
NOTES

Balanced and unbalanced Growth in XIXth Century Europe

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Introduction

Various generalisations have been advanced to explain and predict the paths of economic growth followed by European economies in the period up to 1914. Two which have proved fruitful in generating discussion and research have been Gerschenkron's¹ relationship between 'relative backwardness' and a 'decisive spurt' and Rostow's 'take-off'.² Despite the usefulness of the framework which they offered for the organisation of research into economic growth both hypotheses have proved difficult to render operational so that they might be subject to statistical tests and where they have been subject to such tests the results have not proved entirely convincing.³

It is with another of these grand relationships which this paper concerns itself. This is the proposition that a systematic relationship exists between balance in the growth of sectors of an economy and its overall rate of growth. Over the last quarter of a century economists and economic historians have discussed the merits of 'balanced' and 'unbalanced' growth across sectors of the economy as possible alternative paths to sustained increases in national output⁴. This debate has found expression in discussion of XIXth century

¹ A. GERSCHENKRON *Economic Backwardness in Historical Perspective* (Cambridge 1966).

² W. W. ROSTOW *The stages of Economic Growth* (Cambridge 1971)

³ P. K. O'BRIEN 'Do We Have a Typology for the Study of European Industrialisation in the XIXth Century' *Journal of European History* Vol. 15 No 2 1986 pp. 291-333.

⁴ A. O. HIRSCHMAN, *The Strategy of Economic Development* (New Haven, 1958); G. HABERLER and R. M. STERN, *Equilibrium and Growth in the World Economy: Economic Essays by Ragnar Nurkse* (Cambridge, Mass 1962); A. MALTHUR 'Balanced and Unbalanced Growth: A Reconciliatory View', *Oxford Economic Papers*, XVIII (1966), pp. 137-157; G. OHLIN 'BALANCED GROWTH IN HISTORY', *American Econo-*

Europe in the form of positive statements about the relationship between the overall rate of economic growth of an economy and balance, or the lack of it, in the growth of its different sectors. J.T.R. Hughes, for example, is a clear proponent of the view that, in XIXth century Europe, economic growth was associated with imbalance between sectors:

In recent years economists have become increasingly interested in the possibilities of "balanced economic growth"... It is important to know that, whatever the theoretical possibilities of such a phenomenon, historically, it never occurred. What has been typical of the internal structural framework of a growing industrial economy has been the opposite of balanced growth.⁵

A. Milward and S.B. Saul on the other hand take the opposite view, "...everywhere successful development required balanced development; ... development was sustained only where the agricultural sector responded sufficiently to provide an adequate level of internal demand for the developing sector initially to build upon".⁶ These statements have the merit of being universal. The object of this paper is to make them operational by formulating the notion of balance in economic growth in such a way that it is susceptible to measurement and to test their accuracy against the available evidence by considering the XIXth century growth experience of three European countries — Italy, Sweden and Germany.

I

Consider the theoretical underpinnings of the relationship between balance or the lack of it and an economy's rate of growth. If the term balance is to mean anything in a measurable sense it must be defined and the mechanisms by which balance or imbalance of sectors generate faster economy-wide growth rates explained. We shall consider three balanced/unbalanced growth hypotheses — those of Hirschman, Nurkse and Lewis-Fei-Ranis.⁷

Hirschman views development as a disequilibrium process.⁸ One of the constraints on supply is a shortage of entrepreneurial expertise. Imbalance in sectoral growth rates is reflected as market disequilibrium in the form of excess demand or excess supply and as such facilitates the entrepreneurial deci-

mic Review, XLIX (1959), pp. 338-353; P.P. STREETEN 'Unbalanced Growth', *Oxford Economic Papers*, II (1959), pp. 167-190; R.B. SUTCLIFFE 'Balanced and Unbalanced Growth', *Quarterly Journal of Economics*, 78 (1964), pp. 621-640.

⁵ J.T.R. HUGHES, *Industrialization in Economic History* (New York, 1970), p. 70.

⁶ A.S. MILWARD and S.B. SAUL, *The Development of the Economies of Continental Europe 1850-1914* (1977), p. 529.

⁷ HIRSCHMAN *Economic Development*; HABERLER *Equilibrium and Growth*; Sir W.A. LEWIS, 'Economic Development with Unlimited Supplies of Labour', *Manchester School of Economic and Social Studies*, 22 (1954), pp. 139-191; G. RANIS and J. FEI, 'A Theory of Economic Development', *Am. Ec. Rev.* 51 (1966), pp. 533-565.

