Kurt Rothschild's Heterodox Approach to Price Theory and Oligopoly

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Abstract: The seminal article by Kurt Rothschild on the state of imperfect competition analysis, 'Price theory and oligopoly', published in the *Economic Journal* in1947 is used as an exemplar of the merits of a heterodox approach to economics. We identify key elements of Rothschild's analysis and relate them to later analytical developments in pricing strategies, entry barriers, internal organisation and the use of power by firms. Further, we note lacunae that remain in the modern analysis of oligopoly and price theory that can be addressed by adopting ideas proposed by Rothschild in his 1947 article and in his later writings.

1 Introduction

Kurt Rothschild (1914–2010) was a strong advocate for pluralism in economics. He worked across a broad range of topics within economics, always with an eye to the multiple approaches that were useful in addressing any particular issue. Much of his effort was devoted to problems of wages, unemployment and income distribution, but early in his career he wrote a paper, 'Price theory and oligopoly' (Rothschild 1947), that critically reviewed developments in the theory of imperfect competition. In this paper he not only surveyed the then state of the field but put forward several ideas on how to develop the theory in the future.

From the time of its publication, this paper stimulated research by leading heterodox economists. Geoff Harcourt (2012: 17) relates how the article was '[T]he single most influential article of my undergraduate years' and stimulated him to write a dissertation that focused on replacing the competitive behaviour of John Maynard Keynes's (1936) *General Theory* with price-setting behaviour by Rothschild's strategic oligopolists. Its influence on Harcourt's approach to economics persisted ever after. John King (2011) also notes the paper's seminal influence on his own development as a heterodox economist. We take Rothschild (1947) as an exemplar of the heterodox approach to economic analysis and discuss how it foresaw a number of important advances in oligopoly analysis as well as pointing to problems that remain today in the integration of oligopoly into price theory.

The main theoretical works discussed in Rothschild (1947) are Edward Chamberlin's *Theory of Monopolistic Competition* (1932) and Joan Robinson's *Theory of Imperfect Competition* (1933). Rothschild hails these works as major advances as they brought a large number of new cases into the formal theory of markets and thereby extended the theory beyond its reliance predominantly on the two polar cases of perfect competition and pure monopoly. However, Rothschild notes that while these advances allowed theory to be applied more widely to cases such as product differentiation across firms, which had been treated as exceptions in the theory of competition and monopoly, they did not go far in dealing with interdependence of firms and the resulting indeterminateness of oligopoly pricing outcomes.

Rothschild notes the hesitancy of economists to move away from theory that provides the determinateness for market price found in the theory of competition and monopoly. He also notes that the tools available for properly examining pricing behaviour when firms are interdependent had not yet been developed.[1] Instead, he suggests that:

> The oligopoly-theorist's classical literature can neither be Newton and Darwin, nor can it be Freud; he will have to turn to Clausewitz's *Principles of War*. There he will not only find numerous striking parallels between military and (oligopolistic) business strategy, but also a *general* approach which – while much less elegant than traditional price theory – promises a more realistic treatment of the oligopoly problem. (Rothschild 1947: 307, italics in the original)

He then proceeds to set out 'some considerations to which this approach gives rise' (*ibid.*).

This paper focuses on reviewing developments in research on oligopoly theory and related empirical research on pricing in oligopoly in the time since the publication of Rothschild's seminal 1947 article, with particular attention paid to developments related to the approach proposed by Rothschild. We examine, in order, research on the topics of price rigidity and other pricing practices, non-price competition and barriers to entry, internal organisation of the firm, and the political and economic power exerted by large firms. In the process, we examine writings after 1947 by Rothschild that relate to these topics. In each case, we emphasise the advantages of a heterodox approach and note difficulties that remain with attempts to provide solutions based on neoclassical maximisation theory. We then conclude by reviewing Rothschild's approach for guidance that might fruitfully be explored in future research that incorporates oligopoly into price theory.

2 Price Rigidity and Other Pricing Practices

Essential to the propositions in Rothschild (1947: 309-10) is the notion that in oligopoly 'a "struggle for position" is taking place side by side with an attempt to make the best of every position that is held at any special moment'. Also important is the treatment of price as a dynamic phenomenon in the sense that the implications of a price at any point in time for a firm's position relative to its current rivals, its customers and its potential rivals need to be taken into account. This leads Rothschild to conclude that '[S]ince, therefore, the quoted price is not the mechanic result of impersonal market forces nor the essential adjustment to a constantly changing environment, but the expression of a strategic policy, it is clear that there will be a tendency for its rigid maintenance' (1947: 311). Here, strategic policy needs to be broadly interpreted to include objectives beyond profit maximisation. Specifically, strategic policy is also aimed at enhancing the stability of the firm's position, by seeking secure profits as well as high profits. Also important is fostering internal cohesion of the firm and providing a platform for future development.

