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The Demand-Led Theory of Growth in a Classical Framework: Its superiority, its limitations and its explanatory power

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Summary

1. Introduction
2. Theoretical Problems with Supply-Driven Theory of Growth
3. Historical Model of Demand-Led Growth
4. Classical Theory of Prices and Distribution and the Measurement Problem in our Growth Theory
5. A Demand-Led Interpretation of the Historical Pattern of Growth
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Introduction: Two 'Substantive' Theories in Growth Theory

- There are fundamentally only two coherent theoretical approaches to explaining growth.
- **Supply-side Theory:** Based on the neo-classical (or marginalist) theory of production and distribution in which planned investment is conceived to be brought into equality with full-employment saving through the rate of interest. In this approach aggregate demand adjusts to full-employment output through factor price adjustment, in which the equilibrium level of output is determined by supply-side forces.
- **Demand-Led Theory:** Based on the Keynesian theory of effective demand in which planned saving adjusts to planned investment through changes in income, output and employment. Aggregate output is determined by aggregate demand at which there is no tendency for the equilibrium level output to be at full-employment.

Central Arguments

- **The Demand-led Approach is superior to the Supply-side Approach**
  - On theoretical grounds in Section 2
  - On empirical grounds in Section 5 by appeal to the history of modern economic development (as applied to our 'historical demand-led model'
- **Propose our 'historical demand-led growth model' and the abandonment of 'steady-state' equilibrium**
  - Set out our demand-led growth model in Smith (2012) re-worked to account for technological progress in Section 3
  - Outline theoretical limitations of our model in Section 4

Critique of Supply-side Theory

- Neo-classical supply-side approach to growth is only valid in a one-commodity economic system.
- In a multi-commodity system with heterogeneous methods of production this supply-side growth theory is not valid because it cannot suppose the adjustment of aggregate demand to aggregate output (at full-employment) to establish macroeconomic equilibrium along any growth path.
- This fundamental problem stems from the 'capital controversies' of the 1960s which demonstrated that 're-switching' and 'capital reversing' invalidated the existence of inverse functional relationships between the demand for factors of production and factor prices. In particular, it invalidated an investment demand function such as to undermine the adjustment mechanism of investment to full-employment saving *via* the rate of interest and, thereby, adjustment of aggregate demand to aggregate output.

Critique of Neo-classical supply-side Growth Theory

- In absence of factor price - factor substitution adjustment it cannot be supposed that macroeconomic equilibrium will be systematically established in the long run along a steady-state growth path in the neoclassical supply-side approach.
- This critique applies not only to the Swan-Solow model which is based on the traditional long-period method but also on endogenous growth models that typically adopt dynamic stochastic general equilibrium (DSGE) as based on the Arrow-Debreu intertemporal general equilibrium.
- These DSGE-based growth models basically *assume* macroeconomic equilibrium that must ultimately rely on the traditional neo-classical long-run adjustment mechanism (with an investment demand function) that is only valid in a one-commodity system.

Demand-led Growth Theory

- By contrast, in demand-led theory, to establish macroeconomic equilibrium along the growth path the level of planned output is conceived to adjust to planned aggregate demand through a *change in quantities* – in output and employment – without requiring any change in distribution.
- For a given technique of production, the adjustment to macroeconomic equilibrium in which saving (leakages) endogenously adjusts to autonomous demand through an expenditure multiplier process, can occur for a *given* system of (relative) prices and distribution along the growth path.
- Compatible with proposed classical economists' 'surplus approach' to prices and distribution as reconstructed by Sraffa (1960): long-period equilibrium normal prices and distribution are determined independently on the basis of *given* outputs, the level of aggregate output and employment.

Historical Demand-led Growth Model

Distinguishing features of the model:

- **Historical Periods**: trend growth is determined as an average equilibrium growth rate for historical periods for which the datum is specified as an average and reflects the long run persistence of demand generating forces.
- **Endogenous utilisation**: the utilisation of productive capacity is determined endogenously both in the short and long run with the average utilisation for an historical period likely to vary from the normal utilisation upon which adjustment of productive capacity is premised.
- **Abandons Steady-State**: growth rate of output and the growth rate of the capital stock can vary from each other at any point in a historical period as reflected by endogenous variations in capacity utilisation. Only the average growth rate of capital stock and output will be equal.