⁸ HIRSCHMAN *Economic Development*.

sion-making process by making investment needs more obvious. At this point inter-industry linkages play an important role in transmitting activity throughout the economy. Excess demand on the part of industries with high backward linkages stimulates output growth in their supplying industries thus encouraging investment. Excess supply on the part of industries with high forward linkages both decreases the cost and increases the availability of the product to using industries stimulating output and investment. In this way sectoral imbalance is associated by Hirschman with economic growth.

Nurkse's argument for balanced growth involves two propositions. First that, "private investment in any single industry ... is discouraged by the smallness of the existing market;"⁹ second that, "in the absence of vigorous upward shifts in world demand for exports of primary products a low income country can, through a process of diversified growth, seek to bring about upward shifts in domestic demand schedules"¹⁰ and hence from proposition one to induce investment and promote further growth. It is important to note that Nurkse regarded his balanced growth strategy as applying only in the absence of the possibilities of growth through trade which he regarded as having performed, in the XIXth century, the role of engine of growth.¹¹ It would appear from this important qualification to his balanced growth theory that he did not regard it as shedding light on the XIXth century experience of economic growth. This has not prevented its application in one form or another to XIXth century Europe.¹²

Lewis offers a more generalised balanced growth dictum.¹³ Dividing the economy into agricultural and manufacturing sectors, he makes clear the need for sectoral output to expand in line with each sector's demand for the other's output. A failure of agricultural productivity may, for example, lead to adverse terms of trade for the manufacturing sector in terms of the agriculture sector's output which would act to choke off growth in the manufacturing sector. Fei and Ranis carried analysis of these possible constraints on growth further.¹⁴ They identified a balanced growth path in which the allocation of investment between the two sectors is such that the terms of trade are not allowed to deteriorate substantially.

Of the economic historians mentioned earlier, Hughes, then, is a clear proponent of the Hirschman theory of imbalance between sectors driving the economy forward. Milward and Saul with their emphasis on the role of the agricultural sector appear to be more closely akin to the Lewis-Fei-Ranis no-

⁹ HARBERLER, *Equilibrium and Growth*, p. 247.

¹⁰ *Ibid.*, p. 247.

¹¹ *Ibid.*, pp. 243-247, p. 279.

¹² OHLIN, 'Balanced Growth'; Streeten, 'Unbalanced Growth'; Sutcliffe, 'Balanced and Unbalanced'; Hughes, *Industrialization*.

¹³ LEWIS 'Economic Development'.

¹⁴ RANIS and FEI, 'A Theory of'.

tion of balance than to that of Nurkse. However their definition of 'balance' between sectors is qualified as follows, "balanced growth does not mean that sectors advanced at the same pace, nor indeed that the agricultural sector might not fall markedly behind the others."¹⁵ Nurkse, despite Hughes's interpretation, did not consider that all sectors had to move forward at an equal rate for growth to be considered balanced:

the balanced growth idea is related to the classical law of markets. Supply creates its own demand, provided that supply is properly distributed among different commodities in accordance with consumers' wants. An increase in consumable output must provide a balanced diet. Each industry must advance along an expansion path determined by the income elasticity of consumer demand for its product.¹⁶

It would appear then that the Milward/Saul view of balance between sectors in XIXth century Europe has much in common with Nurkse's theory of balanced growth. The task now is to test the accuracy of these conflicting views of the internal structure of the growing economies of XIXth century Europe by confronting them with the available evidence.

II

The first step is to make the concept of balance in economic growth operational by formulating it in such a way that it may be measured. The degree of balance/imbalance in the economic growth of an economy may be established by examining the degree of dispersion of sectoral growth rates around the overall growth rate, imbalance being indicated by a high value of the measure of dispersion used.¹⁷ A number of possible measures of dispersion are available. The fundamental decision is whether to use absolute or relative deviations round the mean as the basis for the measure of dispersion and hence index of imbalance.¹⁸ The measure used here is that suggested by Yotopoulos and Lau which is a measure of relative deviation.¹⁹ It is an approximation of

¹⁵ MILWARD and SAUL, *Development of Europe* p. 529.

¹⁶ HARBERLER, *Equilibrium and Growth* pp. 150-1.

¹⁷ D.S. SWAMY, 'Statistical Evidence of Balanced and Unbalanced Growth' *Review of Economics and Statistics*, 49 (1967), pp. 208-303; P.A. YOTOPOULOS and L.J. LAU, 'A Test for Balanced and Unbalanced Growth' *Rev. Econ. Stat.* 52 (1970) pp. 376-384; D. DEMERY and L. DEMERY, 'Cross-section Evidence for Balanced and Unbalanced Growth', *Rev. Econ. Stat.* 55 (1973), pp. 459-464; L. SHASHUS and Y. GOLDSCHMIDT 'The Merits of Balanced Growth Reconsidered' *Rev. Econ. Stat.* 49 (1972) pp. 337-339.