Price rigidity was not a new concept in economics. As Rothschild (1947: 310-12) notes, Hall and Hitch (1939) had reported findings from interviews with businessmen in which price rigidity featured as an observed phenomenon. In addition, Paul Sweezy (1939) had put forward the theoretical explanation of rigid prices based on kinked demand curves. However, rather than rely on empirical

evidence as in Hall and Hitch or on a profit-maximising model as in Sweezy, Rothschild's proposition regarding price rigidity is based on his general approach that situates oligopoly behaviour in the context of the struggle for position and making the best out of every position at any special moment.

Rothschild abandons the neoclassical approach that is universal in the sense that it is derived from axioms, such as profit maximisation, which are meant to apply to every situation. Instead, he pursues an approach that is general in the sense of having broad applicability, but with recognition that prices are subject to other influences not incorporated within neoclassical theory.[2] The term, strategic policy, combined with the notion of struggle, reflects the environment of uncertainty in which oligopoly firms operate. Rothschild (1947: 308) contends that oligopoly firms have a security motive as well as a profit motive. Furthermore, there is scope for judgement and for taking definite positions in the market, which would be unjustified in an environment of certainty or rational expectations. The firms behave in a manner that is not the unique outcome of external conditions, with a proclivity towards maintenance of the status quo. Price rigidity is a feature of oligopoly in this sense in that changes in cost or demand conditions do not necessarily lead to changes in price.

The mainstream of neoclassical economics has never accepted price rigidity as a pervasive characteristic of oligopoly. Both the logic and the empirical support for the proposition have been strongly attacked. One serious logical problem is that the theory is incomplete, as it explains why prices do not change but not how the fixed price is determined (for a full discussion, see Reid 1981). Price rigidity can at best be considered as a theory of price in the short run, a theory of price change or rather lack of price change, but it is not a theory determining the price level and certainly not a theory of price in the long run. The empirical attack has been focused on the distinction between posted prices and transaction prices, with the latter shown to be much more flexible than the former (for evidence on this point, see Stigler and Kindahl 1970).

Rothschild's point is that the tendency to maintain rigid prices is a pricing practice notable specifically in the context of oligopoly, because it is when firms are engaged in a struggle for market position and aware of their interdependence that this type of behaviour makes sense. Immediately after arguing for the rigidity of quoted prices, Rothschild (1947: 312, italics in the original) adds that '*[O]ligopolistic circumstances lead to a multitude of conditions surrounding the quoted price*'. He recognises deviations from posted prices as a common occurrence and further discusses circumstances that lead to purposeful deviation from the normal practice of maintaining fixed posted prices, including the aggressive pursuit of a stronger market position (Rothschild 1947: 313-17). Thus, attacks on the theoretical and empirical validity of price rigidity do not directly address the proposition put forward by Rothschild that the circumstances of oligopoly lead firms to try to maintain fixed prices as a normal business practice in circumstances where profit maximisation would suggest a pattern of fluctuating prices.

Price rigidity remains controversial in economics but its practical relevance has dissipated in an era of endemic inflation. Rigid prices are not an appropriate business practice for achieving a secure position when costs and prices of substitute products are normally rising. Rather, maintaining rigid prices would lead to steadily declining profit margins under such circumstances, which would undermine the financial stability of the firm. Thus, alternative pricing practices are required for

oligopoly under inflationary conditions. This is fully consistent with Rothschild's general approach to pricing in oligopoly.

An alternative pricing principle discussed briefly in Rothschild (1947) is full-cost pricing of the type identified by Hall and Hitch (1939) in their interviews with businessmen. Rothschild suggests that this type of pricing is a

> ... perfectly logical outcome of the market situation with which they were primarily concerned – monopolistic competition with an admixture of oligopoly as alternative pricing practices ... When, however, the position of the oligopolists or duopolists is more powerful and not easily invaded they will not keep to the full-cost principle, but will add varying and 'abnormal' profit percentages to their costs in proportion to their assumed strength, or they will fix prices without reference to costs altogether. (1947: 311).