Demand-Led Theory of Growth

$$AD_t = A_t + c_t Y_t + I^I{}_t \qquad \ldots (1)$$

where A_t is autonomous demand, consisting of autonomous consumption, $C^A{}_t$, autonomous private investment, $I^A{}_t$, and government expenditure, G_t (and in open economy, autonomous net exports, X_t); c_t is the social propensity to consume with values, $0 < c_t < 1$; and $I^I{}_t$ is induced investment, which contributes to productive capacity.

For simplicity the model assumes:

(1) that autonomous demand is non-capacity generating, and

(2) the economy is closed (or global).

Induced Investment Function

$$I^I_t = v_t/u^n_t(Y^e_{t+1} - Y_t) + v_t u^n_t d_t Y_t + (v_t/u^n_t - v_t/u^a_{t-1})Y_t \quad \ldots (2)$$

where u^n_t is the normal degree of utilisation in period t upon which capacity is installed by firms in aggregate is the average degree of utilisation, u^a_{t-1}, realised in period t–1, v_t is the capita-output ratio (in period t) corresponding to the full utilisation of the capital stock, Y^e_t is expected demand (output) by firms in period t. Three parts to the function:

(i) $v_t/u^n_t(Y^e_{t+1} - Y_t)$ represents adjustment of capacity to expected demand at normal utilisation;

(ii) $v_t u^n_t d_t Y_t$ represents investment to compensate for depreciation of the capital stock; and

(iii) $(v_t/u^n_t - v_t/u^a_{t-1})Y_t$ is the adjustment of capacity to demand toward establishing normal utilisation from existing average utilisation.

Equilibrium Income

Incorporating (2) into (1) and equating $AD_t = Y_t$ we get:

$$Y_t = A_t / [1 - c_t - (v_t/u^n{}_t)\, g^e{}_t - v_t\, u^n{}_t\, d_t - (v_t/u^n{}_t - v_t/u^a{}_{t\text{-}1})\,] \quad (3)$$

where all variables are expressed as 'averages' and the condition $1 > [c_t + (v_t/u_n)\, g^e{}_t + v_t\, u^n{}_t\, d_t + (v_t/u^n{}_t - v_t/u^a{}_{t\text{-}1})]$ is met. Given the values of c_t (or s_t), v_t , d_t , $u^n{}_t$, $u^a{}_{t\text{-}1}$ and $g^e{}_t$ which together determine the super-multiplier, and given the level of autonomous demand, A_t, equilibrium income and output is determined. Note this equilibrium does not require firms actual capital-output ratio to equal the desired ratio (since $u^n{}_t \neq u^a{}_t$).

Equilibrium income in the previous period t-1 is determined by:

$$Y_{t\text{-}1} = A_{t\text{-}1}/[1 - c_{t\text{-}1} - (v_{t\text{-}1}/u^n{}_t)\, g^e{}_{t\text{-}1} - v_{t\text{-}1}\, u^n{}_{t\text{-}1}\, d_{t\text{-}1} - (v_{t\text{-}1}/u^n{}_{t\text{-}1} - v_{t\text{-}1}/u^a{}_{t\text{-}2})\,]$$

Determining the Demand-Led Growth Rate

The average growth rate in period t is determined according to:

$$g^y_t = Y_t - Y_{t-1} / Y_{t-1} \qquad (4)$$

For simplicity let us denote the super-multipliers for period t and t-1, as follows:

$$m_t = 1 / [1 - c_t - (v_t / u^n_t)\, g^e_t - v_t\, u^n_t\, d_t - (v_t / u^n_t - v_t / u^a_{t-1})\,] \qquad (5)$$

$$m_{t-1} = 1 / [1 - c_{t-1} - (v_{t-1} / u^n_t)\, g^e_{t-1} - v_{t-1}\, u^n_{t-1}\, d_{t-1} - (v_{t-1} / u^n_{t-1} - v_{t-1} / u^a_{t-2})] \qquad \ldots (6)$$

On this basis:

$$Y_t = A_t\, m_t \qquad (7)$$

$$Y_{t-1} = A_{t-1}\, m_{t-1} \qquad (8)$$

Fundamental Growth Equation

Substituting (7) and (8) into (4) and rearranging we obtain the fundamental growth equation for period t:

$$g^{y}_{t} = g^{A}_{t} + \Delta m_{t}\,(1 + g^{A}_{t}) \qquad (9)$$

The growth rate of output is determined by the growth rate of demand, as determined by two elements:

(1) growth rate of autonomous demand, g^{A}_{t} .