¹⁸ For a discussion of the relative merits of each approach see SHASHUS and GOLDSCHMIDT, 'The Merits of'; DEMERY and DEMERY 'Cross-Section Evidence'; P.A. YOTOPOULOS and L.J. LAU 'The Balanced-Unbalanced Growth Controversy Revisited' *Rev. Econ. Stat.* (1975) pp. 516-517.

¹⁹ YOTOPOULOS and LAU, 'A Test for'.

the Pearson Coefficient of Variation which is the standard deviation divided by the mean. Because the average of the sectoral growth rates will not necessarily be equal to the overall growth rate the latter are substituted for the former in the formula:

$$V_1 = \frac{1}{G} \sqrt{\left(\frac{\sum_{i=1}^n (g_i - G)^2}{n} \right)} \quad (1)$$

G is the overall rate of growth of an economy over a given time period

g_i is the i th sector's rate of growth

However, the measure should also allow for the relative share of each sector in the economy. The index of imbalance which allows for differing sectoral shares is:

$$V_1 = \frac{1}{G} \sqrt{\sum_{i=1}^n w_i (g_i - G)^2} \quad (2)$$

w_i is the share of the i th sector in total output

$$\sum_{i=1}^n w_i = 1$$

$$\sum_{i=1}^n w_i g_i = G$$

A third requirement is that the index should allow for Nurkse's stricture that balanced growth of sectors means that each sector should grow along an expansion path determined by the income elasticity of demand for its output. The index of imbalance that allows for differing sectoral shares and income elasticities of demand is defined:

$$V_3 = \frac{1}{G} \sqrt{\sum_{i=1}^n w_i (g_i - e_i G)^2} \quad (3)$$

E_i is total income elasticity of demand for the i th sector's output

Having outlined the appropriate indices of imbalance the next step is their construction for each of the three European countries whose growth experience we propose to consider.

The data required are aggregate and sectoral growth rates, sectoral shares in value added, and sectoral income elasticities of demand. The basic source

for these data is Mitchell.²⁰ Data are provided on real G.N.P. for Germany and for Italy between 1850 and 1913, and 1861 and 1913 respectively. For Sweden the output measure provided is real G.D.P. between 1861 and 1913. Sectoral shares of output are available for six global sectors for Italy and Sweden over the same period. These sectors are Agriculture, Industry, Construction, Transport and Communication, Commerce and Others. For Germany sectoral shares for five global sectors over the period 1851 to 1913 are available, Industry and Construction being treated as one sector. From the basic data aggregate and sectoral growth rates were calculated for every year up to 1913.

Income elasticities of demand for sectoral output are not immediately available. They are estimated for each sector using the equation:

$$\ln v_i = \ln a + b \ln Y$$

where v_i is sectoral value added
 Y is the economy-wide output measure.

This elasticity measure obviously refers to change in the i th sector's output with respect to change in total output. Strictly speaking it is not a measure of income elasticity of demand since it reflects change in the entire system. The estimated sectoral elasticities for each country are reported in Table 1.

Two indices of imbalance were constructed for each country. The first, V_2 , makes no allowance for differing sectoral elasticities, the second, V_3 , does. Each measure is thus based on a different definition of balanced growth. V_2 defines balance to mean that each sector's growth rate is the same as the overall growth rate while V_3 defines balance such that sectors grow in line with the elasticity of demand for sectoral output. The value of the computed index then indicates the extent of divergence from the assumed form of balance on the basis that the higher the value of the index the greater the imbalance reflected.

The question now arises as to what is the appropriate time interval over which to measure balance/imbalance. Clearly whether the signals to the production sector of the economy are being transmitted by means of a series of disequilibrium positions manifesting themselves as shortages, or surplus or whether they are being transmitted by a steady advance of demand on all fronts it would be reasonable that some discrete time period be suggested in which these relationships may be allowed to work themselves out so that the economy may be seen to be growing along either a balanced or unbalanced path. We would require that over this period the economy on average should display the characteristic balance or imbalance. A year would not seem a sufficient length of time for all the responses to take place. Neither of the

²⁰ B.R. MITCHELL, *European Historical Statistics 1750-1975*, (1981).