The general form of pricing practice covered by the passage above is mark-up pricing in which prices are set by adding a percentage profit margin to some measure of unit cost. Mark-up pricing satisfies the basic requirements of Rothschild's general theory of pricing in oligopoly in that it is a practice that allows firms to maintain a degree of stability in the struggle for position while doing the best they can at any special moment. When all firms in an industry follow mark-up pricing rules and face similar inflationary cost increases, their relative position in price can be maintained and the threat of price wars minimised. This is the scenario discussed by Rothschild (1993) in a comparison of a Stackleberg model of oligopoly with a model that he labels the 'Sylos approach' as based on the work of Paolo Sylos-Labini (1969, 1979, 1987). Rothschild (1993: 169) concludes the comparison by stating that '[O]penness of approach can be important. From this point of view case studies, numerical and graphical exercises, and so on, have a role to play in addition to or in place of more "exact" but less open analytical methods – more so in the sphere of oligopoly than in other branches of price and market structure theory'.

Variants of mark-up pricing are dominant in the post-Keynesian theory of pricing (see Lee 1998). Applying mark-up pricing to the manufacturing sector of the economy, which is generally characterised by oligopoly, provides a powerful tool in analysing aggregate economic activity. In particular, Michał Kalecki (1971) showed how the distribution of income in the economy evolves over the business cycle by combining mark-up pricing in oligopoly with competitive pricing in primary production. Similar models are widely applied by other authors for analysing many aspects of income distribution and inflation.[3] Indeed, Rothschild (1972) in his analysis of pricing in an inflationary environment directly applies a variant of mark-up pricing.[4]

As with price rigidity, mark-up pricing is not a complete theory of pricing. It is a theory of price change, but not the price level. In particular, under oligopoly an explanation of the size of the mark-up is required to complete the link between the cost level and the price level. Rothschild (1947) considers factors affecting the gap between cost and price in only a general way, but there is substantial analysis of these factors in the post-Keynesian literature cited above. The size of the mark-up also features prominently in the literature on non-price competition and barriers to entry discussed below, with product differentiation and barriers combining to determine the gap between cost and price that can be maintained without attracting entry into a market.

3 Non-price Competition and Barriers to Entry

Rothschild (1947) makes scant mention of non-price competition and does not deal directly with the issue of barriers to entry, aside from a very perceptive comment on the endogeneity of market structure discussed below. Rothschild's article was written before the seminal contributions of Joe Bain (1956) and Paolo Sylos-Labini (1969), which introduced the threat of entry as a main consideration in the pricing behaviour of oligopolies. This section discusses these contributions and subsequent developments in the analysis of non-price competition and barriers to entry so as to assess the implications for price theory.

The most direct implication for price theory of non-price competition and barriers to entry is in the entry-limiting-price model discussed in the seminal works of Bain (1956) and Sylos-Labini (1969),[5] which identifies a maximum price by incumbents to deter entry of new competitors. Spence (1977) reassesses this model in emphasising early capital accumulation helping incumbents to build large capacity and to make plausible the threat to lower price after entry. Caves and Porter (1977: 261) generalise this approach stating 'as an investment decision made under uncertainty and conjectural interdependence, and by recognizing that subgroup structures of industries impede intra-industry mobility, we have sought to generalize the theory of barriers to entry into a theory of mobility barriers that takes a consistent and comprehensive view of the decision-making behaviour of both nascent and going firms'.

The work of Spence (1977) and Caves and Porter (1977) raises doubt on the ability of incumbents to use the threat of lower prices after entry as an effective deterrent to potential entrants. These doubts are amplified in the application of game theory to the investment decisions of incumbents and entrants by Dixit (1979, 1980). Milgrom and Roberts (1982) further develop this line of inquiry by assuming there is an asymmetry of information between the incumbent and the entrant, where the incumbent uses a low price to signal low demand or low marginal cost and thereby discourages entry. Under conditions of full information and complete markets, Baumol, Panzar and Willig (1982: 82) consider high sunk cost in defining an entry barrier in a contestable market as 'anything that requires an expenditure by a new entrant into an industry, but imposes no equivalent cost upon an incumbent'. At this point, the idea that incumbents can use low prices to deter entry disappears completely from the horizon.

Much of the early research on entry barriers is based on the structure-conduct-performance paradigm, which ignores the dynamics of industry adjustment. In this paradigm, the number and size distribution of firms in an industry (as measured, for example, in a concentration ratio) determine profitability. Essentially, it is high entry barriers, rather than firm price or non-price behaviour, which result in highly concentrated industries and allow firms in these industries to persist in receiving higher profits without eroding their position.[6]

Rothschild (1947) challenges the view of an exogenously determined market structure. In another of his prescient commentaries on the state of existing theory, Rothschild writes:

> ... these theories are all based on the assumption that the oligopolists - while recognising that their price activities will call forth reactions from their rivals - acquiesce in the permanent nature of the industry's structure. But since it is doubtless that one of the distinguishing characteristics of duopoly and oligopoly is that the rival firms can *actively* influence and change the market