(2) the change in the value of the super-multiplier, Δm_{t}

- Note under steady-state, $\Delta m_{t} = 0$ then $g^{y}_{t} = g^{A}_{t}$.

Accounting for Important Contributing Factors to Growth

Unlike a steady-state model, our historical demand-led model is able to account for some important factors that contribute to demand growth which determine variables in the super-multiplier and, thereby, to lasting changes in it.

- Lasting changes in the distribution of income
- Long-term expectations of firms in aggregate of future demand conditions
- **And**, technological progress that generates (labour) productivity growth: contributing to demand growth mainly through inducing growth in consumption by generating a real income gain.

Incorporating Technological Progress

In the Demand-Led approach technological progress, whilst increasing potential productive capacity, contributes to growth by contributing to demand growth.

- *Process of developing and adopting* technological progress contributes to growth in autonomous demand (with both investment in creating and disseminating new superior technology (*via* competitive obsolescence)).
- The main way technological progress contributes to growth is through its *effect in generating productivity growth* which augments real income and, thereby, augments consumption growth.

Incorporating Technical Progress into our Model

Re-arranging equation (3) we obtain

$$Y_t = A_t + [c_t + (v_t/u_n)\, g^e{}_t + v_t\, u^n{}_t\, d_t + (v_t/u^n{}_t - v_t/u^a{}_{t-1})]\ \ Y_t \qquad (12)$$

For simplicity, we denote the propensity to spend as:

$$z_t = [c_t + (v_t/u_n)\, g^e{}_t + v_t\, u^n{}_t\, d_t + (v_t/u^n{}_t - v_t/u^a{}_{t-1})] \qquad (13)$$

to re-write equation (12) as:

$$Y_t = A_t + z_t\, Y_t \qquad (14)$$

If we suppose that λ_t is the growth in income stemming from the productivity growth of technological progress we obtain the following:

$$Y_t = A_t + z_t\, Y_t\ (1 + \lambda_t) \qquad (15)$$

where $Y_t\ \lambda_t$ is the income gain of productivity growth.

Incorporating Technical Progress

Solving for equilibrium income in period t, we get:

$$Y_t = A_t / [1 - z_t (1 + \lambda_t)] \qquad (16)$$

where the condition $1 > z_t (1 + \lambda_t)$ is met for a meaningful solution. We can call $1/ [1 - z_t (1 + \lambda_t)]$ the 'technological super-multiplier'. Again, for simplicity, we denote the technological super-multipliers for period t and t–1 as:

$$\delta_t = 1 / [1 - z_t (1 + \lambda_t)] \qquad (17)$$

$$\delta_{t-1} = 1 / [1 - z_{t-1} (1 + \lambda_{t-1})] \qquad (18)$$

where $z_{t-1} = [c_{t-1} + (v_t / u^n_{t-1})\, g^e_{t-1} + v_{t-1}\, u^n_{t-1}\, d_{t-1} + (v_{t-1} / u^n_{t-1} - v_{t-1} / u^a_{t-2})]$. Based on $Y_t = A_t\, \delta_t$ and $Y_{t-1} = A_{t-1}\, \delta_{t-1}$, the fundamental equation incorporating technological progress for determining the growth rate for period t is:

$$g^y_t = g^A_t + \Delta\delta_t (1 + g^A_t) \qquad (19)$$

Explaining Growth in Autonomous Demand

There is a complex array of socio-institutional and technological factors which can determine the growth in autonomous demand:

