[54] Clearly, then, understanding how circuits accelerate is paramount to creating healthy economic growth. The circuit acceleration of money is ideally conditioned by the underlying rhythms of production. Paying attention to the underlying rhythms and understanding what they signal is key to maintaining healthy economic growth, a growth that includes the possibility of the stationary phase. Ignoring the underlying production rhythms gives us the various manifestations of the trade cycle with its cycle of growth and recession, which in its extreme forms produce booms and depressions. Lonergan identifies a number of mistaken strategies that exacerbate the trade cycle. These notably include the mechanism of the favorable balance of trade and government deficit spending.

4 Concluding Comments

There are a number of things to highlight about Lonergan's argument leading to the construction of the 'circuit diagram' in "For a New Political Economy." In the first place, he makes a detailed case for establishing a dynamic model of economic structure and therefore is keen to establish the instance-to-instance continuity of economic exchanges in the context of rates of flow. In a general sense, the calculus analog is very helpful. The notion of the calculus resolved a fifteen-hundred-year effort to find a solution to the problem of mathematical continuity. The notion of the limit integrated the infinite set of instances between two numbers and this solution made possible the mathematical specification of increments of

[51] *CWL* 21, 72.
[52] *CWL* 21, 73.
[53] *CWL* 21, 72-3.
[54] *CWL* 21, 73.

change.[55] More specifically the notion of elementary differential calculus with its notion of acceleration, velocity, and the constant of integration provides a key to dealing with economic flows. While a complete explanation of economic transactions will be more complicated than, for example, an explanation of water flow, nonetheless, the analogy from the simpler science of hydrodynamics was very helpful in conceiving his model of the structure of exchange dynamically. Lonergan does not reduce economic method to mathematical modeling. In both "For a New Political Economy" and "An Essay in Circulation Analysis" Lonergan, using an engineering analogy, speaks of economy as a mechanism. His shift in the 1980s to speaking of economy as an ecology better captures the richer notion that informs his understanding of economy.[56] All economy is preconditioned by natural schemes of recurrences, which are subsequently sublated by the human ideas and actions that transform the potentialities of nature into economic goods according to a schedule of probabilities.[57] This process has all the richness of human invention and cooperation.

After "For a New Political Economy," Lonergan handles the discussion of continuity more handily with the notions of turnover size and frequency. In the section 'Net Transfers' from the essay fragment "An Independent Method of Circulation Analysis" Lonergan deals specifically with the difficulties of understanding how money changed its velocity in the circuits. He writes: "A general solution of the problem is not as difficult as might appear. We have to deal not with the quantity and velocity of money in all and any payments but only with the quantity and velocity in operative payments. But operative payments have been defined as standing in a network congruent with the network of the productive process; it follows that we have to deal with quantities of money *congruent* with the values emerging in the productive process, and with the velocities of money congruent with the velocities of the production process. In fact we shall be able to deal with the more precise ideas of turnover size and turnover frequency instead of the ill-defined ideas of quantity of money and velocity of money."[58]

In the third place, while equilibrium is an important notion in the argument in "For a New Political Economy " Lonergan soon moves away from talk of equilibrium. No doubt this shift signified an effort to separate his work from both partial and general equilibrium theories. Notes taken

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[55] See Carl B. Boyer, *The History of the Calculus and its Conceptual Development* (New York: Dover Publications, 1959).

[56] *CWL* 15, 3; *CWL* 15, 93.

[57] Lonergan writes: "But the economic issue arises in an ecology in which abstract relationships are complimented by concrete probabilities" (*CWL* 15, 89).

[58] *CWL* 21, 135 (emphasis added). See Philip McShane, "Appendix: Trade Turnover & the Quantity Theory of Money" in *Pastkeynes Pastmodern Economics: A Fresh Pragmatism* (Halifax: Axial Press, 2002) for a more detailed consideration of turnover.

on equilibrium in the period between writing "For a New Political Economy" and "An Essay in Circulation Analysis" indicate his sustained effort to come to grip with notions of price, interest, and market equilibrium.[59] In "An Essay in Circulation Analysis" he speaks of concomitance, whether in terms of the circuits themselves or in terms of the relationship of payments to the stages or steps in production. Lonergan captures the key to economic control in the maxim 'balance the crossovers.'

Finally, I would note the difference between the simplifications typified by reductive approaches such as the Ricardo corn model or the IS/LM curve and what we might term the simplification by generalization as employed by Lonergan. In the standard economic models, which Lonergan worked to replace, simplification is achieved by eliminating elements of the economy. This might be accomplished by ignoring production and considering only market and price. Lonergan's approach was to discover the significant generalization that made possible an explanation of all the relevant elements of an economy. As economies include both production and exchange both elements must be in the set of terms that define the model. The simplification in the latter case is that the generalization makes is possible to work with the full complexity of an actual economy. In this respect, the method of reductive simplification is like a concrete sluiceway for moving water, while the method of simplification by generalization that Lonergan employed is like actual river ecology.[60] Lonergan's quest was not for an algorithm for money managers. He desired to understand the laws that governed economic process, so that "a democratic economics that can issue practical imperatives to plain men" might flourish.[61] Such practical imperatives are best developed from a model that includes an economy in its full complexity.

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[59] See Michael Shute, *Lonergan's Early Economic Research: Text and Commentary* (Toronto: University of Toronto Press, 2010), chapters 4 and 5.

[60] See especially Lonergan's discussion of the 'principle of the level floor' in "For a New Political Economy" (*CWL* 21, 93).

[61] *CWL* 21, 5.