> situation, these theories, too, fail to provide a theoretical framework for the interpretation of reality. (1947: 303; italics in the original)

Some fifty years later, Sutton (1991, 1998) addresses this issue in an application of game theory to the conceptual inadequacies of the structure-conduct-performance paradigm. Sutton (1991, 1998) argues that a definitive inverse relation is expected between concentration and market size as a barrier to entry, only as long as set-up costs for the industry are exogenously determined. Large markets are possible with a few large firms instead of a large number of firms, provided that the few firms have available a strategy of high expenditures on items that enhance their market position, such as advertising and research and development, provided those expenditures have no market value outside of current operations (that is, they are 'sunk costs'). Sutton (1991) finds evidence in support of this hypothesis using data for twenty narrowly defined food and drink industries across six developed countries. Further evidence in support of Sutton's proposition is provided by Robinson and Chang (1996) for a cross-section of US consumer and industrial goods manufacturing, and by Bhattacharya and Bloch (2000) for a cross-section of Australian manufacturing industries.

In Sutton's analysis, pricing does not play a role in the long-run steady-state structure of an industry. However, a potential role emerges in considering the process of adjustment to the steady state. Empirical studies of the adjustment of industrial concentration towards a steady state generally find that adjustment is very slow, approaching steady state at rates of no more than a few percentage points a year. High prices might speed or slow the adjustment process by affecting the timing of the investment decisions of either incumbent firms or potential entrants, for example, by providing more internal finance for incumbents or reducing the risk of short-run losses for entrants. However, there is no clear evidence of a strong impact of profitability on the speed of adjustment.[7]

Bloch, Eaton and Rothschild (2013) use a dynamic model of oligopoly where firms incur sunk or fixed costs with a probability of success for achieving a position in a market. The model shows the entry barrier effects when these positioning costs must be incurred by entrants at a higher level or lower probability of success than by incumbents. In this model, a more concentrated market structure and higher product price occur with a higher level of positioning costs or a lower probability of success. This proposition fits well with Rothschild's general theory of pricing in oligopoly, where barriers to entry are taken to be one of the other factors that must be kept in mind when considering pricing practices in oligopoly.

In recent decades, the structure of many industries has changed substantially, due to the globalisation, liberalisation and privatisation that has occurred across industries and countries. Transnational corporations are increasingly expanding boundaries along with local firms. The whole process opens up opportunities as well as threats to the industries. The role of entry barriers has evolved from the era of Bain and Sylos-Labini to that of Sutton's research. The importance of non-price competition strategies (that is, research and development, advertising, product innovation, product quality, and so on) has increased over time in explaining competition within modern industries as compared to firm's pricing strategies.[8]

In a clear example of the continued relevance of Rothschild's seminal article, Harcourt and Nolan (2012 [2009]) use Rothschild's general approach to oligopoly

analysis in discussing the movement towards the domination by small numbers of multinational firms in world markets for a wide array of goods. They particularly point to how the development of universally recognised technologies or brands allows these dominant oligopolists to control global supply chains in the role of 'system integrators'. As advocated by Rothschild, they rely on case studies, specifically the global aerospace and beverages industries, for evidence in support of their hypotheses. They close their discussion by noting, 'Finally, we submit that the theories and conjectures of Rothschild and Hymer, together with those of the other non-mainstream authors we discussed above, make far more sense of the empirical findings we have reported than do the corresponding theories and conjectures of the mainstream, ancient and modern' (Harcourt and Nolan 2012 [2009]: 174).

4 Internal Organisation

The growing scale and scope of firms had progressed sufficiently to be noted in Rothschild (1947) and was afterwards considered by Rothschild in relation to the power of transnational corporations (see section 5 below). Large diversified firms develop complex internal structures to be able to manage their extensive and diverse operations. This complexity in turn influences decision making in the firm, including their pricing practices. Rothschild (1947: 313) notes the implications for pricing theory, stating that 'Prices are therefore increasingly the outcome of the different pulls of the conflicting interests of various departments'. This idea has not been directly developed further in subsequent literature, but there has been substantial development of the theory of organisation of the firm. At least some of this literature has implications for the strategies adopted by firms including the way in which they compete in price and non-price dimensions. This section is devoted to discussing this literature and its implications for pricing theory in oligopoly.

Edith Penrose (1959) provides a seminal contribution to the theory of organisation of the modern firm. Penrose argues that with modern forms of internal organisation there is no constraint on the size of firms. Large size brings with it the advantages of productivity gains from the division of labour, with large firms able to take advantage of the highly specialised skills and knowledge of individual workers. However, specialisation of knowledge implies a lack of shared knowledge, which contributes to the conflicts of interest noted by Rothschild and the consequent need for mechanisms for coordination and the managing of conflict. Furthermore, the need to share knowledge implies that the growth rate of a firm is constrained by the diversion of managerial effort to train and integrate new managers as the scale and scope of the firm expands.

