THE MEASUREMENT OF MARKET CONCENTRATION IN IRISH BANKING

R.P. KINSELLA*

Central Bank of Ireland

(Read before the Society, 12 February, 1981)

1 INTRODUCTION

This paper analyses the market structure of Irish banking, with particular reference to market concentration. While it is generally recognised that the Irish banking system is relatively highly concentrated there have been few attempts to give empirical precision to this feature. I begin this paper by examining changes in the number of licensed banks since 1960. We next consider what is, perhaps, the most widely used measure of market concentration, the concentration ratio. While useful as a starting point, the concentration ratio has important limitations as a measure of market structure. Hence, we look at measures of relative concentration – that is, measures which take account of changes in output among all licensed banks as opposed to just the largest banks. The Herfindahl-Index, which has been widely used in US studies of market structure in recent years, is discussed in some detail. Measures of inequality with respect to the distribution of output among all banks, including Lorenz curves and the related Gini Coefficient, are also discussed. Finally, changes in bank turnover (that is, changes in rankings over time) and in market shares are examined. The main features of the market structure of Irish banking, as reflected in these various measures, are then summarised.

Economic theory suggests that the behaviour and performance of firms depend, to some extent, on the kind of market structure within which they operate. While the *main* purpose of the paper is to measure market concentration, it would appear to be of some relevance to place the findings in the wider context of their likely impact on the performance of Irish banks. The third section of the paper sets out some considerations in this regard, including the results of previous studies for other countries. A hypothesis which links the market structure of Irish banking, as measured by concentration, to the performance of licensed banks is discussed. Some of the problems involved in testing this hypothesis for Irish banking are also discussed, as well as a possible way around these problems.

The study assumes a familiarity with the main institutional features of the Irish banking system. It is limited, in general, to the years 1972 to 1977. The main reason for this is, quite simply, that a fully consistent series for bank output for all licenced banks is available only for the post-1972 period. The analysis focusses on financial institutions licensed as banks under Section 7 of the Central Bank Act, 1971. Moreover, it is concerned only with within-the-State activities of banks. The implications of a given level of market concentration depend, in part, on access to alternative sources of supply. In the period under consideration, the implications of bank concentration must be viewed in the

context of services provided first, by non-bank financial institutions operating within the State and, secondly, by UK banks inasmuch as the Irish pound was linked to sterling and, as a consequence, there was no perceived exchange-risk differentiating sterling and Irish pound assets and liabilities. It may be useful to develop these points.

It is clear that banks face competition, which is increasing, from non-bank institutions both as repositories of savings and providers of credit and certain other services. Banks have, however, a distinguishing characteristic: they offer demand liabilities which serve as a medium of exchange and, in the context of a branch banking system, play an unique role in the process of financial intermediation. The totality of services provided by banks has a distinct status. Banks enjoy in the words of the US Supreme Court a "settled consumer preference" that gives them an advantage over similar non-bank institutions. In other words, while institutions such as building societies compete with banks in certain product markets, the package of services which banks provide is not easily duplicated by non-bank institutions. The experience of successive bank disputes underscores this point. The second aspect of this question of alternative sources of supply concerns the provision of services by UK banks. Many of the services provided by banks, particularly those of a personal nature, cannot easily be provided by banks operating in a different country and under a different regulatory environment. Certain categories of customers could not, while others would probably be disinclined to, regard UK banking services as an effective substitute for services provided by domestic banks. It seems reasonable to argue, therefore, that the availability of alternative sources of supply, does not constitute a major impediment to analysing market concentration within the banking sector alone. Studies of market concentration in some US States, and also in certain countries like Canada which have close financial links with neighbouring countries and a market structure of banking similar to that for this country, have produced results which have been used by the Courts and for regulatory purposes.

Seller concentration is an important element in the overall market structure of an industry or service. The measurement of market concentration in banking provides a guide to the type of market structure within which banks operate. More precisely, the degree of market concentration is an important indicator of the potential for monopoly power exercised by a firm or group of firms. A relatively high degree of concentration need not *necessarily* imply the existence or exploitation of market power. Much will depend, *inter alia*, on the regulatory framework within which firms operate, the existence of countervailing power and so on. In general, however, the extent of market concentration is a valid enough guide to likely behaviour of firms operating within it. Miller has made the point that:

> The crucial question is whether there is any close correlation between the degree of concentration and the character of the competitive forces at work in a sector of the economy. An influential body of opinion holds that high concentration of output in a market will generally be associated with monopoly rather than competition.[1]

It is this view, for example, that underlies successive decisions by the US Supreme Court with regard to proposed bank mergers which, by increasing market concentration, would thereby lessen the scope for competition.[2] It is supported by a growing body of

1. Miller J.B., 1955. "Measures of Monopoly Power and Concentration: Their Economic Significance", in *Business Concentration and Price Policy*, National Bureau for Economic Research, (N.B.E.R.) New York: Princeton University Press.
2. US v Philadelphia National Bank, 374 U.S. 321, (1963) was a landmark in this regard. See US Treasury 1966, *Studies in Banking Competition and the Banking Structure* (articles reprinted from the *National Banking Review*), US Treasury, Washington DC.

empirical studies which suggest that market structure is systematically associated with bank performance. This corresponds with a priori theory which indicates that the optimal allocation of resources, in banking no less than in other sectors, is to be secured in a competitive market structure. Within such a framework, banks may be expected, other things being equal, to function in a technically efficient manner and at the least cost in terms of resource use; the interest rate spread between the rate earned on assets and that paid on deposits may be expected to be at a minimum, which implies that the cost of credit to borrowers will be as low as possible and the interest rate paid on deposits will be as high as possible.[3]

Finally, it may be as well to underline, from the outset, the preliminary nature of this study. While there is a large and growing literature on market concentration and bank performance in the US, few studies have been published for other countries and, as far as I can establish, none at all for this country. It may be just as well to make haste slowly by laying the methodological groundwork thoroughly before proceeding to draw policy conclusions. Hopefully, some pointers to the direction of further work in this vital, yet under-researched, field will emerge from tonight's discussion.

2. MEASUREMENT OF MARKET CONCENTRATION

(1) *Measuring Bank Output*[4]

In order to measure market concentration in banking it is necessary to have a suitable measure of output. It is, indeed, strange that . . .

Despite the strategic role that commercial banks play in monetary policy and in the real world, there is little agreement on what it is that banks produce.[5]

The approach adopted to the measurement of bank output will depend, in part, on how one chooses to approach the difficult conceptual and analytical problems involved in measuring the output of what is essentially a service or, rather, a "package" of services. It also depends on the purpose of the study. Finally, the measure of output adopted depends on the availability of good quality data.

It may be useful to illustrate some of these points by looking at some alternative measures of bank output for Ireland. The National Accounts are a useful starting point.

It would be possible, at least in theory, to define and measure the output both of individual banks and of the banking sector within the framework of the National Accounts. In practice, the problem is that in "National Income and Expenditure", output originating in banking is included in the "Other Domestic" sector, along with non-bank financial institutions. Disaggregated data for banks on such items as wages and salaries, imputed service charges and so on are not published. (*En passant*, it may be worth noting that data on value-added and staff remuneration is beginning to feature in the Annual Reports of some of the larger Banks.) While it would be possible to build up a very useful picture of what banks are, what they do, what they produce and how efficiently they produce it, within the framework of the National Accounts, as Gorman has done for the United States, the requisite data are not available in a published form for Ireland.

3. Economic Council of Canada, 1976. *Efficiency and Regulation: A study of Deposit Instructions*, Minister of Supply and Services, Ottawa, p. 52.
4. This section is substantially based on Kinsella, R.P., 1980. "The Measurement of Bank Output", *Journal of Institute of Bankers in Ireland*.
5. Gorman J.A., 1969. "Alternate Measures of the Real Output and Productivity of Commercial Banks" in *Production and Productivity in the Services Sector* Fuchs V.R. (ed.), NBER, Columbia University Press, p. 155.

Many of the early US studies of bank concentration used balance sheet items, such as, e.g., total deposit assets or loans, etc., as proxies for bank output.[6] This approach corresponds with a view of banking as "a distinct line of commerce" in the words of the US Supreme Court. Banks are conceived of as offering an unique package of depository and credit services to their customers. This view, and the resultant analytical methodology (discussed in Section III) have produced close approximations of actual competitive conditions in many banking markets. An alternative approach to measuring bank output, for the purposes of concentration analysis, was pioneered by Benston,[7] and Bell and Murphy,[8] in which the output of banks is divided into a number of relatively homogenous services each of which is analysed separately. Some disaggregation of the services provided by banks and, indeed, by different categories of banks, into relevant product lines would seem desirable in order to take account of the fact that, on both sides of the balance sheet, banks are facing increased competition from non-bank firms. Such disaggregation is not yet practicable. It is, however, important, when analysing the effects of market concentration on bank performance, to recognise that the overall level of market concentration is not necessarily a useful guide to market conditions within specific product lines.

Bank output might also be defined in terms of the number of transactions processed or some such volume indicator. Thus, the annual number of cheques cleared could be measured by deflating Government revenue from cheque duty by the actual rate of the duty. There are two difficulties here: first, this measure would not include transactions effected through standing orders, Bank Giro, etc., which have grown substantially in recent years. Secondly, cheques cleared would not fully reflect the output of non-Associated banks since many of these banks do not have a large current account business. A second possible measure might be "aggregate debits", which are published quarterly by the Central Bank in a table relating to the "Turnover of Current Accounts". Now, aggregate debits *do* include standing orders and similar operations. The problem is that published data relate only to the Associated Banks.

There are, then, major problems in selecting an appropriate measure of bank output. The measure adopted for the purpose of this study is non-Government lending by all banks. The compelling reasons for the choice were the availability of relevant data and the fact that many previous studies of market concentration in banking in other countries used a similar measure.[9] It also seemed important to reflect in the measure the fact that, in the Irish economy at least, perhaps the most important function which the banks perform, is the provision of credit.

(ii) *Developments in the Number of Banks as a Guide to Concentration*

A first approximation of the market structure of banking can be obtained by examining changes in the number of banks. Hunter has noted that: "The number of firms in industry is one of the main factors determining the overall degree of monopoly."[10]

6. An excellent review of output measures, though now a little out of date, is in Kalish L., 1972. *The Influence of Output and Potential Competition on a Commercial Banks Operating Efficiency* Working paper Number 15, Research Department, Federal Reserve Bank of St. Louis, January, pp. 44-52.
7. Benston G.J., 1972. "Economies of Scale in Financial Institutions", *Journal of Money Credit and Banking*, May.
8. Bell F. and N. Murphy, *"Costs in Commercial Banking: a quantitative analysis of bank behaviour and its relation to bank regulation"*, Federal Reserve Bank of Boston, Research Report No. 41.
9. Other researches have been similarly constrained. See, e.g., Phillips, A., 1967. "Evidence on Concentration in Banking Markets and Interest Rates", *Federal Reserve Bulletin*, June, p. 917.
10. Hunter A., 1971. "The Measurement of Monopoly Power" in Hunter A. (ed.) *"Monopoly and Competition"*, London: Penguin Books.

Ceteris paribus, one might expect a steady growth in the number of banks to be reflected in a progressive reduction in market concentration. In a recent (1976) review of the US literature, Rhoades reported that the number of banks, considered as a structural measure of competition was positively related to bank performance in six out of ten US studies in which it was used.[11]

Before considering developments in the number of banks in Ireland as a measure of market structures, it is necessary to make a number of observations. First, a reliable yearly series relating to the number of licensed banks exists only for the period since the Central Bank Act, 1971, which stipulates that the Bank shall publish at least once a year the names of banks which have been granted a licence under Section 9 of the Act. In the period prior to the 1971 Act, any financial institution could obtain a banker's licence, more or less on demand, from the Revenue Commissioners. Many institutions did so and held themselves out as bankers. In order to obtain a reasonably consistent series which gives an idea of the growth in the number of banks for the period 1960 to 1971 we focus on those banks which applied for, and were granted, a licence under the Central Bank Act, 1971. It seems reasonable to assume that the ability and willingness to comply with legislative requirements constitutes prima-facie evidence that the institution concerned was carrying on banking business prior to the 1971 Act. The date of incorporation is used for the purpose of defining the year in which a bank commenced banking operations; for the period after 1971, commencement is defined by reference to the year in which a licence was granted.

In using the number of banks as an indicator of market structure it is necessary to take account of the establishment, by the Associated Banks, of subsidiaries. While adding to the total *number* of banks these subsidiaries do not *necessarily* contribute towards a more competitive market structure. In some respects the non-Associated Banks tend to compliment rather than compete vigorously with the Associated Banks.[12] For example, a parent bank may "channel" customers to its subsidiary. Hence, an increase in the number of licensed banks in the form of subsidiaries may not be accompanied by a reduction in market concentration. Of course, banks which are subsidiaries compete with each other, and also with independent non-Associated banks. They may, at the same time, increase the extent of market concentration. The impact of an increase in the number of banks also depends on the origins of the bank, (although this is not reflected in quantitative measures of market concentration used later in this study). Thus, the establishment of foreign banks with large resources and multi-national connections, are likely to have a greater impact on concentration and market structure (in terms of increasing actual and potential competition) than the establishment of domestically-based non-Associated banks.

Finally, note must be taken of the merger of six of the eight Associated Banks. The effect was to halve the number of such banks and to reduce the total number of licensed banks by four. Such a reduction would have had little impact if the banks concerned were, say, small domestic non-Associated banks. In a situation where the market structure was dominated by a relatively small interdependent group of banks, a halving of the number of such banks had, obviously, a much greater impact. This impact is better reflected in other measures of market concentration, such as the concentration ratio, which are discussed later in this study.

11. Rhoades S., 1977. *Structure – Performance Studies in Banking: A Summary and Evaluation*, Washington DC (Mimeo).
12. "Financial Institutions and Monetary Policy" *Central Bank of Ireland, Annual Report* 1979, p. 72/95 p. 75.

