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Loans Make Deposits Make —

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Abstract

We appraise the Schumpeterian invocation against the neoclassical sequence that deposits make loans. The monetary macroeconomic model of Augusto Graziani is used for the purpose. The relationship between the two is shown to be complex in the sense of nonlinear dynamics. The backdrop is the objective of increasing employment in stagnant developing economies.

Key Words: the monetary circuit; chaotic dynamics

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Loans make deposits make ...

1. Introduction

Schumpeter, in the *Theory of Economic Development* (1951), is famous for his account of an evenly rotating economy that suddenly transforms itself into a powerhouse of innovation and growth complete with interconnected financial and real circuits. The first portion of the book pays homage to Walras, the second is beloved of those who would rather forget the first half! Thus, emphasis is laid on the floating of new combinations of the means of production financed by banks. Yet, all classics are seamless and were we to take a snapshot of the mediaeval fair before it transformed itself into an industrial and financial engine, we would find the quantum of savings a priori that needed to be incorporated into the brave new world. For Schumpeter, the annual growth of savings at any point of time, itself the resultant of savings at previous points of time, is as important as the investment plans of businessmen (Correa & Correa 2005). There are limits to the extent to which fresh ideas can be financed without preexisting savings. In a generic Schumpeter-Keynes model, with banks active on both sides of their balance sheets and excluding no behavioral responses, we find that dynamic liability management by banks along with the elasticity of the responses of households to changes in the rate of return on their banks deposits is important. For instance, when the former is strong and the latter weak, a fall in the loan rate might be correlated with a rise in the deposit rate! Thus, by altering the opportunity cost of holding money, central banks can affect the relative costs and benefits of self-financed investment and the need for liquidity, on the one hand, and the development of banking on the other. Historians have strengthened and finessed Schumpeter's theorem and concluded that finance leads growth (Rousseau & Sylla 2006). Financial revolutions preceded, it is claimed, often by decades, the high growth phases of the capitalist economies. A financial revolution comprises of well-managed public finances, stable monetary arrangements, a sophisticated central bank, a smoothly-functioning banking system, securities markets, and corporations. The central message is that a medley of financial instruments are at work. It is left to the circuit approach to disentangle the different 'moments', with banks occupying pride of place in the sequence

The critical role played by the State in this rich menu of options cannot be overstated. The finance-growth nexus was originated by governments seeking to answer the question, How to Pay for the War? The answer was stabilization of currencies, establishment of tax-collecting mechanisms, offering public debt securities attractive to investors, and the founding of central banks that, while bankers to the government, were always sensitive to systemic stability issues. Finance promotes growth by facilitating the collation of capital. With the evolution of money with store of value and medium of exchange functions, people were freed from the compulsion of having to consume their surpluses and could accumulate money that would later fund highly productive but illiquid investments.

In related work with a pronounced development focus, we analyze the economy through an agriculture/industry and basics/non-basics demarcation (Correa & Correa 2004). Once more, interest rate differentiation matters. A classical-Keynesian rationale for the high interest rates in the country and low interest rates in the town is provided. The suggestion is that the monetary authority, oriented as it is towards the thick markets segment of an economy, should not act so as to reduce interest rates. High interest rates in the town would induce a reduced investment in the production of luxury commodities and an inducement to increase savings. In general, the State should get its priorities right and clearly indicate the sectors in which investment is to flow. The plan might entail placing disincentives in the production of luxury commodities, however profit-maximizing at the micro-level, in order to prevent the frittering away of scarce resources including foreign exchange. Correspondingly, incentives have to be created in the appropriate sectors in order to induce private investment. Since private initiatives were unlikely to be forthcoming in adequate quantities, the State had to step in to provide the complementary investment. Secondly, in view of the pauperization of workers, it can safely be assumed that any increase in the purchasing power of the working class through the creation of jobs would be spent primarily on food and essentials. In that case, the productive capacity of that sector would turn out to be the principal bottleneck to the creation of new jobs so as to generate growth without inflation. It might be that the supply of basics is tantamount to the need to finance employment-led growth. State support is not necessary when technologies are profitable without subsidies and

agricultural profitability is dominated by technical rather than price variables. The fiscal and monetary authorities could step in a non-distortionary manner to ease constraints to agricultural intensification by relaxing poor farmers' seasonal financial constraints in order to increase effective demand for inputs.