Innovation is a key requirement for success in the modern large firm, which means the continual introduction of new knowledge to the firm. This adds to the complexity of the modern firm as discussed by Bloch and Metcalfe (2011). Therein, it is noted that such complexity contributes to the adoption of simplified rules and routines as mechanisms for decision making, providing a further rationale for the prevalence of rule-based pricing practices, such as maintaining rigid prices or using mark-up pricing. Modern firms have to deal with complexity from within as well as interdependence from without.

It is interesting to compare the 'complexity view' of the firm with the developments in mainstream analysis of the organisation of the firm. The main focus of mainstream work has been on transaction costs in answering the questions

of why firms exist and what determines their boundaries in terms of size and scope. Following Ronald Coase (1937) the basic mainstream argument has been that firms exist to economise on costs that would otherwise be incurred in organising transactions among independent workers, suppliers of materials and owners of capital equipment. Likewise, firm boundaries are determined to minimise the sum of transaction costs across all firms. This approach fits neatly with the axiomatic approach to production and consumption of neoclassical economics but presumes a well-informed process operating both within firms and across markets. Rothschild's repeated warnings about the dangers of pursuing theoretical elegance at the expense of relevance and realism are particularly appropriate here.

In practice, firm boundaries are blurred in the modern industrial world. For example, compare the Japanese form of industry organisation with strong inter-firm relationships to fiercely independent European and American firms. The former have cooperated effectively to enhance their competitiveness in the world market since World War II (Caves and Uekusa, 1976). This provides an illustration of how firm boundaries (level of integration), the structure of financial markets (in raising capital and develop innovative activities), formal (inter-firm agreements and complementary capabilities) and informal organisational structure (culture of the workforce and managerial complexity) are, together with historical path dependence, highly significant in determining competitive strategies of transnational firms. Here, Rothschild's general approach to oligopoly seems clearly to have found an application.

Case studies provide insight into the extent to which competitive strategy is influenced by internal structure. A powerful illustration is provided by Chandler (1990), especially in relation to the role of investment within organisations in building modern capitalism. In a review, Teece (1993: 200) suggests 'Chandler has grasped some fundamental facets of enterprise performance largely neglected by economic theory – facets which must come into sharper focus if economists are to understand the new forms of business organisations, financial institutions, governance systems, and policies needed to develop and exploit the wave of new industrial technologies which are now upon us'. Modern firms are in fact based on a variety of organisational mechanisms in determining cost and pricing structure.

Teece, Rumelt, Dosi and Winter (1994) develop the concept of 'coherence' of the multiproduct business firm. Enterprise learning, path dependencies and the nature of the selection environment are found to be significant in determining diversity amongst modern firms. The influence of the selection environment in determining the outcomes of strategy, particularly innovation strategy, is explored in detail by Nelson and Winter (1982) in their evolutionary approach to the organisational behaviour of firms.

5 Power

Rothschild (1947) emphasises that oligopoly raises concerns for power well beyond influence in the market place. In particular, the large amount spent on lobbying by large oligopoly firms is seen as playing a role in shaping the firm's position comparable to the role played by the amount spent on advertising. Rothschild put forward the proposition that:

> *The oligopolistic struggle for position and security includes political action of all sorts right up to imperialism. The inclusion of these "non-economic"*

> *elements is essential for a full explanation of oligopoly behaviour and price.* (Rothschild 1947: 319; italics in the original)

The importance of power in pricing theory and other areas of economics is a theme that continually appears in Rothschild's writings. He devoted one of his last articles, Rothschild (2002), to a detailed critique of neoclassical economics for its failure to include the consideration of power. Here, he notes that 'The neglect of power in mainstream economics has its main roots rather in *deliberate* strategies to remove power questions to a subordinate position for inner-theoretical reasons' (Rothschild 2002: 437; italics in the original). These inner-theoretical reasons are partly methodological, particularly the desire to maintain an axiom-based theory that provides precise theoretical results and thereby avoids fuzzy notions embraced by other social sciences, and partly ideological, especially the pursuit of favour from powerful interests within society who benefit from the laissez-faire implications of neoclassical economics.

Of specific concern to Rothschild (2005) is the use of power by oligopoly firms in their modern guise of transnational corporations. Transnational firms are noted by Rothschild (2005: 445-6) for using their power of location of activity to enhance their position relative to parties that are unable to migrate, particularly small businesses and labour as well as national and local governments. The result is higher profits for the transnationals through reduced input prices and production costs. In terms of pricing for outputs not much is expected to change. Rothschild states that 'Competition *within* the transnational sector will continue to run according to existing theories of price and output determination' (Rothschild 2005: 446; italics in the original).