The growth in the number of banks

Chart 1 shows that in 1960 there were 21 *de facto* banks, in the sense defined earlier, including the eight Associated Banks. Two additional banks were incorporated in 1961 with a further two in 1963 and three more in 1964. However, this group of seven banks, which included two UK-controlled banks (Julian S. Hodge and Hill Samuel), had little impact on the level of concentration; as late as 1965 this same group of seven banks accounted for just over 1 per cent of total output. In other words, although there was an increase of about 30 per cent in the *number* of banks during the first half of the 1960s, the new banks accounted for a very small market share and had little or no impact on the extent of market concentration.

The incorporation of the First National City Bank in 1965 reflected the beginnings of a new phase in the evolution of the Irish banking system. It was followed by the establishment of another North American Bank (Bank of Nova Scotia) the following year and, significantly, by the incorporation of licensed subsidiaries of the Bank of Ireland and Allied Irish Banks. These latter were, in part, established to compete with the North American Banks in the high-growth "product markets" such as corporate financing.

Under the Central Bank Act, 1971 all institutions carrying on the business of banking were obliged to obtain a licence from the Central Bank. In fact, a large number of institutions previously registered as banks with the Revenue Commissioners did not apply for a licence. There was an increase in the number of licensed banks in the early 1970s, apart from institutions previously registered as banks and which applied for, and were granted a licence under the Central Bank Act, 1971. Chart 1 shows that three were incorporated in 1971, two in 1972 and no less than four in 1973. These included two foreign (EEC) banks: Algemene Bank Netherlands and Banque Nationale de Paris, which had a notable competitive impact on the market structure and one, Ulster Investment Bank, which, considered as a subsidiary of one of the Associated Banks, reinforced the market power of its parent bank, but at the same time, increased competition among the non-Associated merchant banks. Between 1973 and 1977, which is our cut-off year, no new banks were licensed.

We must now consider how far changes in the number of banks reflect developments in market structure. A priori, the steady growth in the number of banks since 1960 as well as the present relatively large number of banks, are suggestive of low concentration in Irish banking. However, for several reasons, developments in the number of banks are a somewhat misleading indicator of market concentration, at least in the case of Ireland.

Up to the early 1960s, the Associated Banks had a virtual monopoly of the provision of banking services.[13] However, even with a very large growth in the number of banks up to 1977, there was not a corresponding reduction in the extent of market dominance of these banks. The main reason was, of course, the market share of the subsidiaries and affiliates which reinforced the dominance of the Associated Banks.

The increase in the number of banks did not result in an increase in competition with established banks across the broad range of banking activities. The increase in the number of foreign banks, for example, had an important impact in certain product lines but a relatively smaller impact on retail or branch banking. The Associated Banks' dominance of branch banking and the fact that entry into branching is not enthusiastically promoted means that any growth in the number of banks is likely to have a proportionally smaller impact on concentration. This is, of course, even more true when the measure of output used is non-government lending which is largely channelled through an extensive branch network.

---

13. Central Bank of Ireland, 1970. *Survey of Economic Effects of Bank Dispute 1970*, Dublin. Central Bank.

Chart 1 *Developments in Licensed Banks 1960-1977*

1960	1961-1965	1966-1969	1971-1974	1977
North America and Europe				*North America and Europe*
			Algemene (72)	Algemene
		Bank of America (68)		Bank of America
		Bank of Nova Scotia (66)		Bank of Nova Scotia
			Banque Nationale (73)	Banque Nationale
		Chase and Bank of Ireland (68)		Chase and Bank of Ireland
		First National Bank of Chicago (69)		First National Bank of Chicago
	First Nat City Bank (65)			First National City Bank
Merchant				*Merchant*
		Allied Irish Investment (66)		Allied Irish Investment
Ansbacher				Ansbacher
Guinness and Mahon				Guinness and Mahon
	Hill Samuel (64)			Hill Samuel
		Investment B/I (66)		Investment B/I
		Northern Bank Finance (69)		Northern Bank Finance
			Ulster Investment (73)	Ulster Investment
Industrial				*Industrial*
Allied Irish Finance				Allied Irish Finance
			Bank of Ireland Finance (74)	Bank of Ireland Finance
Bowmaker				Bowmaker
	Credit Finance (63)			Credit Finance
			Forward Trust (73)	Forward Trust
		Irish Buyway (66)		Irish Buyway
	Irish Credit (61)			Irish Credit
Lombard Bank (Irl.) Ltd.		Ulster Merchant Finance (67)	Lombard and Ulster (71)	Lombard and Ulster
Mercantile Credit				Mercantile Credit
	Merchant Banking (61)			Merchant Banking
United Dominions Trust				United Dominions Trust
Other				*Other*
	Anglo Irish (64)			Anglo Irish
		Merchant and Industrial (66)		Antony Gibbs
	City of Dublin (64)			City of Dublin
Commercial				Commercial
Equity				Equity
Tea Importers				Irish Bank Commerce
			Irish Trust (71)	Irish Trust
			Irish Intercontinental (73)	Irish Intercontinental
	Julian S. Hodge (63)			Julian S Hodge
			Old Broad St Section (71)	Old Broad St. Section
Royal Trust				Royal Trust
Thrift				Thrift
		Charterhouse (Irl.) Ltd. (67)	Trinity (72)	Trinity
Waterford Mens				Waterford Penny
Associated Banks				*Associated Banks*
Bank of Ireland				Bank of Ireland
Hibernian Bank				Allied Irish Banks
National Bank of Ireland Ltd.				Ulster Bank Ltd.
Northern Bank Ltd				Northern Bank Ltd
Munster and Leinster Bank				
Provincial Bank of Ireland				
Royal Bank of Ireland				
Ulster Bank Ltd.				

37

Chart 2: *Evolution of the Associated Banks 1957-1972*

Year (end)	*Name and Number of Independent Associated Banks*							
1957	Bank of Ireland	National	Hibernian	Munster & Leinster	Royal	Provincial	*Ulster*[1]	Northern[2]
1958	Bank of Ireland	National		Munster & Leinster	Royal	Provincial	*Ulster*	Northern
1965	Bank of Ireland			Munster & Leinster	Royal	Provincial	*Ulster*	*Northern*
1972	Bank of Ireland			AIB			*Ulster*	*Northern*

Note: Banks underlined are registered, and controlled by, interests outside the State.
1. UK Parent Bank (Westminster Bank) merged with National Provincial in 1968 to form Nat West.
2. Merged with Belfast Banking Company in 1968, effective 1970, as a wholly owned subsidiary of Midland Bank Ltd. (UK).

Not only is the number of banks not a good measure of concentration *per se*, but it also, perhaps less obviously, fails to capture the development of official policy on entry which, as Benston has noted, is the key to a competitive market structure. Now, the Central Bank did not acquire specific licencing powers until 1971. Nevertheless, the authorities did have a policy on entry, including entry into branching. The growth in the number of independent domestic non-Associated (essentially unit) banks was of little consequence from a market structure viewpoint and could be accepted by the authorities while they sought, at the same time, to reduce overbranching by the associated banks. The latter was a protracted and uphill struggle. The story was somewhat different with regard to the entry of foreign banks the only ones likely to have a significant impact on market structure. In its Annual Report for 1964/1965 the Central Bank made it clear that it did "not desire to see any substantial growth of external participation in banking activities in Ireland". In part, this was because the country already had "a long-established and well developed banking system." There was also, however, a thread of economic nationalism running through the authorities' approach to external participation in banking.[13A] For the period after 1972 EEC banks had free entry into the Irish banking market.

Overall, the increase in the number of banks over the period certainly reflected an "opening-up" of Irish banking, reflecting developments in the economy in general.[14] To see how far this was accompanied by an increase in effective competition we must look to additional measures of absolute concentration.

(iii) *Concentration Ratios*

Concentration ratios measure the proportion of total industrial output accounted for by a specified number of firms. Sherer notes that: "The most common choice of criteria of alternative market structures is the humble four-firm concentration ratio."[15] Concentration ratios (based on bank deposits as a proxy for bank products and services) are accepted by the Courts as prima-facie evidence in anti-trust cases. Results have been reported for 2, 3, 4 and more banks.[16] The four-bank ratio, in particular, has been widely used. It has the advantage of ensuring confidentiality of data, and, also, focusses on the importance of "fewness" which is a characteristic feature of certain market structures. The four-bank

---

13A. See for example, the exchange between Deputy James Ryan and the Minister for Finance in the course of discussions in Dail Eireann on the National Bank Transfer Act, 1966. *Dail Eireann Parliamentary Debates,* Vol. 219, No. 3. 25 November 1965.

14. See Dowling B., 1975. "Financial Intermediaries and Economic Growth: The Irish Experience", *Journal of the Institute of Bankers in Ireland,* July, pp. 160/172.

15. Sherer F.M., 1970. *Industrial Market Structure and Economic Performance,* Chicago, Rand McNally, 1970.

16. One-bank concentration ratios are reported in Beighley, H., Prescott and A. McCall, 1975. "Market Power and Structure and Commercial Bank Instalment Lending", *Journal of Money Credit and Banking,* Vol. VII, No. 4, November, pps. 449-467 and in G. Kaufoman, 1966. "Bank Market Structure and Performance: the Evidence from Iowa", *Southern Economic Journal,* April, pps. 429-439. A two-bank concentration ratio is employed by R. Ware, 1972. "Banking Structure and Performance: Some Evidence from Ottio" Federal Reserve Bank of Cleveland, *Economic Review,* March, pps. 3-14. However, the three-bank concentration ratio has been the most extensively employed. See Beighley, Prescott and McCall, ibid. F. Bell and N. Murphy, 1969. "Impact of Market Structures on the Price of a Commercial Banking Service", *Review of Economics and Statistics,* LI – 2 May, pps. 210-213. F.R. Edwards, 1964. "Concentration in Banking and its Effects on Business Loans Rates", *Review of Economics and Statistics,* XLVI-3, August, pps. 294-300. F.R. Edwards and A.A. Heggestad, 1973. "Uncertainty of Market Structure and Performance in Banking", *Quarterly Journal of Economics,* LXXXVII-3, August, pps. 445-472. J.B. Kunreuther, 1976. "Banking Structure in New York State: Progress and Prospects", *Federal Reserve Bank of New York Monthly Review,* April, pps. 107-115. A. Phillips, 1967. "Evidence of Concentration in Banking Markets and Interest Rates", *Federal Reserve Bulletin,* LIII-6, June, pps. 916-926.

ratio has the added advantage, for our purposes, of underlining the key place of the four Associated Banks in the market structure of banking in Ireland. This gives empirical substance to one of the theoretical advantages which is claimed for concentration ratios as a measure of market structure. As Hunter notes: "the concentration ratio starts from what is basically an analysis of the actual structural characteristics of the industry."[17]

Table 1 below shows the four-bank ratio for Irish banking for 1972 to 1977. Also shown is the aggregate market share of the four Associated Banks which coincides closely with that of the four largest banks. As can be seen, the four bank ratio is not the same as the aggregate market share of the four Associated banks for each year.

The unadjusted (U) four-bank ratio for 1977 was 65 as compared with 68 for 1972. This suggests that the level of market concentration has declined somewhat over the period. However, this does not take account of the market share accounted for by subsidiaries and affiliates of the top four banks. When the ratios are *adjusted* (A) to take account of this factor, it can be seen that 85 per cent of bank output in 1977 was accounted for by the four largest banks and their subsidiaries. This is slightly above the corresponding figure for 1972.

Depending on conditions in local markets, especially with regard to the existence of alternative sources of supply, concentration ratios may not be a wholly accurate pointer to the scope for competition. Where concentration ratios are not used with discretion and in conjunction with other measures, they may lead to simplistic behavioural interpretations of market structure. The ratio gives a numerical value to the relative importance of a specified number of banks. In so far as it focusses on the concept of "fewness" it is sometimes regarded as a useful, if rough, proxy for oligopoly; that is, a market structure within which a relatively small number of firms produce the bulk of output and which is usually characterised by interdependence in decision-making. However, the ratio gives no indication of the distribution of output among all firms in an industry. For example, given a four-bank ratio of, say, 75 per cent it is certainly of great importance to know how the remaining 25 per cent is distributed among all other firms. Such information is provided by measures of relative concentration, to which we now turn.

Table 1: *Concentration Ratios for Irish Banking 1972-1977*

	1972		1973		1974		1975		1976		1977	
	A	*U*	*A*	*U*	*A*	*U*	*A*	*U*	*A*	*U*	*A*	*U*
4-bank	83.57	67.97	83.87	65.45	84.57	63.99	85.48	64.46	84.15	65.10	84.54	64.64
Ass. Banks	83.57	65.96	83.87	63.00	84.57	62.32	85.48	62.82	84.15	63.88	84.54	63.52

(iv) *Relative Concentration in Irish Banking*

Measures of absolute concentration, such as the concentration ratio, focus on the relative importance of a small number of the larger banks. The growth in the number and (albeit to a lesser extent) relative importance of the non-Associated banks since the middle and late 1960s require that we take account of developments in output among all banks. Various statistical measures may be employed for this purpose.

These measures are based on the size distribution of all firms in an industry. Singer points out, for example, that changes in the disparity of firm size can have a significant

17. Hunter A. op cit., p. 93.

effect on competition in an industry, even though the effects on the leading firms are minimal.[18] Prais goes so far as to use the term "concentration" as synonomous with the dispersion of firm size within an industry: "the greater the dispersion, that is, the greater the disparity between the size of the largest and the smallest firms, the greater the degree of business concentration."[19] Relatively few of these measures have, however, found their way into the literature on market concentration in banking. Below we use some of the more commonly used measures to analyse concentration in Irish banking.

(v) *The Lorenz Curves for Irish Banking*

The Lorenz Curve is a summary measure of concentration based on the distribution of all firms in an industry.[20] Changes at any point in the distribution, rather than simply a change among the largest firms, will be reflected in the slope of the curve. Lorenz's original objective was to put forward a measure which would indicate whether the distribution of wealth was over time, becoming more, or less, unequal. Both the Lorenz Curve and related measures, such as the Gini Coefficient, have a much broader application, however, and have been widely employed in studies of market concentration and industrial structure.

Graphs II to IV (appendix 1) show Lorenz Curves for Irish banking for the years 1972, 1973, and 1977. The vertical axis shows cumulated percentages of total output for each year. The horizontal axis shows percentages of the total number of banks cumulated from the smallest to the largest bank. The Lorenz Curve for each year joins those points which indicate the cumulative percentage of output accounted for by various percentages of licensed banks. Graph I compares the Lorenz Curve for 1972 with that for 1977.