The framework for addressing the problem of unemployment in the developing world is no different, in some senses, from the problem of unemployment in the developed world. The root of both cases is the failure of effective demand. Thus, in a rigorous test of job creation in Sweden using firm-level data in the 1990s, M. Carlsson, S. Eriksson and Nils Gottfries conclude that aggregate demand is the superior explanation. In the context of sub-Saharan Africa, Epstein and Heintz record that only when employment expands along with growth can the gains be evenly distributed. Besides, investment in new productive capacity is essential if growth is to be accompanied by an increase in employment. Furthermore, a positive connection between growth and poverty reduction can be made when due attention is paid both to the quality and scale of the employment-generation effort. Financial development and the level of investment are correlated. In an econometric specification for the period 1961-2002, along with current government spending, the provision of domestic credit to the private and to the public sector were important explanatory variables. The short-term interest rate had no perceptible impact on investment behavior. In India, the labor force is growing at an average rate of 2% p.a. The growth rate over the next few decades is expected to escalate and outstrip those of competitor economies. In a growth accounting framework, an increase in the growth of labor must translate into an increase in output. However, growth accounting does not take cognizance of demand, nor the composition of demand or output. The result is jobless growth in organized manufacturing as well as services. The task is to ensure that new entrants to the labor force as well as the backlog of unemployed and underemployed have access to decent work *with adequate remuneration and/or rising real wages* (Dasgupta & Singh 2005, 1053, italics in the original). If the formal sector is unlikely to be an engine for generating net new jobs without a faster rate of growth, the onus will fall on the informal sector. There is some evidence that portions of the unregistered manufacturing sector in India are subject to Kaldorian increasing returns. Thus, in addition to the supply of finance and technical services, the government can be

pivotal in maintaining a high rate of growth of aggregate demand consistent with current account balance. To that end, many domestically-oriented manufacturing and service industries will have to reorient themselves toward greater exports.

Comparative static results were reported above. What follows is derived from dynamics. Many have strongly recommended a complex systems approach to the problem of economic development (see, for instance, Nelson 2006). Thus, our behavioral coefficients will range from one end of the unit interval to the other to encompass the most wretched of the earth in Africa to rapidly transforming economies like India. While equilibrium will be "blither" in Joan Robinson's memorable description, we will have occasion to dwell on a position from which desperately poor countries are unable to escape; the origin in the non-negative orthant of activity space. The neoclassical method is unhelpful in explaining the dynamics of polarization between groups of countries. The catching-up theories of Gerschenkron and Abramovitz were encyclopedic explanations of the income growth of countries. They state that the larger the gap between the level of per capita income of a country and that of a leader at a given point in time, the higher its rate of income growth. Over time, the follower catches up with the leader and the two rates of growth converge. Thus, the catching-up process between Asian and OECD countries has been unfolding over the past two decades. The model cannot, however, account for groups of countries like Africa or some Latin American cases whose initial conditions are far below the levels of the comparison countries. Kaldor's model, it has already been suggested, might be used to trace the divergent paths of countries (Targetti 2005). Thus, while China is on an upward cumulative spiral and has reduced the gap between its per capita income and that of the developed world, the chasm between Africa and the first world has widened. One potentially line of enquiry, and an inspiration for the model to be developed below, might be the trajectory of wages and employment, for which purpose the subsistence wage assumption will have to be dropped.

Poor countries are caught in bad equilibria when the dynamics of unemployment are self-reinforcing. The recent UN Millenium Task Force final report identifies a tipping point that tilts a country from growth to decline. The recommendation is for a big push of basic investment that raises a country's capital stock to the point where an economy can be lifted out of a trough into a self-sustaining growth spiral. The

pioneers of classical development economics like Myrdal, Nurkse, Rosenstein-Rodan, and Young developed the idea of positive technological spillovers brought about by internal or external economies of scale. Positive pecuniary externalities were associated with industrialization not less than a minimum critical effort. One industry's growth depended on the existence of demand for its product and the latter could only come from the labor force of other industries. Governments, lacking the will to tax Optimally, are unable to undertake the huge investment plans called for if firms are to be crowded into fixed capital formation and new job creation. Since firms cannot reap economies of scale, much production takes place in unviable units that are unable to access state-of-the-art technologies. Poverty traps are fractal, that is, independent of scale (Barrett & Swallow 2006). A redistribution of initial endowments will only hold out a false promise and pull households back into the pits of a low-level equilibrium. Analogous to the notion of a tipping point are critical thresholds, spaces of outcomes wherein the pull of the inferior equilibrium is snapped and the economy comes under the thrall of a superior equilibrium. Another key factor condemning people to subsistence are inadequate financial markets. A dense network of formal and informal financial must be set in place if individuals with meager asset stocks are to borrow. The low level of productivity resulting from sub optimal production scale is barely adequate to cover the consumption needs of proprietors. Thus, not enough time deposits enter the banking industry and the wherewithal to fund investments plans of businesses is woefully small.