As Rothschild maintained a stream of commentary on the treatment, or rather neglect, of power in economic analysis, we do not comment further on the literature (see King 2011 for a wider discussion). However, events of recent years provide compelling examples of the use of state power to the advantage of large firms, particularly in the financial sector. The use of public funds to prop up large banks and other financial firms has meant that others in society have had to deal with the impact of severe austerity programs.

6 Ideas for the Next Generation

Rothschild's (1947) paper on price and oligopoly aimed to provide guidance to subsequent researchers and he clearly did that with at least some of his theories and conjectures. While orthodox theory has developed mostly in the direction of game-theoretic analysis, heterodox economists have drawn substantially on his main insight, namely that oligopoly is a struggle for position requiring an analysis that is much more than the application of an elegant profit-maximising calculus. Rothschild was consistent throughout his life in arguing for a pluralist and realist approach to economic theory, including the role of oligopoly in price theory. As detailed above, there has been considerable progress of this sort in price theory through developments in rule-based pricing practices, such as mark-up pricing, endogenous market structure, the analysis of the impact of internal firm organisation on strategic policy and the use (and abuse) of market and political power by oligopoly firms. However, much remains to be done along the lines suggested by Rothschild.

Power remains a key element of the economy and requires further consideration. Economists have been strong critics of state power being used to pursue private

interest and have even provided a theory of public choice based on the axioms of private optimisation. However, the policy prescriptions from the mainstream for dealing with the problem fail to go beyond advocating laissez-faire. As Rothschild points out, these longstanding policy prescriptions are flawed:

> The trouble began ... by concentrating many of its analyses on the actions of single self-interested individuals in a competitive world. While competition certainly still exists, the individual behavior and the extent and type of competition have dramatically changed since Smith's days and these changes suggest very clearly that today it might be – more than ever – a big mistake to regard the power problem as a quantité negligable. (2002: 436)

Indeed, power affects pricing directly through various state interventions in the market, including price controls, subsidies, taxes, tariffs and other restraints on trade, with national governments often subservient to the interests of large transnational corporations. Power also affects pricing indirectly through the regulation of market structure, industrial relations, consumer protection and environmental controls, as well as a host of other legislative, regulatory and judicial interventions. More generally, power influences the whole structure of society and the course of development through time, including the provision of education, the development of technology, the degree of inequality in income and the extent of economic and political freedom for individuals. Rothschild was clearly on the mark arguing that this is a core issue for economics, including price theory, rather than a *quantité negligable*.

The internal organisation of firms remains a fertile ground for further development of price theory. Rothschild (1947) saw conflicts of interest within the firm as being one possible influence on pricing. As mentioned above, the complexity of the modern firm contributes to the adoption of rules and routines, including rule-based pricing practices such as mark-up pricing. More generally, there is work needed on how coordinating the specialised knowledge within a firm, and managing the conflicts that arise, impacts on the type of competitive strategies adopted. Further, little has been done to incorporate the security motive identified by Rothschild as operating alongside the profit motive in analysing the behaviour of oligopoly firms.

In spite of the voluminous literature on the subject appearing since Rothschild (1947) the dilemma for pricing theory in oligopoly today is not much different than what was described by Rothschild. There are analytical models based on axioms, such as profit maximisation, which avoid the general indeterminateness of price in oligopoly to produce exact results. However, these results only relate to the specific assumptions of the analysis, which often involve very restrictive conditions. There is also the approach that emphasises the struggle for position in oligopoly and captures features of pricing that result, such as price rigidity and mark-up pricing. Neither approach on its own is fully satisfactory in terms of rigour and realism for economic modelling. Rothschild's consistent argument for openness to many approaches in dealing with this dilemma is still relevant and helpful as are the closing sentences of his 1947 article:

> But the undiscovered territory must be entered by economic theory if it is not to lose all touch with reality. The tentative first step outlined in the previous section certainly looks very crude and pedestrian when compared with the

> polished elegance of modern value theory. But it is tentative steps of this sort which economic analysis must undertake today. (1947: 320)

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Notes

1 Rothschild (1947: 306, n.4) comments perceptively on the potential to tackle these problems using the analysis presented in the book, *The Theory of Games and Economic Behavior*, that had just been published by Morgenstern and von Neumann (1944), even though he had to rely only on review articles to make this judgement. In particular, he notes that the game-theoretic approach, which adds generality, rigour and elegance in the analysis of the oligopoly problem, comes at a cost in terms of concreteness and the ability to analyse complex dynamic relationships. The development of game theory as a framework for analysing price behaviour has been impressive and has extended the early static analysis to more complex dynamic relationships. However, Rothschild (1993: 156-7) notes that while 'game theory represents a consistent and sophisticated "paradigm" to study "rational" strategic behaviour, we must also see that this has been achieved at a cost.' The cost includes having to 'work at very high levels of abstraction and on a number of very simplified assumptions, such as very specific attitudes towards risk, high degrees of information regarding the structure of games and strategies, etc.' (*ibid*). He then proceeds to use an example to illustrate that 'the possibilities and opportunities (and weaknesses) of the "open" approach become visible' (*ibid*: 158).