If all banks were of equal size, the Lorenz Curve would coincide with the diagonal or "line of equal distribution" which corresponds to zero inequality. The level of concentration increases to the extent that the Lorenz Curve deviates from the diagonal. It is relevant and of interest to cite Lorenz's original rule for interpretation:

> ... with an unequal distribution, the curve will always begin and end in the same points as with an equal distribution, but they will be bent in the middle; and the rule of the interpretation will be as the curve is bent, concentration increases.[21]

Analysis of Lorenz curves for Irish banking

There is little apparent change in the extent of relative concentration on a year-by-year basis as reflected in the graphs for the years 1972, 1973 and 1977. A comparison (Graph I) of the Lorenz Curves for 1972 and 1977 suggests that for banks in the intermediate range there has been some decline in market concentration and in the extent of size inequality between banks. Thus, the Lorenz Curve for 1977 in this middle range is closer to the diagonal, or "line of equal distribution", than the 1972 Curve. The comparison is not altogether unambiguous. Graph I shows that, in the upper range the Curves for 1972 and 1977 intersect. This may reflect changes in the market shares of the two largest banks: the graph ranks banks in ascending order of size so that the two largest banks dominate the upper range of curves. The absolute size of the two largest banks, relative to other banks, means that changes in relative concentration, induced by relative changes
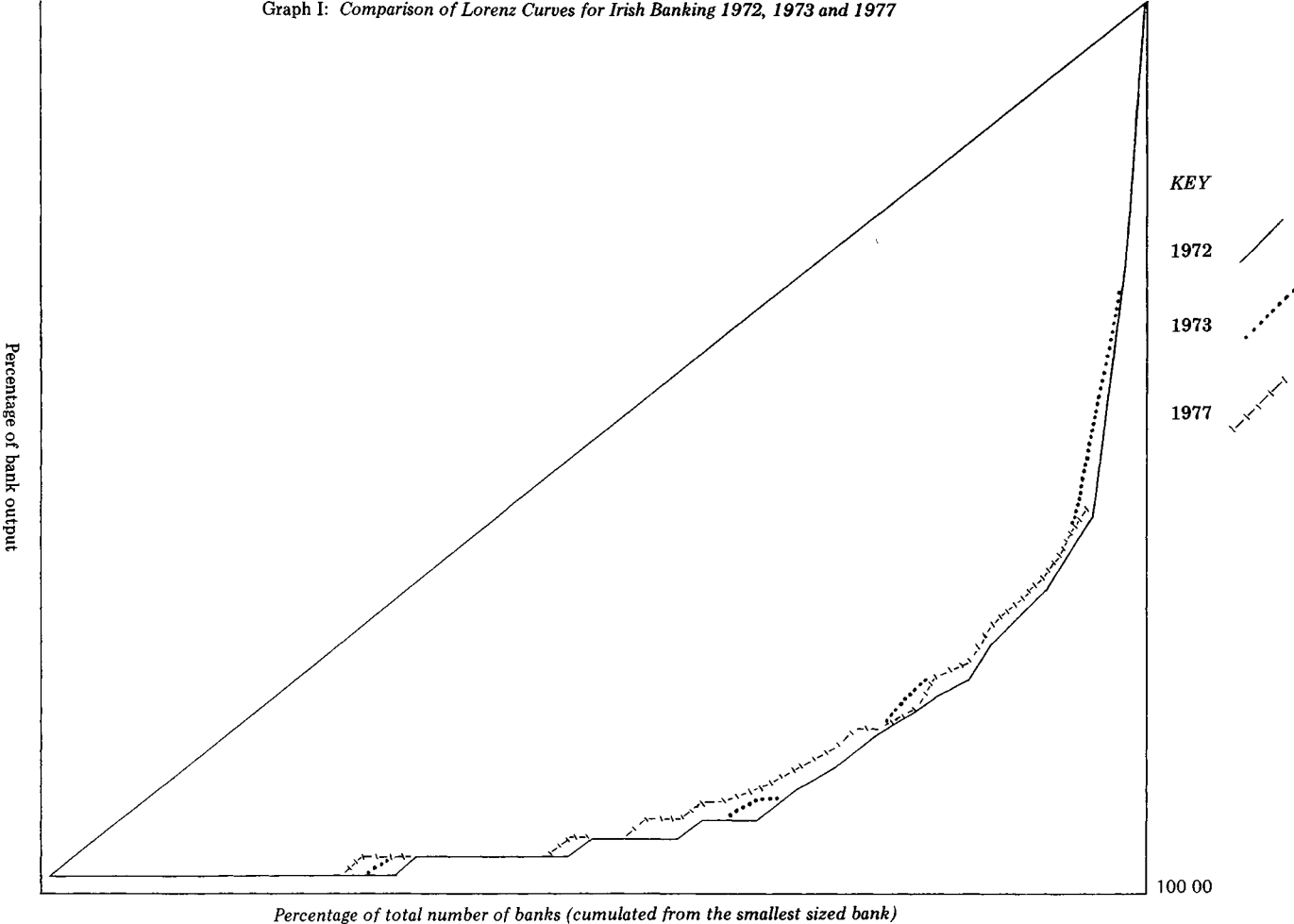
18. Singer E.M., 1968. *Anti-trust Economies: Selected Legal Cases and Economic Models*, New Jersey: Prentice Hall, p. 137.
19. Prais J.S., 1958. "The Statistical Conditions for a Change in Business Concentration", *Review of Economics and Statistics*, Vol XL August, p. 258.
20. Lorenz M.O., 1905. "Methods of Measuring Concentration of Wealth", *American Statistical Association* (new series, No. 70, June 1905 pp. 209-219). See also pp. 318/319 of same issue for interesting contemporary comments on Lorenz's paper.
21. Lorenz loc cit., p. 217.

Graph I: *Comparison of Lorenz Curves for Irish Banking 1972, 1973 and 1977*

Percentage of bank output

KEY

1972

1973

1977

100 00

Percentage of total number of banks (cumulated from the smallest sized bank)

in their respective percentage shares of the market, tend to be highlighted by the Lorenz Curves.

The shape of the curves reflect the market dominance of the Associated Banks in Irish banking. Thus, for example, in Graph II for 1972, the curve rises very sharply at the latter end as the Associated Banks (top four) are subsumed into the Lorenz Curve, graphically illustrating the fact that the four Associated Banks (excluding subsidiaries) which comprise 10 per cent of the *number* of banks, account for 68 per cent of bank *output.*

An examination of Lorenz Curves for Irish banking shows that a relatively high degree of inequality exists in Irish banking. This inequality corresponds with the market dominance of the Associated Banks. The curves also suggest that there was a slight reduction in inequality between 1972 and 1977.

(vi) The Gini Coefficient[22]

The information shown by a Lorenz Curve may be summarised by means of the Gini Coefficient which measures the area between the line of equal distribution and the Lorenz Curve. The Gini Coefficient has been used in at least one US study of bank concentration.[23] Because it measures the extent to which individual bank shares deviate from the *mean* market share, it gives a useful insight into market structure which cannot be inferred from absolute measures of market structure such as the concentration ratio. In this context Singer notes that:

> If all firms in an industry were of equal size, the Gini Coefficient would equal zero; the Lorenz Curve would coincide with the diagonal of equal distribution, and there would be no area of concentration. At the other extreme, where one firm has a monopoly and accounts for all the output of an industry, the area of concentration coincides with the area under the diagonal of equal distribution and the Gini Coefficient is equal to unity.[24]

The Gini Coefficient can, as noted, be derived from the Lorenz Curve. In the insert, figure A is the area between the Lorenz Curve and the diagonal, while B represents the
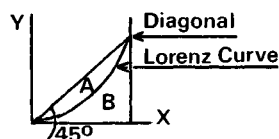
area between the Lorenz Curve and the X axis. The Gini Coefficient is given by $\frac{A}{A+B}$. It can be shown that the formula is equivalent to the following:

$$G = \frac{1}{2} - \frac{1}{n} \sum_{i=1}^{n} X_i$$

where X_i is the market share of the i smallest banks and n is the number of banks.

The Gini Coefficients for Irish banking for 1972-1977 are set out in Table 2 below.

The coefficient is, essentially, a measure of the extent to which firms in an industry or, in this case, banks, are unequal in size. A lower value for the coefficient corresponds to a reduction in inequality. It can be seen that, first, the coefficient is relatively high and, secondly, that it has declined marginally between 1972 and 1977.

22. Gini C. 1913/14. "Sulla Misure Della Concentrazione e Della Variabilita dei Carrattere" in *Atti del Reale Instituto Beneto di Scienze*, Lettere ed Arti, Tome LXXIII, Parte Seconde, p. 1207 ff., for a recent theoretical exposition and useful bibliography see Platt G., 1976. "On the interpretation and disaggregation of Gini Coefficients" *Economic Journal*, Vol 86, June, pp. 243/255.
23. Beighley H., Prescott and A. McCall, 1975. "Market Power and Structure and Commercial Bank Instalment Lending", *Journal of Money Credit and Banking*, Vol VII No. 4 Nov. pp. 449/467.
24. See Singer op cit., Chapter 13.

43

Table 2: *Gini Coefficient for Irish Banking 1972-1977*

	1972	*1973*	*1974*	*1975*	*1976*	*1977*
No. of banks	40	43	43	43	43	43
Gini Coefficient	.748	.752	.744	.741	.739	.744

(vii) *Herfindahl Index*

Herfindahl's Index (H-Index) is defined as the sum of the squares of firm sizes in an industry, each of which is expressed as a percentage of total industry size. Stigler has suggested that the H-Index reflects the competitive position outlined in his theory of oligopoly.[25]

In an important critique of the Herfindahl Index, Grossack notes that:

> The Herfindahl Index is an excellent measure of static size structure (as opposed to dynamic measures of market structure measured by changes in the market size of individual firms) for two basic reasons. The first is that it is sufficiently sensitive to take into account the complete size distribution of the firms. The second is that it incorporates both of the two static size structural features that are probably most relevant to the ability of the larger firms to [increase] price with a minimum of market loss; namely, the smallness of the number of firms and the variations among the size of the firms.[26]

The index is defined as follows:

$$H = \sum_{i=1}^{i=n} Y_i^2 \tag{1}$$

where Y_i is the market share of the ith firm expressed as a ratio and n is the number of firms in an industry.

It can be shown that the H-Index is equal to $\dfrac{C^2 + 1}{n}$

where C is the coefficient of variation of output.[27] In the case of a monopoly the coefficient of variation would be zero, and the value of the H-Index would be one. The higher the value of the index, the greater is the degree of market concentration. The H-Index is perhaps the most widely used measure of market concentration in banking in recent US studies. The index has been computed for Irish banking for the years 1972 to 1977 and the results are set out below.

The decline in the Index between 1972 and 1977 — which we will shortly examine from a rather different perspective — suggests a decline in concentration over the period. The sharp dip in the Index for 1974 is almost certainly attributable to the relatively

25. Stigler G.J., 1964. "A theory of Oligopoly", *Journal of Political Economy*, Vol 72, pp. 44/61 cited in Hart, *et al., Mergers and Concentration in British Industry* London. Cambridge University Press, (for NIESR) p. 18.
26. Grossack I., 1965. "Towards an integration of Static and Dynamic Measures of Industry Concentration", *Review of Economics and Statistics*, August, p. 302.
27. See Rosenbluth G., 1955. "Measures of Concentration" in *Business Concentration and Price Policy*, NBER, Princeton University Press.

Table 3 *H-Index for Irish Banking 1972-1977*

	1972	*1973*	*1974*	*1975*	*1976*	*1977*
1. Mean percentage share	2.4996	2.3253	2.3247	2.3254	2.3264	2.3275
2. Standard Deviation	6.4297	5.9585	5.7797	5.8838	5.9180	5.9265
3. Coefficient of Variation (C)	2.5723	2.5625	2.4862	2.5302	2.5438	2.5463
4. $\dfrac{C^2 + 1}{n}$ = H-Index	0.1904	0.1760	0.1670	0.1721	0.1737	0.1740

large number of new banks which were licensed in the preceding year (1973). While the share of the market accounted for by these new banks would be small in 1974, it is a feature of the H-Index that it is sensitive to such changes in the number (as well as the size distribution) of banks.

The H-Index as a numbers-equivalent

If all banks were of equal size, the standard deviation would be zero and the Index would be $\dfrac{1}{n}$ or the reciprocal of the number of banks. Hence, the inverse of the H-Index is the number of equal-sized banks corresponding to the particular value of the Index.[28] A high inverse of the H-Index is indicative of relatively low concentration, since it corresponds to a relatively larger number of equal-sized banks.

The inverse conveys more effectively the significance of a particular value of the Index, as well as changes in the value of the Index over time. The inverse also facilitates international comparisons of bank concentration.

Thus, in 1972, the inverse of the H-Index was 5.252, which suggests that the extent of concentration for that year was equivalent to just over 5 equal-sized banks. The value of the inverse rose to approximately six in 1974 before declining again up to 1977 when the inverse was 5.746. In other words, the degree of concentration, as reflected in the inverse of the H-Index, declined somewhat between 1972 and 1977.

International comparisons of H-Index

To the writer's knowledge only one attempt has been made to compare relative concentration in banking, as measured by the H-Index, between countries.[29] In a recent

Table 4: *H-Index as a Numbers-Equivalent for Irish Banking 1972-1977*

	1972	*1973*	*1974*	*1975*	*1976*	*1977*
Equivalent number of equal-sized banks	5.252	5.682	5.988	5.810	5.757	5.746
Actual number of banks	40	43	43	43	43	43

28. Adelman M., 1969. "Comment on the H-Concentration Measure as a Numbers-Equivalent", *Review of Economies and Statistics*, L1 − 1, February, pp. 99-101.
29. Short B., 1977. *An International Comparison of Bank Concentration and Performance*, Washington: International Monetary Fund.

paper, Short has given values for the H-Index for a number of countries, excluding Ireland. Table 5 below extracts from Short's data values for selected countries for which a comparison with Ireland might reasonably be made.