In what follows, we offer an analytical framework within which to pursue our enquiries. Two variants of the circuit approach to macroeconomics are displayed. A final section concludes.

2. The Monetary Circuit: The French Connection

The Cencini-Schmitt schemata starts with a tabula rasa in which the only premise at the outset of a thought experiment is that we never swerve from the principle of double-entry book-keeping and, therefore, acknowledge that banks can issue their own acknowledgement of debt (Cencini 2005). The discovery of negative numbers, allegedly by the Indian mathematician Brahmagupta in the seventh century, is the foundation of

this version of the circuit approach. Banks create a magnitude that is both positive and negative. In order to appreciate this radical approach to macroeconomics it is imperative to understand that money is dimensionless and a pure number.

Money is a payment that banks make on behalf of their clients. No preexisting deposits are required. Yet, if deposits are not involved, the payment would have no real content. Then, it is the payment of wages that generates the positive bank deposit required for the transaction to be meaningful. Consumption is interpreted as a transaction of the opposite sign of production. While production is the creation of a positive income, consumption is its destruction. The output that was transformed into a bank deposit loses its monetary wrapping when it is purchased. Capital permits bridging the gap between the present t_i and future t_j . At the present moment, the income that is formed is lent to firms to finance their purchase of current output which is, thereby, transformed into capital. The recipients of wages at t_i are transformed into holders of financial claims. At t_j , workers-rentiers relinquish their savings to purchase current output and recover their initial income. The first step towards the formation of fixed capital is the formation of circulating capital, that is, saved income at the disposal of firms for financing the production of investment goods. It is clear that a stock of consumption goods is a prerequisite for the production of capital goods. If firms can earn a profit from the sale of their output, a stock of unsold consumption goods is formed. This stock will be the payment of workers producing fixed capital” goods. The outcome is instrumental goods that will enhance the productivity of future workers.

Brahmagupta is credited with attention to the join in the real number line, with reflection that zero has a definite numerical value; it is neither a positive or a negative number. Elsewhere, we have drawn institutional implications of moving from this number in order to write the balance sheets of the circuitistes (Correa 2006). For the present purposes, zero is a natural focal point because it corresponds to the definition of stagnation. The struggle for full employment must mean escape from the trap of the null.

3. The Monetary Circuit: The Italian Job

The preeminent exponent of the circuit approach in Italy is Augusto Graziani. The following account is taken from what is probably his first essay in English. Consider production as an integrated and consolidated sector. Then, demand for credit on the part of firms depends solely on the wage bill. Thus, loans granted by banks at the beginning of the period L_1 equals the current wage bill $(wN)_1$ plus the extant money stock M_0 . The money stock is the liquid balances of households which, in turn, is cash plus deposits accumulated from previous periods. At the same time, it is the remaining debt of producers at the beginning of the new period. Thus,

$$L_1 = M_0 + (wN)_1$$

Household savings, $S = (1-c)(wN)_1$, where c is the propensity to consume, are distributed between an increase in money holdings and an increase in the holdings of securities issued by producers. The fraction b^d of savings placed in securities can be assumed to be a function of an array of interest rates. In like manner, the supply of securities by producers will be a fraction b^s of total savings, depending on the same explanatory variables with opposite signs of influence. The equilibrium condition in the financial market is given by $b^d = b^s = b$.

The bank debt of producers outstanding at the end of the period, and the beginning of the next, is equal to the debt at the beginning of the period just elapsed minus the amount of new securities issued by producers and sold to savers. That is,

$$L_2 = M_0 + (wN)_1 - b(1-c)(wN)_1 = M_1$$

We thus have a dynamical system in L and M where deposits (liquid balances) lag loans one period and the initial condition is given by.

$$L_0 = M_0 = (wN)_0 - b(1-c)(wN)_0$$

4. A Dynamical Systems Interpretation

The translation of the above has been drawn from R.L. Devaney as well as A. Medio and M. Lines. Let the initial value of the state of the world be given by x . Denote $b(1-c)$ by k . Then $k \in [0,1]$. The question to be answered in what follows is: given a function f , what eventually happens to the sequence of iterations

$$x, f(x), f(f(x)), f(f(f(x))), \dots$$

The n -fold composition of f with itself is denoted by $f^n(x) = \underbrace{f \circ \dots \circ f}_n(x)$. The loan

function L will be denoted by f and the liquid balances (deposits) function by g . The domain of the two functions is R^+ .