- Fiscal policy through G_t
- Monetary policy influencing private spending of $I^A{}_t$ and $C^A{}_t$ and also *via* debt-servicing costs, G_t
- Technological progress directly through $I^A{}_t$ but also influencing G_t, $C^A{}_t$ and X_t
- Institutional development of the financial system to better mobilise savings and finance spending: $I^A{}_t$, $C^A{}_t$ and G_t
- Single Nation: international trade and competitiveness: X_t

In explaining $g^A{}_t$ all these components should be treated as potentially inter-related so that, for example, an increase in $g^G{}_t$, consisting of infrastructure spending, can lead to an increase in the growth of other components (i.e. $g^{IA}{}_t$).

Coherency of Framework and the Measurement Problem

- Historical time and the long-period method in classical theory of prices and distribution: classical economists treated the aggregate level of output as determined for a given technique by the given capital stock accumulated at the 'stage of accumulation' (i.e. referring to historical time).
- Divergence between average and normal utilisation: normal price is based on normal utilisation when capital is discretely installed by firms accounting for such systematic divergence.
- Measurement problem
  - change in relative prices and composition of output affecting the measurement of macroeconomic aggregates to measure growth (viz. Adam Smith *WN*)
  - Technical progress, change in the distribution of income, change in structure of demand due to change in consumer preferences (and change in normal utilisation rate and depreciation rate) all change relative prices: measure by indexes and settle for close approximation in theory.

Institutions Generate Demand

- A fundamental characteristic of our demand-led approach is that 'human action' in the shape of actions by social, political and economic institutions play a central role in the determination of economic growth.
- g_t^A depends on fiscal decisions by government on its spending, on decisions by private enterprises on investment, including on the development of new technology, and on spending decisions by households on durable consumer products, all by reference to the financial system.
- $\Delta\delta_t$ depends also on socio-economic and politico- institutional forces: with c_t shaped by social and conventional norms and the distribution of income (including role of tax and welfare system), $g^e{}_t$ by enterprises. Technological progress shaped by a whole range of institutions contributing to education, research and commercial product development.

Explaining the Pattern of Historical Development

- From the demand-led perspective the problem of economic development is one of generating demand when income per capita is low. The challenge is to develop a complex of institutions that can generate sustained demand growth which ultimately raises income per capita and, with it, increases the capacity to create demand.
- The historical pattern of economic development since the emergence of capitalism in the late eighteenth century provides support for our argument.
- An outstanding feature of this historical pattern is that the trend growth rate of later developing countries is generally greater than their predecessors. Hence, Britain 1780-1850 grew at 2% trend; Germany 1850-1913 over 3%; United States 1869-1913 over 4%; Japan 1955-1973 at 9%; and China 1976-2012 at 9%.

Historical Pattern of Economic Development

- The development process is conceived to involve sustained demand growth which, by lifting income per capita, thereby increases a nation's *capacity* to generate domestic demand, principally consumption. In this process higher income strengthens the ability of institutions to generate demand
- A short cut to economic development is for a poor nation to get access to a rich nation's market and through an export-led strategy generate foreign demand and raise income per capita.
- But at the beginning of industrialisation 250 years ago this was not possible. Instead, Britain as the pioneer had to adopt a mercantilist policy to build a larger market by colonial expansion and the development of a transport and communications network. Besides export growth, it had to rely on technical progress to generate demand until it could develop those demand generating institutions.

Interpreting Early Industrialisation

- Main constraint was on g^A_t because of the undeveloped state of institutions: relied on colonial expansion that (1) enabled an export in exotic products to the richer European market; (2) export domestic manufactures to Europe and colonial market, especially to higher income North America.
- Technological progress crucial to competitive superiority for export of manufactures as well supply of cheap resources (i.e. cotton) and to generate domestic demand *via* productivity g^G_t gain, in terms of $\Delta\delta_t$. Inducing technological progress depended on building national market and effecting labour and capital mobility conducive to the 'division of labour'.
- g^{IA}_t was constrained by difficulty of obtaining long-term finance: mainly consisted of 'working capital' and credit for merchant trade (bill of exchange).
- g^G_t stimulus from mercantile expansion and wars.