It is recognised that cross-country comparisons are, at best, only a very approximate guide to differences in market structure.[30] Differences in the structure of the economy, the level of development, degree of monetisation, and so on all have an impact on the extent to which competition exists in practice. At the same time, a comparison of concentration in countries at a roughly similar stage of development is instructive.

It may be noted that the H-Index for Ireland is more or less in line with that for Canada and higher (i.e., closer to 1.0) than that for Australia. The results for Canada and, also, Australia, are of interest. The banking system in both countries is modelled (as is that for Ireland) on the British banking system which has been shown to be essentially oligopolistic.[31] Griffiths has demonstrated that Canadian banking is also oligopolistic.[32] What evidence there is, therefore, suggests that the value of the H-Index is generally in line with that of a number of countries which have been categorised as oligopolistic.

Table 5: *Comparison of Relative Concentration of Banking for Selected Countries*

	Number of Banks	Number of Banks used to calculate Index	H-Index	Inverse of H-Index	Output Measure	Date (end of)
Australia	13	13	.1609	6.215	Deposits	April 1974
Canada	10	10	.1743	5.736	Total Assets	1976
Denmark	67	34	.1382	7.235	Deposits	1974
Ireland	43	43	.1737	5.757	Lending	1976

Source: Data for countries other than Ireland are based on Short (1977).

Statistical significance of changes in market shares

The H-Index can be modified to determine whether any change in concentration is statistically significant. In order to do this, it is necessary to estimate the slope coefficient of a simple linear regression of the market share of banks in 1977 (i.e., the terminal year) with market shares for 1972 (i.e., the base year).

In this connection, Grossack notes:

The regression coefficient will differ from one by an amount and in a direction that is

30. Ideally, the H-Index for each country should be weighted to take account of differences in market size. See Honohan P. and R.P. Kinsella, 1981. *Using the H-Index for International Comparisons of Bank Concentration*, Dublin: Central Bank of Ireland, Research Department.
31. For example, see Presnell L., 1970. "Cartels and Competition in British Banking: A Background Study", *Banca Nazionale del Lavoro Quarterly Review* December, p. 375. On the same point, see also Griffiths B., 1973. "The Development of Restrictive Practices in the UK Financial System", *Manchester School*, March.
32. Griffiths, B., 1975. *Competition and Regulation in Oligopoly Banking: The Canadian Experience with the 1967 Bank Act.* (Mimeo) Presented to the Queen's University Conference on Canadian Monetary Issues, August.

a weighted average of the relative changes from the initial year to the terminal year in the deviations from the means of the banks' market share.[33]

The movement of a bank's market share away from the mean market share is indicative of an increase in concentration over the period for which the regression is run, and gives the slope coefficient a value greater than one. Conversely, a movement towards the mean market share. which reflects a decline in concentration, gives a value of less than one to the slope coefficient.

In short, if concentration has increased, the slope coefficient will be greater than one: if there has been a reduction in concentration, the coefficient will be less than one.

A simple linear regression of the market share of banks in 1977 (MS_{77}) on the share of the same banks in 1972 (MS_{72}) gave the following result.

$$MS_{77} = 0.1224 + 0.9475 MS_{72} \qquad DW = 1.54$$
$$(1.356) \quad (68.238) \qquad R^2 = .990 \tag{2}$$

Before commenting on the result, mention must be made of two assumptions which were adopted in order to carry out the regression. First, a market share of zero for 1977 was attributed to a bank which existed in 1972 but ceased operating prior to 1977. Secondly, four new banks were licensed in 1973, which necessitated attributing a zero market share to these banks in 1972, as compared with their actual market share for the terminal year, 1977.

To revert to regression (1) above, the slope coefficient is less than one. That is, there has been a reduction in concentration (as measured by the H-Index) over the period. Moreover, the difference from one is statistically significant. In sum, the degree of relative concentration in the banking system fell between 1972 and 1977.

This result should be treated with some caution. It would be desirable to have observations extending over at least a decade before drawing conclusions regarding the direction and extent of changes in concentration. Also Table 3 shows a relatively sharp fall in the H-Index between 1972 and 1973. Indeed, the slope coefficient estimated from a regression of market shares of banks in 1977 as against the share of the same banks in 1973, is not significantly different from one, at the 95 per cent confidence level. That is, the degree of concentration in the banking system was approximately unchanged between 1973 and 1977.

(viii) *Turnover and Ranking as Measures of Market Structure*
    A priori, oligopolistic market structures should be reflected in the stability of market shares. The stability of the market shares may reflect the intensity of competition and hence market structure and bank behaviour. An analysis of the stability of market shares might supplement the information provided by measures of market structure discussed earlier.

    To begin with, it would be useful to examine changes in the *ranking* of licensed banks between 1973 and 1977 (that is, in the turnover of licensed banks).

Bank turnover as a measure of stability
    Firm turnover, as a measure of market behaviour, has been used both to supplement information reflected in direct measures of concentration and also as an alternative to such measures.[34] Frequent changes in ranking (that is, a relatively large turnover within

---

33. Grossack op. cit., p. 303.
34. Hymer S. and Pashigian P., 1962. "Turnover of Firms as a measure of market behaviour", *Review of Economics and Statistics*, February, pp. 82-87.

a specified period) are suggestive of instability. A priori, one would not expect to find a large turnover of firms in a relatively highly concentrated industry.

Between 1973 and 1977 there was no change in the rankings of the top four banks. The four-bank concentration ratio, as noted, is frequently used as a measure of absolute concentration, so that the absence of changes in ranking confirms the conclusions reached earlier regarding the relatively high level of market concentration over the period 1973 to 1977. There were some changes in rankings of the smaller banks, but the most significant changes relate to a small number of foreign banks which had just commenced operations in 1973 and so had a relatively low ranking at that time. By 1977, these banks increased their share of the market and, correspondingly, their ranking.

A more rigorous indication of the significance (if any) of changes in rankings is provided by the (Spearman) rank correlation coefficient, which was computed for 1973 and 1977. If the ranking of bank i for year 1 and year 2 is denoted by x' and y', respectively, and the number of banks is denoted by n, then the (Spearman) rank correlation coefficient is given by:[35]

$$r_s = 1 - \frac{6}{n(n^2-1)} \times \left[\sum_{i=1}^{n} (x' - y')^2 \right]$$

The value for r_s falls between +1 and -1. A value near zero indicates that the rankings for 1973 and 1977 are not related.

For the relevant data we compute

$$I - \frac{6}{79464} \times 1749$$

$$r_s = 0.8679$$

The relatively high value for r_s suggests, in essence, that the rankings are related to an extent which cannot be explained by random factors. This market stability is suggestive of the kind of market structure one might expect in a non-competitive, or oligopolistic, banking system but it is hardly possible to be more definite since comparable studies are not available for the UK (which has a broadly similar market structure) or, indeed, for other countries.

The stability of market shares

Bank turnover, as a measure of market stability, is, then, of limited use. In 1973 over 60 per cent of the total *number* of licensed banks had a market share of less than 1 per cent — indeed, about 20 per cent had a market share of less than 0.01 per cent. Hence, a very significant change in ranking could be produced by relatively small changes in market share. For the smaller non-Associated banks, for example, it is probable that chance alone is working out and creating differences in ranking that have little or no significance in terms of overall market structure. It should be added, perhaps, that if one was examining specific product markets (e.g., the market served by industrial banks) then certain changes in ranking might have a somewhat greater significance — at least within that particular market. Here, however, we are concerned with the banking sector as a whole.

It would, therefore, appear more useful to focus directly on changes in *market shares* rather than *rankings* in analysing market stability. Indeed, it is a defect of the rankings measure that it does not take direct account of certain changes in market share which may be of significance. A large bank may retain its *ranking* while, at the same time, experi-

35. Kendall M.G. and A. Stuart, 1967. *The Advanced Theory of Statistics* Vol 2. (2nd edition) London: Griffin and Co. pp. 476/77.

encing a fall in its *market share*. The same fall might well result in a major change in ranking for a medium-sized bank. This is not reflected in the turnover measure. In this connection, Hymer and Pashigian have made a point that is of some relevance to the present analysis:

> . . . in many or most industries the size distribution is such that a Spearman coefficient will reflect merely the accidental fact of number of firms and their initial size distribution.[36]

The correlation coefficient of the 1973 and 1977 *market shares* (rather than rankings) of licensed banks seem, therefore, to provide a more useful indicator of market behaviour over this period.

To begin with, the market share for 1977 was regressed on the share of the same bank for 1973. Perfect correlation, that is, a coefficient of 1.00 would indicate no change in market shares over the period. A coefficient less than 1.00 would indicate that the smaller (non-Associated) banks had engaged in effective competition and increased their share of the market. (It need hardly be added that this process would be reflected in significant changes in *ranking*; except that now we would *also* have important evidence relative to the corresponding changes in market share and, therefore, we should know to what extent changes in ranking were significant.)

A simple linear regression of market shares (MS) for each bank for 1977 on the share for the corresponding bank for 1973 gives the following result

$$MS_{77} = .03483 + .98858\,MS_{73} \qquad \bar{R}^2 = .9915 \qquad (3)$$
$$(.399) \quad (71.700) \qquad DW = 2.302$$
(t values are in parentheses)

This equation was re-estimated to take account of developments in the market shares of licensed subsidiaries of the Associated Banks: that is, the share of the former for both years were added to the shares of their parent banks and changes in the aggregate market shares were compared. This gives the result[37]

$$MS_{A77} = 0.04755 + 0.9873\,MS_{A73} \qquad \bar{R}^2 = .9958 \qquad (4)$$
$$(0.5001) \quad (91.7163) \qquad DW = 1.537$$
(t values are in parentheses)

In neither cases are the coefficients significantly different from 1.000. This indicates a relatively high degree of market share stability over the period.

In conclusion, bank turnover has certain limitations, as a measure of stability. The analysis does, however, serve to support some of the evidence adduced from absolute measures of concentration. Thus, the top four banks in 1977 were the same as for 1972. Again the effects on market structure of the entry of foreign banks (which, as noted, were the only ones to have any real impact on concentration) shows up in the change in rankings of such banks for 1977 as compared with earlier years. The (Spearman) rank correlation was computed for 1973/77 to ascertain the statistical significance (if any) of changes in ranking. The rankings were shown to be related to an extent which could not be explained by random factors. However, since similar studies are not available for

36. Hymer and Pashigian op. cit., p. 83.
37. See Salley, C.D., 1972. "Concentration in Banking Markets: Regulatory Numerology or Useful Merger Guidelines" *Monthly Review*, Federal Reserve Bank of Atlanta, November.

other countries, all that can be added to the total body of evidence on the basis of an analysis of ranking is that the pattern conforms to the typical oligopolistic market structure. Changes in market shares for 1973 and 1977 were also computed and the correlation coefficient estimated. A number of equations were estimated and the results showed a relatively high degree of market-share stability.

3. MARKET STRUCTURE AND BANK PERFORMANCE

Measuring the extent of market concentration in banking is of interest in its own right. However, as Hart et al., note, ideally a concentration index should be directly related to the economic theory of market behaviour.[38] It is important, for example, for policy purposes to know whether and to what extent, the market structure of banking has an impact on bank performance. Competition in banking in Ireland has always, for a variety of reasons, been constrained.[39] It would be of interest to know whether these constraints are directly related to the level of concentration and, thereby, affect bank performance. This section sets out Bain's Structure-Conduct-Performance (SCP) hypothesis as a possible explanatory framework in this regard. A suggestion for overcoming some of the formidable difficulties in applying this hypothesis to Irish banking is proposed.

(i) *The Structure-Conduct-Performance Hypothesis*
Bain's SCP hypothesis has been summarised by Rhoades as follows:

Markets characterised by a structure with relatively few firms and high barriers to entry will facilitate conduct that is aimed at achieving joint profit-maximisation policies through collusion, price leadership or other tacit pricing arrangements. This type of pricing conduct should, in turn, yield profits and prices that are greater than the competitive norm.[40]

The genesis of the hypothesis is set out in Chart 3. The hypothesis grew directly out of theoretical work on competition and monopoly during the 1930s. In 1939, for example, Mason (who, together with Chamberlin had a major impact on Bain's thinking) proposed the thesis that the structure of a market largely explained the behaviour of firms which operated in it.[41] There was, he argued, a systematic relationship between market structure and behaviour. At a time when, as Caves has pointed out,[42] few, if any, economists could have given well reasoned answers to questions such as, for example, whether industries dominated by a few sellers earn excessive profits or provide inferior services, Bain had already discerned in Chamberlin's work:

the intriguing possibility of generating empirically testable hypothesis concerning the relationships of the structure of industries to their market performance.[43]