2 These other influences are not simply random shocks that have no systematic impact on the average outcome, as in neoclassical theory. Rather, they impact on the outcome in a systematic way, but only under special circumstances that must be considered in more detailed analysis on a case-by-case basis.

3 See, for example, the application to the analysis of inflation in Beckerman and Jenkinson (1986).

4 In Rothschild (1972) prices rise by a fixed proportion of unit costs plus a percentage that depends on the phase of the business cycle, which results in a percentage profit margin that varies over the business cycle. However, the analysis roughly captures the spirit of cost-plus pricing rules.

5 The Italian original of 1956 is exposited in Modigliani (1958).

6 Mueller (1986) provides detailed evidence on the extent of persistence of profits and Warning (1996) summarises the literature on factors affecting profit persistence across industries.

7 See Bhattacharya and Bloch (2000) for some estimates for a cross-section of Australian manufacturing industries and for a review of earlier studies on the speed of adjustment.

8 For example, using data for 46 major product innovations, Agarwal and Gort (2001) find that the average duration between the commercial introduction of a new product and its imitation by competitors declined from 33 years at the beginning of the century to 3.4 years for the two decades from 1967 to 1986.

References

Agarwal, R. and Michael, G. 2001. 'First-mover advantage and the speed of competitive entry', *Journal of Law and Economics* 161 (44): 1887-1986.

Bain, J.S. 1956. *Barriers to New Competition*. Cambridge: Harvard University Press.

Baumol, W.J., Panzar, J.C. and Willig, R.D. 1982. *Contestable Markets and the Theory of Industry Structure*. San Diego: Harcourt Brace Jovanovich.

Beckerman, W. and Jenkinson, T. 1986. 'What stopped the inflation? Unemployment or commodity prices?', *Economic Journal* 96 (March): 39-54.

Bhattacharya, M. and Bloch, H. 2000. 'The dynamics of industrial concentration in Australian manufacturing', *International Journal of Industrial Organization* 18 (8), December: 1181-99.

Bloch, H.B., Eaton, C. and Rothschild, R. 2013. *Does Market Size Matter? A Dynamic Model of Market Structure, Featuring Costs of Creating and Maintaining a Market Position and Free Entry and Exit of Firms*. CRAE Working Paper 04072013, Curtin University, Perth, Australia.

Bloch, H. and Metcalfe, S. 2011. 'Complexity in the theory of the developing firm', in C. Antonelli (ed.), *Handbook on the Economic Complexity of Technological Change*, Cheltenham, UK: Edward Elgar.

Caves, R.E. and Porter, M. 1977. 'From entry barriers to mobility barriers', *Quarterly Journal of Economics* 91 (2): 241-62.

Caves, R.E. and Uekusa, M. 1976. *Industrial Organization in Japan*. Washington, DC: Brookings Institution.

Chamberlin, E.H. 1933. *The Theory of Monopolistic Competition*. Cambridge, MA: Harvard University Press.

Chandler, A.D. 1990. *Scale and Scope: The Dynamics of Industrial Capitalism*. Cambridge, MA: Harvard University Press.

Coase, R.A. 1937. 'The nature of the firm', *Economica* (*NS*) 4: 386-405.

Dixit, A. 1979. 'A model of duopoly suggesting a theory of entry barriers', *Bell Journal of Economics* 10 (1): 20-32.

Dixit, A. 1980. 'The role of investment in entry-deterrence', *Economic Journal* 90 (March): 95-106.

Galbraith, J.K. 1991. 'Economics in the century ahead', *Economic Journal* 101 (January): 41-6.

Hall, R.L. and Hitch, C.J. 1939. 'Price theory and business behaviour', *Oxford Economic Papers* 2 (May): 12-45.

Harcourt, G.C. 2012. *The Making of a Post-Keynesian Economist: Cambridge Harvest*. Basingstoke: Palgrave Macmillan.