4.1. Wage-Employment Contracts in the moment

As a benchmark, Graziani considers a stationary economy with an unchanging demand for liquid balances. Here, the savings of wage earners is spent wholly in the financial market. The output of capital producers is entirely sold. Since households spend their entire incomes in the commodity or financial markets, firms are able to repay their debt to the banks in toto. If, at the outset, firms were in debt to the banks, this debt remains constant and equal to the amount of liquidity held by workers. The corresponding case in our formulation is $k = 1$. The situation corresponds to a rentier regime wherein households consume nothing and expend all their savings on the securities issued by producers.

The sequences are

$$f: 0, (wN)_1, 0, (wN)_2, 0, \dots$$

$$g: 0, 0, 0, \dots$$

Thus, the origin is a periodic point of the function f with prime period 2. Indeed, $f^{2i}(0) = 0$, for $i = 1, 2, \dots$. Zero, on the other hand, is the fixed point of the function g . That is,

households are not increasing their idle money hoards. The point 0 is hyperbolic since the derivative of f at the point is not equal to unity. Furthermore, since the derivative is (trivially) strictly less than unity zeroed is an attractor or a sink. The attracting periodic point of period 2 has a neighborhood which is mapped inside itself by f^2 . Such a neighborhood is called a local stable set. It is interesting to note that the notion of stability in this sense is independent of the path taken over time by wages and employment or both. Thus both could be rising or falling or displaying no discernible pattern. The observation is worthy of explicit statement.

Proposition 1. The level of wages and employment has no bearing on the local stability of the origin as attractor in the independent period-by-period working out of the monetary circuit.

Periodic points are atypical and we display the general sequence below. Recall that the initial point is $x - (l-k)(wN)_0$.

$$f: x, x + (wN)_1, x + (1-k)(wN)_1, x + (1-k)(wN)_1 + (wN)_2, x + (1-k)(wN)_1 + (1-k)(wN)_2, \dots$$

$$g: x, x + (1-k)(wN)_1, x + (1-k)(wN)_1 + (1-k)(wN)_2, \dots$$

Clearly, the general point above is aperiodic. If there is an increase in the demand for liquid balances, the savings of wage earners are partly used to increase bank deposits, the residual being placed on the market for securities. The debt of firms to the banks increases by exactly the same amount by which the liquid balances of consumers have increased. The issue of securities now attracts a sum lower than the cost of new capital. The owners of the firms, the shareholders, observe that while the gross wealth of their firms has increased, the burden of bank debt has also increased. Investment is financed by savings through an indirect route. Savers, through the firms they own, go into debt in order to increase their liquid hoards. Graziani makes an apt application of this relation to an alleged difference between developed and developing countries. The former, it is believed, suffer from a surfeit of savings, while there never is enough to finance investment plans in the latter. The conclusion drawn is that owing to the paucity of savings, investment has to be financed by bank credit. However, what the present

analysis reveals is that while in developing countries the propensity to save might be low, once a given quantum of investment has been conceived and executed saving will follow. If the propensity to save is high, savers will increase their financial wealth equal to the value of investment. If, on the other hand, the propensity to save is low, investment will be financed by forced savings and the firms will acquire a corresponding amount of profits. In both cases, investment is financed by savings. Bank credit solves a different problem. It makes it possible for agents to hold the desired amount of liquid balances. In a sense, banks and firms compete for the available financial savings.

The intuition that poor households save a smaller proportion of their incomes than their affluent neighbors because they are closer to the point of subsistence can bear scrutiny. By inter temporal considerations, savings should smooth consumption over time. If it is the time pattern of income that is important, those with more volatile incomes should have higher savings rates. Also, households in poor countries are credit-constrained and thus are less likely to conform to life-cycle or permanent income theories. Consumption and savings, in other words, would be highly responsive to changes in income. The evidence from East Asia and Latin America is that the direction of causation runs from growth to savings (Mavvrotas 2005). High growth precedes savings. Only after a sustained phase of high growth do savings rates increase.

Now the point $(wN) o$ is said to be eventually periodic of period n if $(wN) o$ is not periodic but that there exists an $m > 0$ such that $f^{n+i}(x) = f^i(x)$ for all $i \geq m$. Beginning with the lower bound of k and taking the limit as $k \rightarrow 1$ as well as with the starting value of $(wN) o$, considering the declining sequence $\{(wN)_1 > (wN)_2 > \dots$, we arrive at the following result

Proposition 2. Moving from a pure production economy where workers consume all their incomes to the pure rentier regime of Proposition 1, the starting wage-employment contract of the monetary circuit when wages and employment are time-invariant becomes an eventually periodic point of the loan and deposit mappings.