38. Hart (et al.) op. cit., p. 18.
39. See, for example, Chapter IV of the *Commission of Inquiry into Banking, Currency and Credit* (Dublin: Stationery Office, 1938) and Oslizlok, J., 1963. "Our Currency and Banking System", *Journal of Institute of Bankers in Ireland*, October, pp. 266-285. More recently, it has been noted that "over a significant area of the clearing banks' activities, the element of price competition has been largely absent", Central Bank of Ireland, *Quarterly Bulletin*, 4/1980, p. 67.
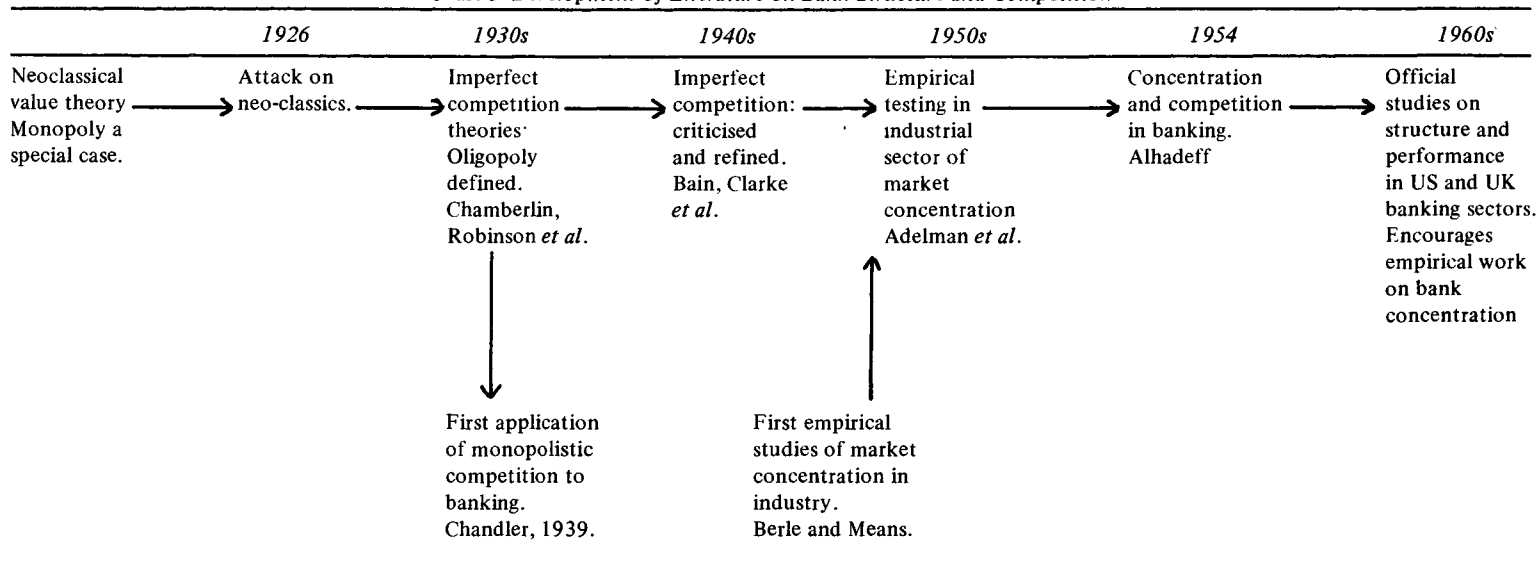40. Rhoades op. cit., p. 6.
41. See Mason E., 1939. "Prices and Production Policies of Large Scale Enterprises", *American Economic Review*, March, pp. 61-74.
42. Caves R. in Bain J., 1972. *Essays on Price Theory and Industrial Organisation*, New York. Little, Brown & Co., p. iii.
43. Bain J. loc cit., p. 190.

Chart 3· *Development of Literature on Bank Structure and Competition*

	1926	1930s	1940s	1950s	1954	1960s
Neoclassical value theory → Monopoly a special case.	Attack on → neo-classics. →	Imperfect competition → theories· Oligopoly defined. Chamberlin, Robinson *et al*.	Imperfect competition: → criticised and refined. Bain, Clarke *et al*.	Empirical → testing in → industrial sector of market concentration Adelman *et al*.	Concentration and competition → in banking. Alhadeff	Official → studies on structure and performance in US and UK banking sectors. Encourages empirical work on bank concentration

First application of monopolistic competition to banking. Chandler, 1939.

First empirical studies of market concentration in industry. Berle and Means.

51

The hypothesis was explicitly formulated by Bain during the 1940s. Drawing on Mason and Chamberlin (and also J.M. Clarke's ideas on "workable" competition), and in the context of his own pioneering work on *conditions of entry*, he advanced the hypo-thesis that, given entry conditions, industries of moderate concentration should have relatively lower average prices and profits and less output restrictions than those of high concentration.

It is, perhaps, worth noting that the relevance of the new theories of imperfect competition to the actual conditions prevailing in industry had, in the case of banking, already been discussed by Chandler as early as 1939. In a classic paper on "Monopolistic Competition in Commercial Banking" Chandler noted that:

> it is the theory of monopolistic competition rather than the theory of pure competition that is the most useful in explaining the rates of interest on bank loans, on time and savings deposits and the prices paid by customers for other banking services.[44]

This was, however, an isolated case. The new theories had first to be absorbed into the mainstream of economic thinking. Appropriate techniques for measuring market concentration and its effects had to be developed, initially in the field of industrial economics. It is only since about 1960 that we have seen a growing body of empirical work dealing with market structure and its impact on bank performances. Virtually all of this work has been done in the US, essentially, because anti-trust legislation, which embraces banking, is predicated upon a relationship between market structure and behaviour of firms operating within that market.

As noted prior to recent work by Short there was little evidence regarding the effects of concentration on performance (using profits as a measure) for countries other than the US.[45] Short presents evidence for ten countries: Australia, Canada, Denmark, Greece, Israel, Japan, Jordan, Mexico, Switzerland and Thailand.[46] Concentration emerged as a significant determinant of the bank profit rate accounting for about two-thirds of the variation in profit rate. As Short himself notes, his results are all the more remarkable in view of the many other factors, including regulation, which impinge on profitability.

We now turn to the question of possible ways to establish whether the relatively high level of market concentration in Irish banking has an impact on bank performance.[47] How might this be tested?

(ii) *Measuring Bank Performance*

First, a measure of bank performance is required. There are a number of possible candidates. Heggestad and Mingo have argued that market structure may have its main impact on the non-price (or services) dimension of bank performance. However, most

44. Chandler L., 1938. "Monopolistic Elements in Commercial Banking", *Journal of Political Economy*, Vol 46, No. 1, February, pp. 1-38.
45. An exception is Japan. See Teranishi, J., 1977. "Availability of Safe assets and the process of Concentration in Japan", *Economic Development and Cultural Change*, XXV-3, April, pp. 447-470.
46. Short op. cit. See also Short B., 1978. "*The Structure-Performance relationship in Commercial Banking in Canada, Western Europe and Japan*", Paper presented to the Canadian Economic Association Annual meeting in London (Ontario), May.
47. See Heggestad A.A. and J.J. Mingo, 1976. "Prices, non-prices and Concentration in Commercial Banking", *Journal of Money Credit and Banking*, Vol VIII-I, February. See also an earlier version of this paper in *Procedures of a Conference on Bank Structure and Competition*, Federal Reserve Bank of Chicago, 1974.
    Weiss S. was one of the first to consider the possibility that bank competition is best reflected by the non-price dimension. See "Commercial bank price competition", *New England Economic Review*, Federal Reserve Bank of Boston, Sept/Oct 1969.

studies have used:

> profit and price measures because these have a sounder foundation in theory and because structure/performance studies of the industrial structure, which have generally supported the SCP hypothesis, typically focus on profit and price-related measures.[48]

Interest rates were used in many of the earlier studies (during the 1960s).[49] From a theoretical point of view, variations in bank charges may, in certain circumstances, reflect cost conditions rather than the exploitation of market power. In practice, in Ireland, bank charges are supervised by the Central Bank and are changed only infrequently. Also, there are practical difficulties in obtaining a useful statistical series for bank charges other than interest rates, notably because of cross-subsidisation of certain charges. In recent years, however, there has been a definite trend towards the use of profit-based measures of performance. This does not, of course, imply that profitability is the only or, necessarily, the most important objective of the banking sector. Indeed, some researchers, for example, Heggestad (1977)[50] and Edwards (1977)[51] have argued that oligopolistic banks attempt to exploit market power to engage in non-profit maximising objectives, such as risk avoidance and to increase staff expenditure and compensation to management. In general, however, economic theory and empirical research in other countries supports the use of bank profits as a measure of performance.

Testing the structure/performance relationship for Irish banking: methodology

One obvious way to test the impact of the relatively high level of market concentration on bank performance would be to use regression analysis to determine whether concentration (as measured by the H-Index) is a statistically significant determinant of bank profitability. Unfortunately, a series for the H-Index is not available prior to 1972.

In other words, it will be several years before we have a sufficiently long time series for the H-Index (as measured in this study) to test the SCP hypothesis directly. This poses the question of whether, in the meantime, some alternative procedure might be devised. One possible approach would be an inter-sectoral comparison of profitability over the period for which data on concentration is available. If such profits could be shown to be "above normal" then, in the absence of alternative explanations, it would be consistent with economic theory to attribute them to the oligopolistic structure within which the banks operate. We could then look to the *conduct* of banks for additional confirmation. Once we had a reliable series of data on relative rates of profitability, the question of testing for alternative explanations could be easily enough dealt with. The real problems confronting researchers in this field are, first, the construction of a reliable series on bank profits and, secondly, making a meaningful comparison of profitability between sectors. In the space available it is possible only to touch on the more obvious difficulties involved.

First, there is the problem of computing a series for bank profits. Only those banks which are public companies are required by law to disclose their profits. Then there are the different conventions adopted by the major banks in their published accounts with respect to subsidiaries. Some show profits for the group (that is, including non-Associated

48. Rhoades op. cit., p. 9.
49. See, for example, Edwards F.R., 1964. "Concentration in Banking and its effect on Business Loan Rates", *Review of Economics and Statistics*, August. Phillips A., 1967. "Evidence of Concentration in Banking Markets and Interest Rates", *Federal Reserve Bulletin*, June.
50. Heggestad A.A., 1977. "Market Structure, Risk and profitability in Commercial Banking", *Journal of Finance*, September, pp. 1207/1216.
51. Edwards F.R., 1977. "Managerial Objectives in Regulated Industries: Expense/Preference behaviour in Banking", *Journal of Political Economy*, February pp. 147-162.

subsidiaries) while others distinguish between the profitability of the parent bank and its subsidiary. Secondly, there are major difficulties in comparing the profitability of banks with that of other commercial companies. It has been done, but the difficulties involved should not be underestimated. There are, to begin with, major differences in the financial structure of banks and public companies. In part, these stem from the fact that, essentially, banks are *financial* firms whose assets and liabilities comprise financial claims. In part, they stem from the fact that, for regulatory reasons, banks operate under constraints with regard to their liquidity and capital employed. These differences are accentuated during a period of high inflation. What may appear to be a relatively high (or "above normal") level of profitability by conventional accounting measures may be no more than is required to enable banks to maintain equality with other companies in the light of differences in financial structure. Indeed, much public controversy concerning the level of bank profits stems from a misunderstanding of the nature of banks as financial firms and of their pivotal role in the economy.

Thirdly, in an inter-sectoral comparison of profitability much will depend on how profitability is actually defined. If, for example, the pre-tax rate of return on capital employed is used, the performance of banks is likely to be shown in a relatively favourable light compared with public companies. An alternative measure — e.g., return on total assets — would show banks performing in a less favourable light.

When account is taken of such factors, a comparison of bank profitability over a specified time period with that recorded for other companies can serve to indicate whether, in fact, profits are relatively high. Looking at such published sources as are available, a comparison of bank profits (possibly disaggregated into Associated and non-Associated categories) with, say, the average profit before income tax (PBIT) capital employed for the twenty largest financial public companies might provide a basis for establishing whether bank profits are "above normal".

(iv) *Relative Risk*

Let us assume, for the purposes of the argument, that bank profits could be shown to be "above normal" by reference to comparable companies. Relatively high profits in banking could, conceivably, reflect relatively greater riskiness of banking rather than the exploitation of market power. High accounting profits might not motivate entry into banking if the additional profit just compensated existing shareholders for the risks borne. In this instance, "above normal" profits could be regarded as a necessary cost to bank customers, rather than a loss which might be eliminated through a reduction in concentration, e.g., by means of greater competition in banking.

This hypothesis could be tested by analysing movements in the share prices of banks as compared with other share price indices. The Central Statistics Offices publishes a monthly index of prices changes registered by ordinary stocks and shares of Irish companies on the Irish Stock Exchange. The index covers all Irish industrial, commercial and financial companies with a capitalisation in excess of £500,000 (coverage, in fact, is 99.7 per cent of value weight). This index is made up of four sectors: first, banks, insurance and finance (BIF) which, in practice, is dominated by the two major Associated Bank groups, secondly, industries, thirdly, distribution and fourthly, services. For the purposes of this study, the Central Statistics Office made available the sectoral data.

In order to determine the relative riskiness of bank shares, movements in the BIF share price index were compared with movements in the index of industrials by regression analysis. The reaction of the BIF index to a specified change in the industrial index gives, in effect, a reaction coefficient based on the equation:

$$\text{BIF Index} = a + \beta \text{ (Industrial) Index}$$

which has been estimated with monthly data for the period 1972 to 1977 using the first difference form. The result is as follows:

$$\text{BIF Index} = 0.440 + 0.764 \text{ Ind}$$

$$(0.435) \quad (7.968)$$

$$\text{DW} = 1.89 \qquad R^{-2} = .472 \text{ (t values are in parentheses)}$$

Theory predicts that the return on any security will vary directly with its systematic risk. Systematic risk refers to the movement of a security's return relative to the movement of returns on all share prices. The measures used are a reasonable proxy for the systematic risk on bank shares since, as noted, the banking, insurance and finance (BIF) Index is, in practice, dominated by the very large Associated Banks' group, which, in fact, the Central Bank focusses on in regulating the level of bank profitability.

On average, over the period 1972 to 1977 whenever the Index of Industrials changed by 100 basis points, the BIF Index changed to 76 points. This would suggest that bank shares were no riskier than the market (an outcome which is hardly surprising). Since share prices presumably reflect the market's assessment of expected profits, a relatively low variability in share prices can be interpreted as relative stability of expected profits; and assuming a forcastability on the part of the market we might conclude that profitability in banking is comparatively stable. This suggests that banking is less risky than the general run of industry. Accordingly we could not attribute to risk any excess profits in the banking sector.

Conclusion

It is important for policy purposes to ascertain whether, and to what extent, the present level of market concentration has an impact on bank performance. Profitability is perhaps the most appropriate measure of performance. For a number of reasons the SCP cannot be tested directly using concentration as a determinant of bank profits. As an alternative, it might be worthwhile to establish if bank profits are high relative to other sectors taking account of the problems involved in inter-sectoral comparisons. If, in fact, it were shown that bank profits *were* "above normal", possible explanations could be tested. In the absence of any alternative explanation it would be consistent both with economic theory and applied research in other countries to attribute this to the oligopolistic market structure of Irish banking.

4. SUMMARY OF FINDINGS

(i) *Bank Concentration in Ireland: Main Findings*

The number of banks is a poor indicator of bank concentration for Ireland. The weakness of this measure relate to the growth in the number of banks which are subsidiaries of, and therefore reinforce the market power of, Associated Banks. A second reason relates to the dominance of branch banking by the Associated Banks. Hence, the steady growth in the number of banks over the years has not been accompanied by a proportional reduction in market concentration in banking.