Table 1
ESTIMATED AVERAGE SECTORAL
INCOME ELASTICITIES OF DEMAND

Sector	Country		
	Italy (1861-1913)	Sweden (1861-1913)	Germany (1851-1913)
Agriculture	0.610 (0.042) DW = 2.07	0.630 (0.039) DW = 2.04	0.607 (0.026) DW = 2.14
Industry	1.218 (0.103) DW = 2.30	1.647 (0.078) DW = 2.37	1.427 (0.037) DW = 2.57
Construction	0.562 (0.371) DW = 2.00	0.949 (0.168) DW = 2.44	
Transport and Communication	0.864 (0.319) DW = 2.14	1.611 (0.142) DW = 2.44	2.137 (0.110) DW = 1.87
Commerce	0.228 (0.155) DW = 1.85	1.005 (0.031) DW = 2.26	1.192 (0.016) DW = 1.88
Others	0.330 (0.482) DW = 2.16	0.812 (0.032) DW = 1.98	0.272 (0.021) DW = 2.04

Source: Elasticities estimated from the equation in $V_i = \ln a + b \ln Y$ where V_i is sectorial value added and Y is an economy wide output measure. Standard deviations are in parenthesis.

competing hypotheses on the importance of balance/imbalance for successful growth in XIXth century Europe considered above specify the time period over which the relationship which they identify between balance/imbalance and economic growth might be expected to operate. Despite this Milward and Saul are in no doubt about the consequences for an economy which fails to grow along a balanced path. Discussing late XIXth century Norway, for example they are convinced that, "the absence of balanced growth left the economy very vulnerable when any major sector faltered."²¹ In the absence of any indication as to what is an appropriate time period over which balance might be expected the decision was made to select five-year intervals. Accordingly the indices of imbalance, V_2 and V_3 were constructed for each year and then averaged over five year intervals.

²¹ MILWARD and SAUL, *Development of Europe*, p. 529.

III

The existence of a relationship between balance/imbalance and economic growth is tested for by means of correlation analysis. A positive relationship between the computed V 's and the rate of growth of output would indicate that high growth rates were associated with high levels of sectoral imbalance, a negative relationship would indicate the reverse. The results of the correlation analysis are reported in Table 2. In all three countries and in the case of both indices the correlations are negative. This would appear to indicate that sectoral imbalance was associated in XIXth Century Europe with lower overall rates of growth of output which would contradict the Hughes view and favour that of Milward and Saul.

Table 2
CORRELATION COEFFICIENTS BETWEEN INDEX
OF IMBALANCE AND RATES OF GROWTH

	Italy (1861-1911)	Sweden (1861-1911)	Germany (1850-1910)
V_1	-0.4058 (n=10)	-0.0801 (n=10)	-0.0244 (n=12)
V_2	-0.4056 (n=10)	-0.0879 (n=10)	-0.0225 (n=12)

However on closer inspection the correlation coefficients are observed not to be significantly different from zero at any acceptable level. The conclusion then must be that there is no simple linear relationship to be observed, at least in the case of these three countries, between variability in sectoral growth rates and the overall rate of growth in XIXth Century European economies. Since both the Hughes and the Milward/Saul hypotheses were set out in universal terms, then encountering one instance when the relationship does not hold is sufficient to demonstrate that their statements are false i.e. the hypothesis that there is a linear relationship between sectoral variability and economic growth in XIXth century Europe may be rejected.

IV

What has just gone it must be conceded is economic history on the grand scale. There must be some doubt as to whether the few variables used can capture the full complexities of the relationships involved and the historical peculiarity of the circumstances in which they worked themselves out. Even those who accept the validity of the statistical exercise carried out may well doubt the quality of the data which has gone into generating the results.

However we are dealing with grand generalisations about the experience of European economies which are set out in terms of a systematic relationship between balance and imbalance in the growth of sectors of the economy and the economy-wide rate of growth. This relationship is of a quantitative nature and if it is not to be just another empty box some attempt must be made to render it measurable and then to quantify it for any set or subset of economies to which it is applied using the available data. Statements about balanced/unbalanced growth of economies in XIXth century Europe and its effects have been substantiated by impressionistic observations about 'leading sectors' rather than by a systematic appeal to such evidence as is available. Indeed it is arguable that they have been based less on a review of the evidence than on an implicit appeal to a general or covering law of the form:

if (balance/imbalance) then economic growth

This essay set out to test the existence of such a relationship in XIXth century Europe. The concept of balance was made operational by defining it in such a way that it was measurable and the existence of the relationship, tested using correlation analysis. No simple linear relationship was found to exist. The tentative conclusion must be that there is no general law of the form outlined above to which economic historians may appeal if they wish to discuss the issue of balanced/unbalanced growth in XIXth century Europe.

A broad conclusion might be to offer a general word of warning against the temptations of making universal statements about such a diverse population as that making up the national economic experiences of XIXth century Europe. O'Brien has recently persuasively advocated the case for an increased concentration on 'an inductive statistical approach' to XIXth century European economic history.²² The findings of the essay might be taken as adding some small amount of evidence in favour of this useful piece of advice.

²² O.K. O'BRIEN, 'Do We Have a Typology.'