The map is said to be topologically transitive if for any pair of open sets $U, V \subset \mathbb{R}^+$. there exists an $m > 0$ such that $f^m(U) \cap V \neq \emptyset$. That is to say, a topologically transitive map has points, which move under iteration eventually from one arbitrary neighborhood to

another. Therefore, the dynamical system cannot be decomposed into two disjoint open sets which are invariant under the map. Our map is said to have sensitive dependence on initial conditions if there exists a $\delta > 0$ such that for any x in the domain of the function and any neighborhood N of x , there exists a $y \in N$ and such $n \geq 0$ that $|f^n(x) - f^n(y)| > \delta$. Alternatively put, a map possesses sensitive dependence on initial conditions if there exist points arbitrarily close to x that eventually separate from x under the iteration of the mapping. The map is said to be chaotic on R^+ if, along with the two conditions, periodic points are dense in R^+ . That is to say, in turn a map is chaotic if it is unpredictable, indecomposable, and possesses an element of regularity.

The mathematical literature is open with regards to the components of the definition to be included as well as embellishments of the components. In particular, the last component is often not included in the definition. The rationale is as follows. Not all orbits of a chaotic map are chaotic. We know that there are non chaotic orbits on chaotic flows in the form of periodic orbits. However, we modify the third condition to state that eventually periodic points are dense in R^+ . Also, it is important that the domain of definition of the function be compact. For instance, consider two increasing sequences in

Arrangements $(wN)'_1 < (wN)'_2 < \dots$ and $(wN)''_1 < (wN)''_2 < \dots$ with

$$|(wN)'_i - (wN)''_i| < |(wN)'_{i+1} - (wN)''_{i+1}|.$$

The first two requirements of the definition are met but the map cannot be said to be chaotic because the domain is not closed and bounded. The situation does not change if we confine ourselves only to points where $k = 1$ because the origin as a periodic point is an isolated point and the third requirement of the definition would not be met. In sum, we have

Proposition 3. For every non-negative point (wN) the function f is chaotic on the compact set $[0, wN]$.

In other words, the interests of employers and workers and policy makers must then lie on increasing wage contracts in the interval $[wN, \infty)$.

4.2. Employment and wages over time

Rather than work with a sequence of moments disconnected with each other, it is natural to examine the dynamics of the system where wage bargains in a certain period are struck based on agreements reached in the previous period. The simplest assumption to make is that $(wN)_t = k(wN)_{t-1}$. The sequence in this case is

$$f: (wN)_0 - k(wN)_0, (wN)_0, (wN)_0 - k^2(wN)_0, (wN)_0, (wN)_0 - k^3(wN)_0, \dots$$

The following comparisons will be made. In the case of $k = 1$, the sequence is identical to our first case and our first Proposition applies. The second result is generalized to the extent that we do not require the behavioral propensities to change in a particular direction. Our simple assumption about wage arrangements implies that wages and/or employment are declining over time. In summary form,

Proposition 4. Under all values of the propensity to consume and the propensity to buy securities, the opening level of wages and employment becomes an eventually periodic point in the monetary-financial circuit when contracts are time-dependent. Seen in tandem with the earlier results, the conclusion is that the opening level of output and employment must be 'high enough', bounded far away from zero, in order to originate a virtuous movement away from stagnation.

5. Conclusion

There is no question that while the market, in developing economies particularly, provides employment and income for some, it leaves out millions from its compass. The worldwide attack on trade unions has weakened the ability of workers to protest and the equally virulent attack on public expenditures has silenced the voice of government. The need is for a great transformation in Karl Polanyist terms (Stewart 2006). The basic impetus of the first transformation was to regain control over people's lives; to recapture the ideology that market resultants are not solely the outcome of impersonal forces but

must be tempered by care. For the purpose, an organized working class is a sine qua non. The movement for improving working conditions must gain ground and macroeconomic policy must come into its own. In detail, the programme involves interventions to reduce labour market flexibility and mobility, give stability to incomes, and continuity to production. In England, the forces that supported these interventions were the trade union movement and the adoption of Keynesian macroeconomics.

The beautiful aspect of the circuit approach to examining the malfunctioning of economies is that while starting out with financial markets and the decisions to borrow and lend, the employment relationship springs out of the page in the special isomorphism between the financial and the real that is characteristic of that approach. The lessons to be learnt are as follows: Irrespective of financial arrangements and corresponding wage bargains, the attraction of stagnation is ever present. Therefore, both wages and employment must be high enough and rising in an increasing crescendo of activity backed by the active intermediation of banks to escape both the origin and chaotic trajectories in employment space.

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