The analysis of concentration ratios for Irish banking shows that a relatively small number of banks account for the bulk of output. The (adjusted) four-bank concentration ratio which has been extensively used in US studies, was 85 per cent in 1977 compared with 84 per cent in 1972.

The H-Index provided some useful insights into market concentration in Irish banking. The Index summarises, *inter alia*, the effects on market structure of changes both

in the number as well as the size distribution (deviation from average bank size) of all banks. The inverse of the Index gives the number of equal-sized banks equivalent to a particular value for the Index, which enables policy-makers to see at a glance the direction in which market structure is changing. In 1972, the H-Index was 0.1904 (equivalent to 5.252 equal-sized banks). By 1977, the Index was 0.1740 (equivalent to 5.746 equal-sized banks). There was, however, a decline in relative concentration between 1972 and 1977 and, moreover, this reduction was statistically significant at the 95 per cent confidence level. However, this decline in relative concentration was, in effect, telescoped into the years 1972/1973. The value of the H-Index for Ireland appears to be in line with that for Canada and Australia and higher than that for the few comparable countries for which data are available, e.g., Israel and Belgium. The banking systems of Canada and Australia have developed along the lines of the United Kingdom. All three countries are recognised as having relatively highly concentrated oligopolistic market structures.

An important aspect of market structure relates to turnover (changes in ranking) as well as the stability of output shares of market participants. While bank turnover has certain limitations as a measure of stability, the analysis did serve to confirm some of the evidence relating to concentration. Thus, the top four banks in 1977 were the same as for 1972. Again, the effects on market structure of the entry of foreign banks shows up in the change in rankings of such banks for 1977 as compared with earlier years. The (Spearman) rank correlation which was computed for 1973/1977 showed the rankings to be related to an extent which could not be explained by random factors. However, since similar studies are not available for other countries, all that can be added to the total body of evidence on the basis of an analysis of ranking is that the pattern conforms to the typical oligopolistic market structure. *The situation is best characterised as one of no significant change in concentration or inequality in recent years.*

In sum, Irish banking appears to conform to the typical oligopolistic market structure. Observed features of the banking system are consistent with the predictions of the model. There is, for example, the fact that: "over a significant area of the clearing banks activities, the element of price competition is largely absent." Non-price, or service competition, is restricted. The clearing banks also enjoy an unique legal status which allows them to differentiate, albeit to a limited extent, their services. However, it is important to recall that banking in Ireland is highly regulated. There is all the difference in the world between regulated and unregulated oligopoly as from the point of view of the consumer. It should also be noted that the clearing banks are constrained by a countervailing force in the form of a labour monopoly. Before we can draw any implication from the level of market concentration it is necessary to take account of such factors and, also, to establish an appropriate analytical framework.

The SCP hypothesis, initially formulated by Bain, and widely used in US studies, was suggested as a possible framework within which to analyse the impact of the present level of market concentration in Irish banking. There are major difficulties relating to the availability of data which necessitate a less direct way to testing for possible effects. There would appear to be an urgent need for work in this area. Oligopolistic market structures have been shown to involve high welfare costs in banking systems similar to that of this country.[52]

(ii) *Future Work*

Most of the research work in banking in recent years has been directed towards mone-

52. Griffiths, B., 1972. "The Welfare Cost of the UK Clearing Banks Cartel", *Journal of Money Credit and Banking*, pp. 61/77.

tary policy and exchange arrangements. The study of market concentration, its causes and effects, which has important implications for the efficiency of the financial system and the productivity of the banking sector, have been relatively neglected. On the basis of tonight's paper I would suggest three broad areas which offer great scope for future work in this field.
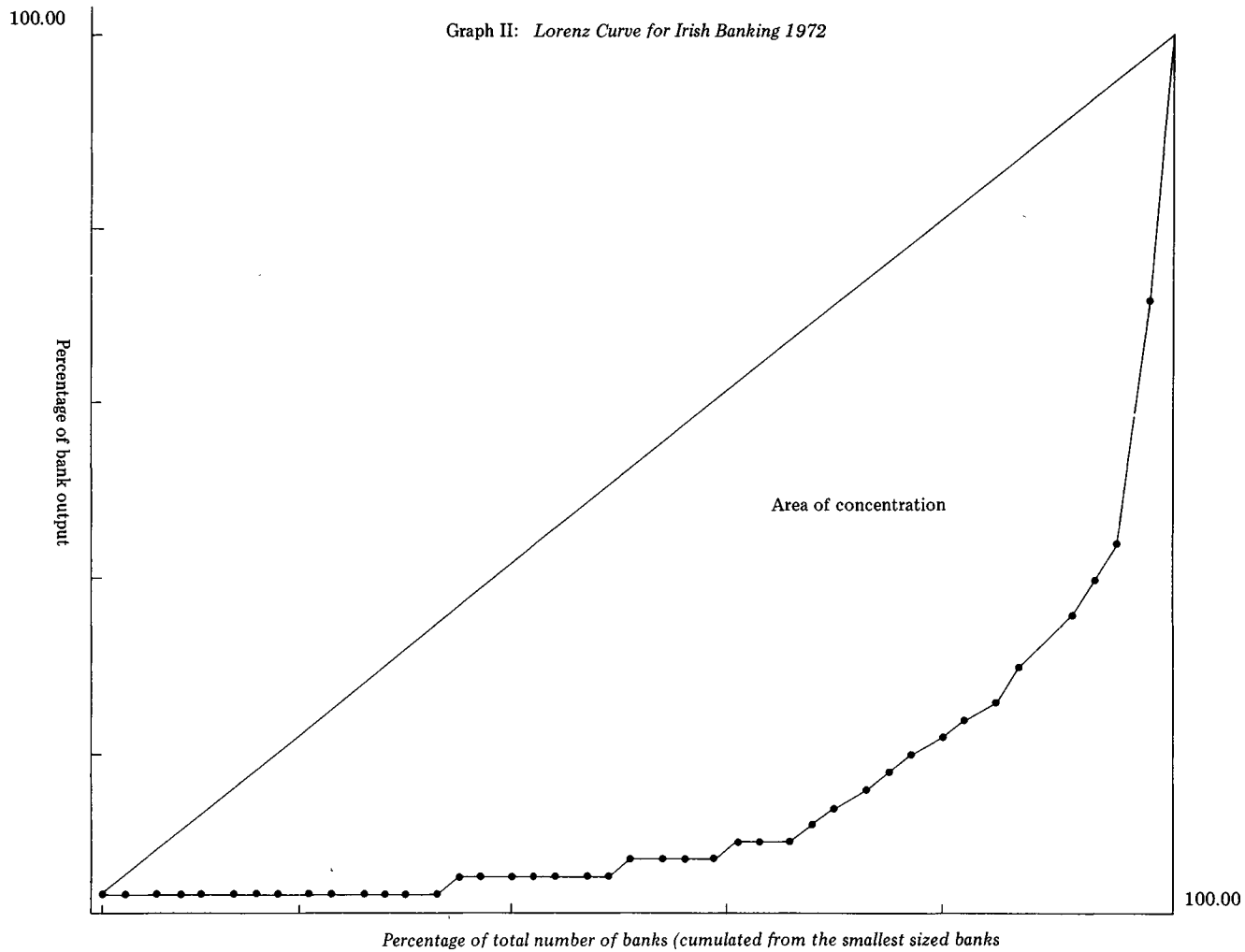
1. *Conceptual Issues*   These include how far banks can be considered as firms for predictive purposes in the context of economic models of market structure, the selection of empirical counterparts to the theoretical variables used for measuring market structure and performance, how far the present categorisation of banks as Associated and Non-Associated is relevant today and how one might disaggregate bank output into relevant product lines for the purposes of statistical analysis.
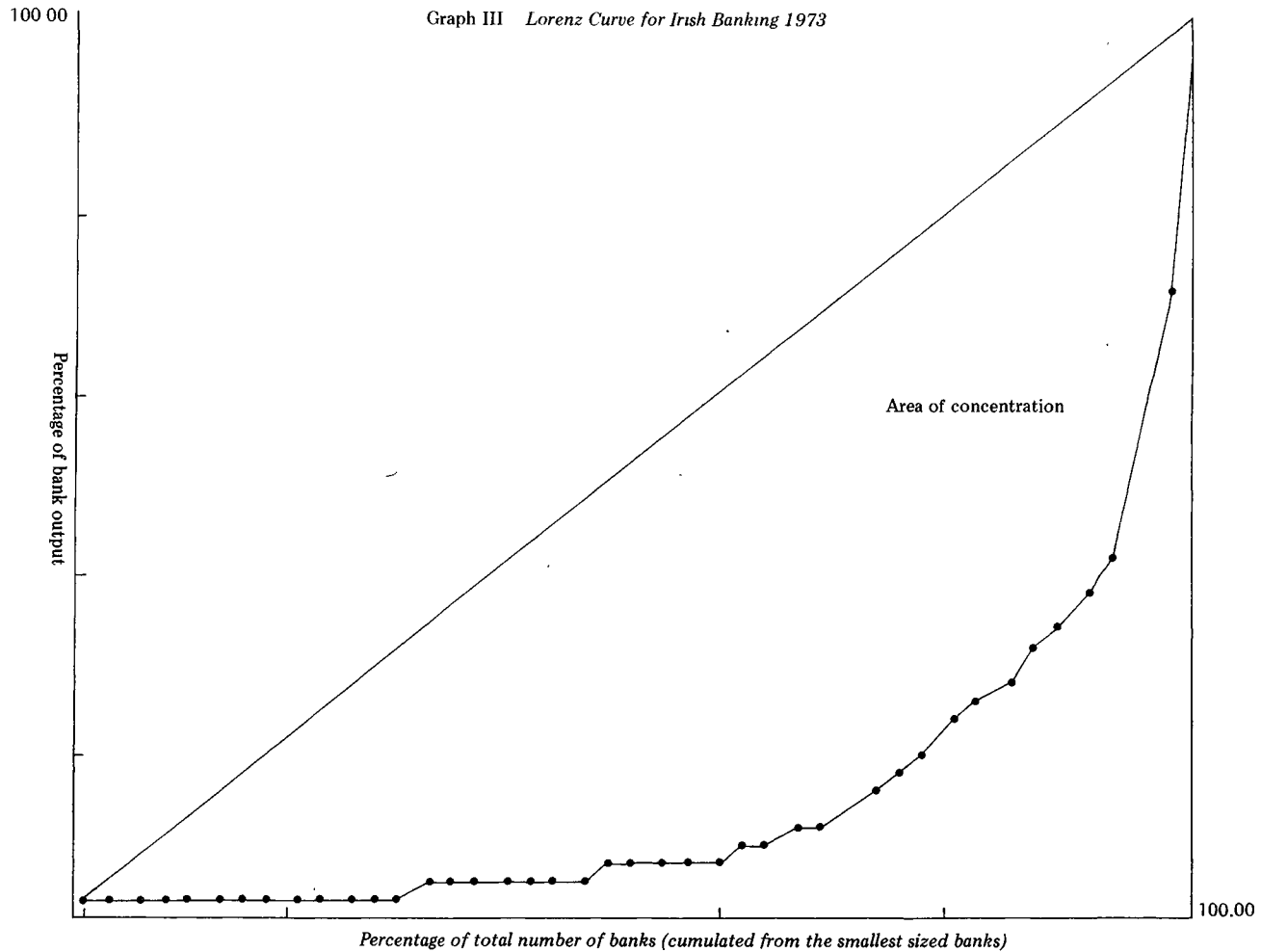
2. *Methodological Issues*   Further work in this area could very usefully focus on the adaptation of the SCP hypothesis to Irish banking, along the lines I have indicated.

3. *Other Issues*   On the basis of detailed work in these areas, further research could focus, *inter alia*, on the main determinants of concentration. In this context, the nature and rationale of barriers to entry into certain banking activities merit examination. This, in turn, touches on the important question of whether, and to what extent, there are economies of scale in the provision of certain banking services in this country. If, indeed, there were, this would have important implications, e.g., for entry into branch banking. There is also a great deal of work to be done on the historical development of the present relatively highly concentrated system. Further research should focus on how it is possible, or appropriate, to have greater competition in banking and what changes in existing arrangements would be required to this end, as well as on the costs (in terms of society's welfare) of market concentration.
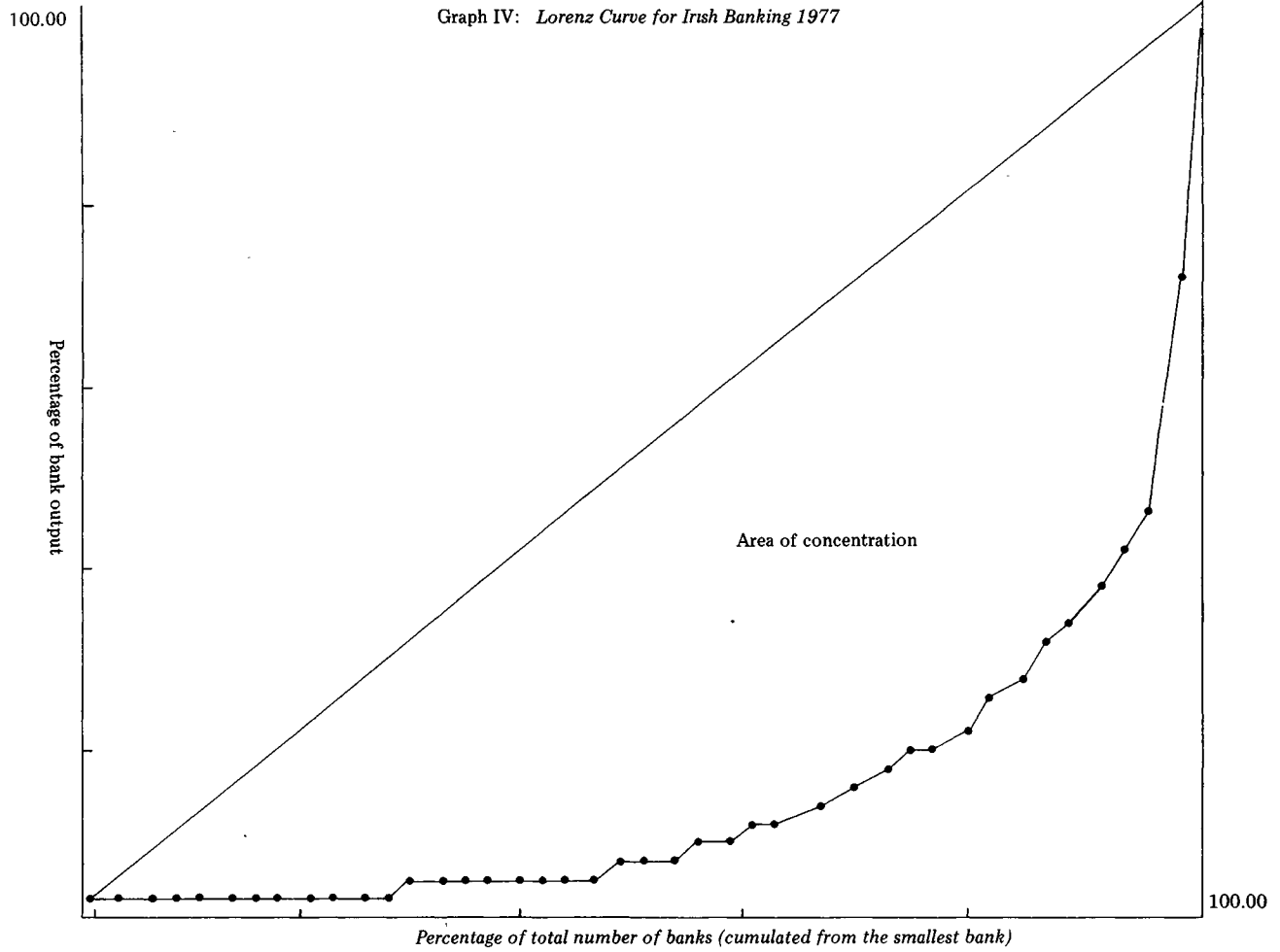
REFERENCES