Harcourt, G.C. and Nolan, P.H. 2012 [2009]. 'Price theory and multinational oligopoly: Kurt Rothschild and Stephen Hymer revisited (2009)', in G.C. Harcourt, *On Skidelsky's Keynes and Other Essays*, Basingstoke: Palgrave Macmillan: 156-78.

Kalecki, M. 1971. *Selected Essays in the Dynamics of Capitalist Economies*. Cambridge: Cambridge University Press.

Keynes, J.M. 1936. *The General Theory of Employment, Interest and Money*. London: Macmillan.

King, J.E. 2011. 'Remembering Kurt Rothschild', Paper prepared for 'Economics as a Multi-Paradigmatic Science: Conference in Honour of Kurt Rothschild (1914–2010)', Vienna, 1-2 December.

Lee, F.S. 1998. *Post Keynesian Pricing Theory*. Cambridge: Cambridge University Press.

Milgrom, P. and Roberts, J. 1982. 'Limit pricing and entry under incomplete information: an equilibrium analysis', *Econometrica* 50 (March): 443-59.

Modigliani, F. 1958. 'New developments on the oligopoly front', *Journal of Political Economy* 66 (June): 215-32.

Morgenstern, O. and von Neumann, J. 1944. *The Theory of Games and Economic Behavior*. Princeton, NJ: Princeton University Press.

Mueller, D.C. 1986. *Profits in the Long Run*. Cambridge: Cambridge University Press.

Nelson, R.R. and Winter, S.G. 1982. *An Evolutionary Theory of Economic Change*. Cambridge, MA: Harvard University Press.

Penrose, E.T. 1959. *The Theory of the Growth of the Firm*. Oxford: Basil Blackwell.

Reid, G.C. 1981. *The Kinked Demand Curve Analysis of Oligopoly*. Edinburgh: Edinburgh University Press.

Robinson, J. 1933. *The Economics of Imperfect Competition*. London: Macmillan.

Robinson, W.T. and Chiang, J. 1996. 'Are Sutton's predictions robust?: Empirical insights into advertising, R&D, and concentration', *Journal of Industrial Economics* 64 (4): 389–408.

Rothschild, K.W. 1947. 'Price theory and oligopoly', *Economic Journal* 57 (September): 299-320.

Rothschild, K.W. 1972. 'Stagflation and intensified inflation. A primitive hypothesis', *Economic Journal* 82 (December): 1383-7.

Rothschild, K.W. 1993. 'Oligopoly: Walking the Sylos path', in S. Biasco, A. Roncaglia and M. Salvati (eds), *Market and Institutions in Economic Development*. New York: St. Martin's Press: 155-71.

Rothschild, K.W. 2002. 'The absence of power in contemporary economic theory', *Journal of Socio-economics* 31 (5): 433-43.

Rothschild, K.W. 2005. 'New worlds – new approaches: A note on future research strategies', *Kyklos* 58 (3): 439-47.

Spence, M.A. 1977. 'Entry, capacity, investment, and oligopolistic pricing', *Bell Journal of Economics* 8 (2): 534-44.

Stigler, G.J. and Kindahl, J.K. 1970. *The Behavior of Industrial Prices*. New York: National Bureau of Economic Research.

Sutton, J. 1991. *Sunk Costs and Market Structure: Price Competition, Advertising and the Evolution of Concentration*. Cambridge, MA: MIT Press.

Sutton, J. 1998. *Technology and Market Structure: Theory and History*. Cambridge, MA: MIT Press.

Sweezy, P. 1939. 'Demand under conditions of oligopoly', *Journal of Political Economy* 47 (August): 568-73.

Sylos-Labini, P. 1969. *Oligopoly and Technical Progress*, Cambridge, MA; Harvard University Press (English version of the Italian original, *Oiligopolio e Progresso Tecnico*, Milano: Guffré, 1956).

Sylos-Labini, P. 1979. 'Prices and income distribution in manufacturing industry', *Journal of Post Keynesian Economics* 2 (3): 3-25.

Sylos-Labini, P. 1987. 'Oligopoly', in J. Eatwell, M. Milgate and P. Newman (eds), *The New Palgrave: A Dictionary of Economics*, Cambridge: Macmillan.

Teece, D.J. 1993. 'The dynamics of industrial capitalism: Perspectives on Alfred Chandler's *Scale and Scope*', *Journal of Economic Literature* 31 (March): 199-225.

Teece, D.J, Rumelt, R., Dosi, G. and Winter, S. 1994. 'Understanding corporate coherence: Theory and evidence', *Journal of Economic Behavior and Organization* 23 (1), 1-30.

Warning, G.F. 1996. 'Industry differences in the persistence of firm-specific returns', *American Economic Review* 86 (5): 1253-65.