Key Institutional Developments

Financial institutions in 19th century to finance long-term investment: joint-stock banking, stock exchange and limited liability corporations. Facilitated higher $g^{IA}{}_t$ with firms installing larger-scale steam powered mechanized capacity and higher capital-output ratio, v_t , and, thereby, $\Delta\delta_t$.

- Spectacular example was Germany with 'mixed banking' financing rapid and sustained $g^{IA}{}_t$ of railways and heavy industries from low income (saving) base. It provides some strong evidence for Keynesian notion that investment causally generates saving through higher income against the neoclassical notion that saving causally generates investment.
- International communications with the telegraph and steam-powered ships facilitated greater British capital investment in United States, especially railways.

Key Institutional Developments

- Emergence and rise of **Labour Movements** and **Trade Unions** in the nineteenth century played an important role in strengthening the bargaining power of organized workers to obtain a larger share of productivity gains and raise wage-earners incomes, thereby contributing to stronger consumption growth.
- Through wider political influence (associated with a progressive widening enfranchisement of the electoral vote), labour movements contributed toward government policies that improved living standards generally, and thereby also contributed to stronger consumption growth (e.g. removal of English corn laws with free trade in 1840s onwards, regulations on working hours, social welfare and health provisions (including unemployment insurance as implemented by Bismark's Germany in 1880s)).

Key Institutional Developments

Government and Macroeconomic Policymaking: in 20th century the role of government substantially increased with a great development of the institutional machinery of policy-making. This stemmed from the need to respond to Great Depression and experience of wartime economy. The 'Keynesian revolution' of 1930s and 1940s played a key role in shaping this institutional machinery to increase the capacity of capitalist 'mixed' economy to generate demand. Key institutional changes were:

- Abandonment of 'Gold Standard' and adoption of fiat money systems (1930s)
- Low interest rate monetary policy by central bank control of liquidity of a fiat money system (1930s and 1940s)
- Debt management to enable higher long-term public debt and lower debt-servicing cost (1930s and 1940s)

Key Institutional Developments

- Public welfare and taxation systems greatly expanded providing social security net and redistributing income equitably (1930s - 1960s)
- Fiscal policy developed associated with larger government role in public provision of health, education and community services (1940s – 1960s).
- Bretton Woods international monetary arrangements paved the way for post-war multilateral trade (convergence and Asian export growth)
- Globalization of capital markets (since 1960s) has given greater capacity for nations to adopt policy induced growth in domestic demand unconstrained by external imbalances

Note: neoliberalism since the 1980s has seen a degrading of the 'Keynesian' policy capacity whereby greater freedom of international trade is seen as an opportunity for export growth as a *substitute* for national policy to generate domestic demand growth.

Annual Average Growth Rate of Real GDP of Advanced Countries

	% 1913-1950	% 1950-1973	% 1973-1989	% 1990-2016*
United States	2.8	3.6	2.7	1.6
United Kingdom	1.3	3.0	2.0	2.0
Germany	1.3	5.9	2.1	1.6
France	1.1	5.0	2.3	1.6
Italy	1.5	5.6	2.9	0.7
Japan	2.2	9.3	3.9	1.1
Average	**2.2**	**5.4**	**2.7**	**1.6**

Source: Maddison, A. (1991) *Dynamic Forces in Capitalist Development: A Long-Run Comparative View*, Oxford: Oxford University Press, p. 50; * IMF *World Economic Outlook Database*.

Conclusion

- Our ‘historical’ demand-led growth theory in classical analytical framework is superior in explaining the phenomenon of sustained growth and development.
- Theoretical Grounds:
  - neoclassical growth models only valid for one-commodity economies.
  - ‘historical’ demand-led growth models (with endogenous utilization and abandonment of steady state) consistent with classical analysis of distribution and prices.
  - demand-led growth model is valid for multi-commodity economies: (i) precise when no technological change and distribution and social preferences unchanged; (ii) approximate when these factors change and cause a change in relative prices and composition of output due to measurement problem.
- Empirical Grounds:
  - historical pattern of modern capitalist development and the historical development of institutions and role in generating demand.
  - Demand-led approach provides insight into economic history.