COWLING, K. and M. WATERSON, 1976. "Price-Cost Margins and Market Structure", *Economica*, August.

ENCAOUA, D. and A. JACQUEMIN, 1980. "Degree of Monopoly, Indices of Concentration and Threat of Entry", *International Economic Review*, February.

FISHER, L. and J.H. LORIE, 1968. "Rates of Return on Investments in Common Stocks, 1926-1965", *Journal of Business*, July.

FLEMMING, J.S., L.D.D. PRICE and S.A. BYERS, 1976. "The Cost of Capital, Finance and Investment", *Bank of England Quarterly Bulletin*, June.

HAUSE, J.C., 1977. "The Measurement of Concentrated Industrial Structure and the Size Distribution of Firms", *Annals of Economic and Social Measurement*, Vol. 6 No. 1.

HUTCHINSON, R.W., 1981. "Price-Cost Margins and Manufacturing Industry Structure: The Case of a Small Economy with Bilateral Trade in Manufactured Goods", *European Economic Review*, (forthcoming).

KHALILZADEH-SHIRAZI, J., 1974. "Market Structure and Price-Cost Margins in United Kingdom Manufacturing Industries", *The Review of Economics and Statistics*, February.

STIGLER, G., 1964. "A Theory of Oligopoly", *Journal of Political Economy*, February.

Graph II: *Lorenz Curve for Irish Banking 1972*

100.00

Percentage of bank output

Area of concentration

100.00

APPENDIX 1

Percentage of total number of banks (cumulated from the smallest sized banks

Graph III *Lorenz Curve for Irish Banking 1973*

100 00

Percentage of bank output

Area of concentration

100.00

Percentage of total number of banks (cumulated from the smallest sized banks)

Graph IV: *Lorenz Curve for Irish Banking 1977*

100.00

Percentage of bank output

Area of concentration

100.00

Percentage of total number of banks (cumulated from the smallest bank)

DISCUSSION

R.W. Hutchinson: Mr. Chairman, ladies and gentlemen, I would like to thank Dr. Kinsella for delivering an extremely interesting and thought provoking paper on the measurement of concentration in Irish Banking. He has experienced severe data limitations. Indeed, such are the limitations that many economists who might have been interested in the topic would have avoided it. Dr. Kinsella must therefore be commended for his perseverance and for the insight and ability he has demonstrated in overcoming these limitations. He has succeeded in conveying, in a comprehensive manner, the nature and degree of oligopoly in the banking sector.

In an oligopolistic structure there exists a potential to exploit elements of monopoly power. The topic considered is, therefore, important, especially in two respects: first, from the aspect of the average consumer who uses banking services and secondly, from the aspect of industrial economics where a view has been developing (although it is still in embryonic form) that it is imperfections in capital markets which ultimately permit the development and maintenance of oligopolistic structures in product markets.

My discussion of the paper focuses on four specific areas: the measurement of concentration, the structure-conduct-performance model, the measurement of bank performance and some inferences on bank conduct.

The Measurement of Concentration

I would agree with Dr. Kinsella that numbers alone do not convey sufficient information on market structure and that the absolute n-firm concentration ratio is defective in a number of ways. In particular, it does not tell us anything about the relative sizes of the n largest firms included in the numerator of the ratio or of the relative sizes of the n+1, n+2, etc., largest firms excluded from the numerator. Disparity of firm size in oligopolistic markets will partially determine firm conduct and hence influence equilibrium outcome. The size distribution of firms might be such that it resulted in price leadership behaviour or of a nature that resulted in collusion. Nevertheless, the n-firm concentration ratio is a useful summary measure of dominance and an analysis of the change in the number of firms in conjunction with a market share analysis does give an indication of the importance of new entry in the competitive process.

The Gini coefficient is concerned purely with inequality of firm size and is not normally used in studies of market concentration.

I would agree with Dr. Kinsella's choice of the Herfindahl (or what some refer to as the Hirschman-Herfindahl) index of concentration. Its importance lies in the fact that it takes into account both the number and size distribution of firms, giving greater weight to firms with large market shares relative to firms with small market shares. I do feel, however, that Dr. Kinsella has underplayed the importance of this measure in the sense that in recent years it has been shown to be soundly based in oligopoly theory.

Dr. Kinsella mentioned in a footnote Stigler's [1964] theory of oligopoly. Stigler has shown that effective collusion, leading to joint profit maximising strategies, is influenced by fewness of sellers and disparity of relative seller size and has related this to the Herfindahl index. In addition, it can be shown that in Cournot-Nash equilibrium, performance as measured by a generalised Lerner index of monopoly power is related to the Herfindahl index. For example, Cowling and Waterson [1976] have derived an equilibrium condition which in its simplest form (assuming a homogeneous product and Cournot behaviour) states that the price-marginal cost margin for the ith firm in a market, is equal to the firm's market share times the inverse of the slope of the market demand curve. Further, assuming constant costs, this can be aggregated to give a market equilibrium condition, where the profit-revenue ratio is equal to the ratio of the Herfindahl index to the market

price elasticity of demand. Similar work on a general level has been carried out by Hause [1977] and by Encaoua and Jacquemin [1980]. The latter developed equilibrium relationships between measures of market concentration and aggregated Lerner indices for a whole series of static and dynamic, co-operative and non-co-operative, oligopoly models.

The Structure-Conduct-Performance Model

The structure-conduct-performance model was developed on an *ad hoc* basis as a response to the problem of there being no unique theory of oligopoly. For this very reason the model has been primarily concerned with the relationship between domestic market performance and domestic market structure (measured in terms of concentration, barriers to entry and growth). Conduct has been ignored. The discussion of the previous section indicates that recent research has enabled implicit assumptions to be made in respect to conduct and that a measure of concentration can be included on sound theoretical reasoning. A persistent problem that has been encountered in empirical tests of the model, is that the effect of concentration on performance has been reduced and more often than not rendered insignificant, when barriers to entry measures (in particular scale economies) are included. This highlights the need in the present context to examine the determinants of banking concentration.

Recently the model has been extended to take into account aspects of foreign competition (see for example Khalilzadeh-Shirazi [1974] and Hutchinson [1981]) and there is a view developing that the single equation approach is inadequate. Many of these points are not of immediate concern to Dr. Kinsella. As he has pointed out, there is an insufficient number of degrees of freedom for estimation purposes.

The Measurement of Performance

There are two points to be made in respect to the measurement of performance. First, Dr. Kinsella's analysis of risk and rate of return, which is based implicitly on the capital asset pricing model, indicates that with a β coefficient less than one, bank shares represent defensive securities. If bank shares were added to a portfolio of shares correlated with a stock market index, the result would be risk reduction in that portfolio. It is clear, therefore, that not only are banks no riskier than the market, they are less risky. Secondly, I would not favour a comparison of bank profit rates with those of the top financial public companies because they may possess elements of monopoly power. What is needed for comparative purposes is an estimate of a competitive rate of return.

This could be achieved in one of two ways. Given the availability of share price data it might be possible to estimate, using the capital asset pricing model, the rate of return on the average share and compare this with the rate of return in banking. For example, Fisher and Lorie [1968] using data for the United States have estimated the rate of return on the average share, where average is defined as a share having a β coefficient equal to one. Alternatively, Flemming *et al.,* [1976] have estimated a competitive average cost of capital for the United Kingdom. As far as I am aware, no such analysis has been undertaken in the case of the Republic of Ireland.

Inferences and Conclusions

It would be essential to analyse the factors determining the level of concentration in Irish Banking, before coming to conclusions in respect to the implications of the high levels of concentration for allocative efficiency within the banking sector. It would also be useful to determine why foreign banks entered the Irish market. A possible inference from oligopoly theory, in particular the theory of limit pricing, could be that this resulted from above normal profits being earned by the domestic banks. Also, it could be inferred from Dr. Kinsella's detailed analysis of market share stability that collusive behaviour was

taking place. Oligopoly theory does imply that in highly concentrated structures, market share stability of the kind observed in Irish Banking, is indicative of collusion.

Such inferences must, however, be advanced tentatively because of the regulated nature of the market.

Michael J. Meagher: I have much pleasure in seconding the vote of thanks to Dr Kinsella for the most valuable paper which he has presented to us this evening. He has tackled an important topic with considerable imagination and insight. He has established an excellent base on which further research can be built in the future and I look forward to the development of the paper in the directions indicated by Dr Kinsella. Banks in Ireland are frequently accused of exercising monopoly power and earning excessive profits. It is important that these claims be investigated dispassionately and I am confident that Dr Kinsella's work will make a major contribution in this regard.

While acknowledging that further work is planned, I would like to make a number of observations on the paper. Dr Kinsella recognises that the overall level of market concentration is not necessarily a useful guide to competitive conditions within specific product lines or market segments. I believe there is considerable evidence to show that extremely competitive conditions prevail in what can be termed the corporate segment of the banking market in Ireland. The paper shows that the Associated Banks accounted for 64 per cent of non-Government lending in 1977 and for 85 per cent of such lending if the activities of subsidiaries and affiliates are included. If we take lending to manufacturing and financial companies as a proxy for corporate lending, we can compare overall concentration ratios with the ratios for corporate lending. On this definition the Associated Banks accounted for 44 per cent of corporate lending in 1977 which was significantly lower than their overall market share. While it is not possible to determine precisely from the published figures the concentration ratio for the Associated Banks plus their subsidiaries and affiliates, it would appear that the ratio for corporate lending was less than 75 per cent. It is clear that the concentration ratio for the Associated Banks plus their subsidiaries and affiliates in the corporate banking market has declined further since 1977 particularly when account is taken of the sale by the Bank of Ireland of the 50 per cent shareholding in Chase Bank (Ireland) Limited. This is demonstrated by the fact that about 30 per cent of all lending to manufacturing and financial companies is now held by the North American and European Banks, none of which were in existence prior to 1965.

Another approach in assessing the degree of competition in corporate banking is to compare the interest margins charged on Irish pound lending by domestic banks, to prime borrowers with the rates which the same prime borrowers could command in the Eurocredit market, which is considered to be the most competitive banking market in the world. By interest margin, I mean the profit margin over the cost of funds charged on corporate loans. The pressure of outside competition is not felt in the Irish pound market because banks based outside Ireland have no capability to lend in Irish pounds. There is no published information available on lending margins in Irish pounds, but it is generally acknowledged among bankers that the lending margins in Irish pounds are only marginally higher than the margins on loans of comparable maturity and quality in the Eurocredit market. The small differential which exists can be explained entirely by the fact that Irish pound lending is subject to credit guidelines and, therefore, to some degree, a scarce commodity, whereas Eurocurrency borrowed outside the country is external to the credit guidelines. The differential existing at present amounts to no more than 1/8 per cent or 1/4 per cent.

It is relevant to point out that the form which credit guidelines have taken in this country in the past two years inhibits a reduction in the degree of market concentration in banking. The credit guidelines operate on the basis of direct quantitative limits on lend-

ing by individual banks which has the effect of restricting competition between banks and freezing market shares at their existing levels. I recognise that credit guidelines in some form have been necessary over the past 2 years, but it appears to me that, with the break in the link with sterling and the development of an independent monetary policy in this country, the Central Bank has the instruments to control money supply and credit growth without the use of quantitative ceilings applied on an individual basis to all banks. I would like to express the hope that in the future the Central Bank will feel able to operate monetary policy without resorting to the use of direct controls on individual banks, and thereby permit the free flow of competitive forces in the banking market.

In Section 3 of the paper, Dr Kinsella refers to the desirability of a comparison of profitability between banks and other businesses with a view to determining whether banks earn excess profits. Reference is made to the difficulty of defining profitability for this purpose. I suggest that the best single measure of profitability for this exercise is profit after taxation which is independent of the distortions which occur in Banks' profit before taxation as a result of the provision of tax-based financing. Furthermore, I suggest that the comparison should be conducted in terms of inflation adjusted or CCA profit figures which are required under standard accounting practice for all companies reporting for the calendar year 1980 and thereafter. It is noteworthy that, on the basis of the limited information available from companies which have produced CCA accounts to date, the impact on Banks' profitability of CCA adjustments is much greater than it is for the major non-financial public companies. This would appear to reflect the particular nature of banks as businesses dealing mainly in financial assets and liabilities. It is noteworthy also that the investment community have adjusted for this factor for some years past by capitalising the historic profits of banks on lower multiples (or price earnings ratios) than the multiples applied to the major non-financial public companies. Accordingly, it can be seen that a comparison on a CCA basis will show a different picture from a comparison on a historic accounts basis.

In conclusion, Mr President, I have great pleasure in seconding the vote of thanks.

Louis Smith: We must thank Dr. Kinsella for a most interesting piece of research on the statistics of banking in Ireland.

Dr. Kinsella's task was made most difficult, as is the case with all Irish analyses of competition, by the size and openness of our economy.

(a) Borrowers and depositors are not confined to the Republic. Multinationals obviously can carry out much of their banking operation in any country at choice. Irish companies, even if they observe all regulations, have much trade abroad and were encouraged to borrow abroad by the Government last year.

The Central Bank has at times encouraged the establishment of foreign banks in the Republic to ensure competition.

If Irish institutions were not competitive in charges or service they would have lost market share to British, American or Continental banks. It appears that they held their shares.

A useful exercise would be to compare the cost of selected loans, including all charges, in different countries. I did this in 1961 for Agriculture and found Ireland competitive on short-term but inadequate on long-term mortage finances.

(b) Banks must be fairly large if they are to provide a range of services and have enough spread of risk to avoid dangerous exposure to any one client or sector. Therefore, small countries must have few main banks. Dr. Kinsella's comparison with Belgium and Australia is misleading because both have GNP *eight times* that of the Republic.

Further differences are caused by the prevalence of branch banking and also the pay-

ment of wages. If wages are paid weekly, as in Ireland, earners live on cash and do not need banks; if paid monthly as much as 80 per cent of workers may have accounts, but use them simply. so that small bank units are adequate.

(c) Banks must grow in line with the economy. The major source of capitalisation must be profits ploughed back. In a time of inflation profits are grossly overstated if allowance is not made for the changed values of money. Ireland's accounts for tax and other purposes are based on historical costs and a constant value of money. When allowance is made for inflation in reducing the real value of money and near cash (which banks must hold) the two main banks showed in their reports 1980 a low real profitability.

The AIB made £40.14m on the historical based accounts published. Allowing depreciation on own cash or near cash items of £170m at 18 per cent the profit is reduced to £17m in real terms. This does not cover tax and dividends. The Bank of Ireland profit of £40m evaporate in inflation in the same way — a deficit of our £3m after tax and dividends is shown in their 1980 report.

The banks, and Irish industry generally, would be more accurate, and would avoid much public resentment, if they based their statement of profit in a form adjusted for inflation.

(d) Banks work in a regulated market which is deliberately distorted. Inserting some elements of competition while retaining distortions does not necessarily move the market in the desired direction.

I suspect that the Government, the Central Bank, and the public have never thought out just what they want in banking. They follow conflicting policies. In particular, market share of savings is influenced by differential tax reliefs, guidelines, disclosure of deposits, etc., to push savings towards building societies, insurance companies, pension funds, government institutions. Increased competition among associated banks would not divert more resources to productive industry (giving permanent employment) away from consumer expenditure (e.g., through building societies) or the financing of the Government's current account deficit. I do not think that increased competition, or increased efficiency in banking, would achieve what should be our main purpose: to shift savings and lending to industrial investment (mainly through banks) away from less productive spending on sectors such as Government or housing.

We are investing only half as much per head as neighbouring countries. If we are to reach Continental standards of work and life we must favour saving and capital accumulation through the institutions which channel these savings to further production.

Patrick Honohan: This paper relates to a matter which always generates great public interest. Monopoly is widely believed to have undesirable social consequences — or more precisely in the structure-conduct-performance distinction — monopolistic conduct is often held to be inferior, from the point of view of society's welfare, than competitive conduct. Naturally I will confine myself to some technical aspects of how the issues relate to banking.

Both structure and performance can provide some indirect evidence with regard to the conduct, or behaviour, of the banking system. However, we cannot regard the structure-conduct-performance hypothesis as established beyond question, and if it is not, then such indirect evidence can be misleading. Take performance, for example. As has been hinted at by Dr. Kinsella, in large organisations like banks, profit maximising behaviour cannot be taken for granted. Indeed the objectives of individual decision-makers within monopolistic banks could lead to quite small profits being made without the behaviour of the bank being thereby improved, from a social perspective. Nor is this mere abstract theorising, since it has been suggested by empirical work in the United States.

As to structure, there is the difficult issue of deciding just how high the concentration ratio, or the Herfindahl index, has got to be before we declare the structure to be oligopolistic. International comparisons can help, but here there has been a tendency to neglect the influence of the size of the market on the maximum practicable number of banks. If a bank has got to be big to be efficient, then a small country will tend to have a small number of banks dominating the market. Indeed, the usual measures of concentration are correlated with GNP. The appropriate correction to the Herfindahl index appears to be proportionate to the square root of GNP, a finding which may not be entirely unrelated to some old results in inventory theory. Correcting the Herfindahl index along these lines makes a dramatic difference to the ranking of countries by the concentration of their banking sector, as Dr. Kinsella and I have shown elsewhere.

It seems best, therefore, to focus directly on the *conduct* of banks to see whether or not their behaviour approximates the social optimum. In particular, do banks behave in the classical non-competitive manner of restricting output in order to raise unit price? An important consideration to be borne in mind in tackling this question is that, although measures of output based essentially on the overall size of the balance sheet — such as that which Dr. Kinsella has used — are adequate for obtaining the broad picture of the structure of concentration in banking, they will not do when we come to analyse conduct. This is because such balance sheet aggregates as deposit liabilities or bank credit to the private sector are, in most countries, a matter of monetary policy. The scope for non-competitive behaviour on the part of banks does not therefore lie in influencing the quantity of these aggregates. Instead, non-competitive or monopolistic behaviour in the banking system would be recognised by a reduction in the *quality* of the intermediation services the banking system provides to the economy. This would include the flexibility of lending arrangements, or what are termed in the literature "nonprice loan terms", the diversity of deposit instruments, the convenience of branch bank facilities, and the level of charges made for various services. It will be clear that the judgement of non-competitive behaviour calls for detailed and complex analysis.

Another measure that is sometimes used to this end is the spread between borrowing and lending rates, but for a variety of reasons I am somewhat sceptical of the commonly-held view that this spread is likely to be a reliable indicator of non-competitive behaviour.

D. McAleese: I would like to begin by congratulating Dr. Kinsella on his paper. This pioneering study will, I am sure, stimulate others to enter the relatively unexplored field of research into Irish banking. Like the proposers of the votes of thanks, I was much impressed by Dr. Kinsella's scholarly exposition, by the clarity of his analysis and by his concern to point to the broader implications of the results of what is a fairly technical paper.

While there are fleeting references in the paper to staff expenditure and cost minimisation, I believe that this issue deserves considerably more attention. The structure of Irish banking should be considered in the context of the unionisation of bank officials as well as in the context of the degree of competition in the final product market. The extent of the IBOA's power has been eloquently documented in the Fogarty Report. Taking this report, in conjunction with the present paper, the banking system could be theoretically stylised as a situation of bilateral monopoly in the factor market and oligopoly in the final product market (or at least in part of this market). In another paper Dr. Kinsella may be able to explore the implications of this simplified version of reality for the level of banking activity carried out in the Republic. A casual comparison between bank officials' remuneration and conditions of service in Ireland and in Britain suggests that the IBOA have had some success in wielding their monopoly power, which implies that the theory of second-best may have to be used to analyse the effects of more competition between banks in the context of unchanged factor market conditions. What I am saying

merely expands on Dr. Kinsella's own suggestion that before we draw any implications from the level of market concentration we must have regard to "the countervailing force in the form of a labour monopoly".

The economic consequences of a strong bank officials' union for price, level of service and quantity of service would, I expect, be very sensitive to the assumptions we make about the openness of the banking system to external competition. Mr. Meagher suggests that much of the non-associated banks' activities are highly open in this sense and, following this suggestion, it would surely be useful to distinguish in greater detail the areas of banking which are sheltered from those which are exposed. Lending to the relatively "open" manufacturing and financial sectors, for example, nowadays comprises about 17 per cent of the Associated Banks' advances within the State and more than 50 per cent of non-Associated Bank lending. (The latter are not, of course, unionised to the same extent as the Associated Banks and their labour costs would have to be assessed separately.) The more exposed the sector to outside competition, the more likely it is that monopoly labour pricing will lower output, whereas in the more sheltered sectors the higher labour costs can be passed on in terms of higher prices and lower quality of service. It would be useful to have these a priori hypotheses examined in a proper analytical framework.

Three rather minor points may also be mentioned. First, there might be scope for using the experience of bank mergers in Ireland to test for the existence of economies of scale and thereby help us to form a view on why concentration ratios are so high in banking. Second, how is the monopolistic competition referred to in the quotation from Chandler (which presumably refers to product differentiation) related to the notion of oligopoly which is the subject of concern in this paper? Third, in explaining the public controversy surrounding bank profits, the nature of banks as financial firms and their pivotal role in the economy is mentioned. For the sake of completeness, distortion in bank profits created by tax-based financing and the mistaken impression that the negative real interest rates prevailing through most of the last decade were reflected in "excessive" bank profits, might have been mentioned as additional sources of confusion.

Reply by R.P. Kinsella: I would like to thank the speakers for their most constructive comments. Mr. Hutchinson's comments on the measurement of performance and Mr. Meagher's suggestions regarding an appropriate definition of profitability will certainly be of great assistance to subsequent workers in this area. May I say that I am most grateful for the work they have so evidently put into their respective contributions. In the time available I can only touch briefly on one or two of the more important points which have emerged from the discussion.

Mr. Hutchinson points out that it would be essential to analyse the determinants of bank concentration before arriving at any conclusions regarding the implications for efficiency of the prevailing relatively high levels of bank concentration. I agree. The main determinants, as I see them — and I can only mention them briefly — include certain historical advantages accrued by what have become the Associated Banks as well as regulatory and economic constraints on competition including barriers to entry. Much more work needs to be done in this area.

Several speakers referred to the question of the impact of inflation on bank profits and capital adequacy. I am in general agreement with the views expressed and would only say that it is up to the banks themselves to educate their customers — the general public — on this important and contentious point.

I think Professor Smith is being a little generous when he says that if Irish banks were not competitive in charges or services they would have lost market shares to foreign banks. As Mr. Meagher has pointed out, they have, in fact, seen their shares eroded in certain product areas. (*En passant*, it is, of course true, that the impact of concentration

on competition is best analysed within certain product markets, or areas, as mentioned by Mr. Meagher and others.) This erosion has been limited, partly by the constraints which I have mentioned and also inasmuch as the Associated Banks have established subsidiaries in those sectors in which foreign banks have been allowed to establish. The Associated Banks dominance of retail banking (and as I indicated in my paper, there are costs, as well as benefits, involved in retail banking) constitutes a powerful element in the relatively high concentration of Irish banking and one which recent developments, notably electronic banking, will further enhance. However, the extent to which the banks can exploit this is restricted, not only by regulatory controls but also by the countervailing power of the IBOA. A word on each of these points.

Some regulation is, of course, necessary: there can be no such thing as free and unfettered competition in banking. But regulation should be directed towards efficiency and stability. Mr. Meagher has, in my view rightly, questioned the usefulness of quantitative controls on lending. Professor Smith has, again rightly in my view, noted that the regulatory framework within which banks operate is distorted by hidden subsidies to certain institutions.

To turn to the second point, Professor McAleese had some very important points to make on the whole issue of staff expenditures and costs in banking which I could only refer to briefly in my paper. He is entirely right when he characterises the banking system as a bilateral monopoly in the factor market. Those who criticise the "monopoly power of the banks", as they put it, should recognise that the IBOA is a very effective countervailing power and is, if anything, a more important determinant of the price and quality of Irish banking services. Research by Professor Brian Griffiths in Canada and the UK (both of which have similar banking market structures in Ireland) has clearly shown that in this situation it is the public which lose out. This hardly needs saying in view of successive bank strikes here. Nevertheless, it is important that any analysis of the *effects* of market concentration in banking take account of this factor, more especially in the light of the relatively low productivity of the banking sector (perhaps I should add that my own research which pointed to low productivity in banking is now a little out of date. Some up to date research in productivity in banking would be useful).

All of this takes me to my final comment. First, perhaps I could mention, for the record, some work in progress on a few issues raised by some of the speakers. In my paper tonight I stressed that inter-country comparisons of bank concentration were difficult, a point taken up by Professor Smith. In a recent paper,[1] Dr. Honohan and I propose a new measure for such comparisons. We would be happy to send copies to those interested in pursuing this important point. Also, Professor McAleese states that there might be scope for using the experience of the bank mergers to test for the existence of economies of scale which, in turn, might help explain why concentration ratios are relatively high in Irish banking. The whole episode of the bank mergers: their rationale and the lessons to be learnt; is under researched. Indeed, nothing has been published on it. Again, I have just finished a preliminary study of the mergers which I would be glad to make available to those interested.

Let me turn now to my final point. Successive speakers have drawn out some of the policy implications of my paper and made valuable suggestions regarding the extension of the theoretical framework. The whole question of bank concentration and competition bears on the question of the efficiency of our financial system and is of vital public interest. I have a certain sympathy with Professor Smith's view that the authorities and the public have never thought out just what they want in banking. Really, it is astonish-

[1] P. Honohan and R.P. Kinsella, 1982. "Comparing bank concentration across countries", *Journal of Banking and Finance*, 6.

ing that there has been no major Commission of Inquiry looking into this whole area since the Second Banking Commission 1934/38. In my view there is need for such an Inquiry into the structure and functioning of the Irish financial system in the light of national needs and objectives and against the background of development in banking at home and abroad. Such a Commission could take up some of the issues referred to in my paper and also those raised by speakers and which I have just touched on. This is not necessarily a criticism of the existing system which, indeed, has an enviable record of stability. But it should be pointed out that such Inquiries have performed valuable work in many countries with essentially similar market structures.