PETER NEARY

James Peter Neary

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elected Fellow of the British Academy 2008

by

PATRICK HONOHAN

CORMAC Ó GRÁDA

Summary. Peter Neary, a master of the understanding of international trade, and an international leader in the organisation of the economics profession, is generally regarded as the greatest Irish economist of modern times. Known for the elegant rigour and precision with which he presented the arguments and evidence in his research papers, he devised modelling tools that can be used to think clearly about how the economy responds to shocks and policy initiatives, especially in an economy open to foreign trade and investment and even in the presence of oligopolistic multi-product firms.

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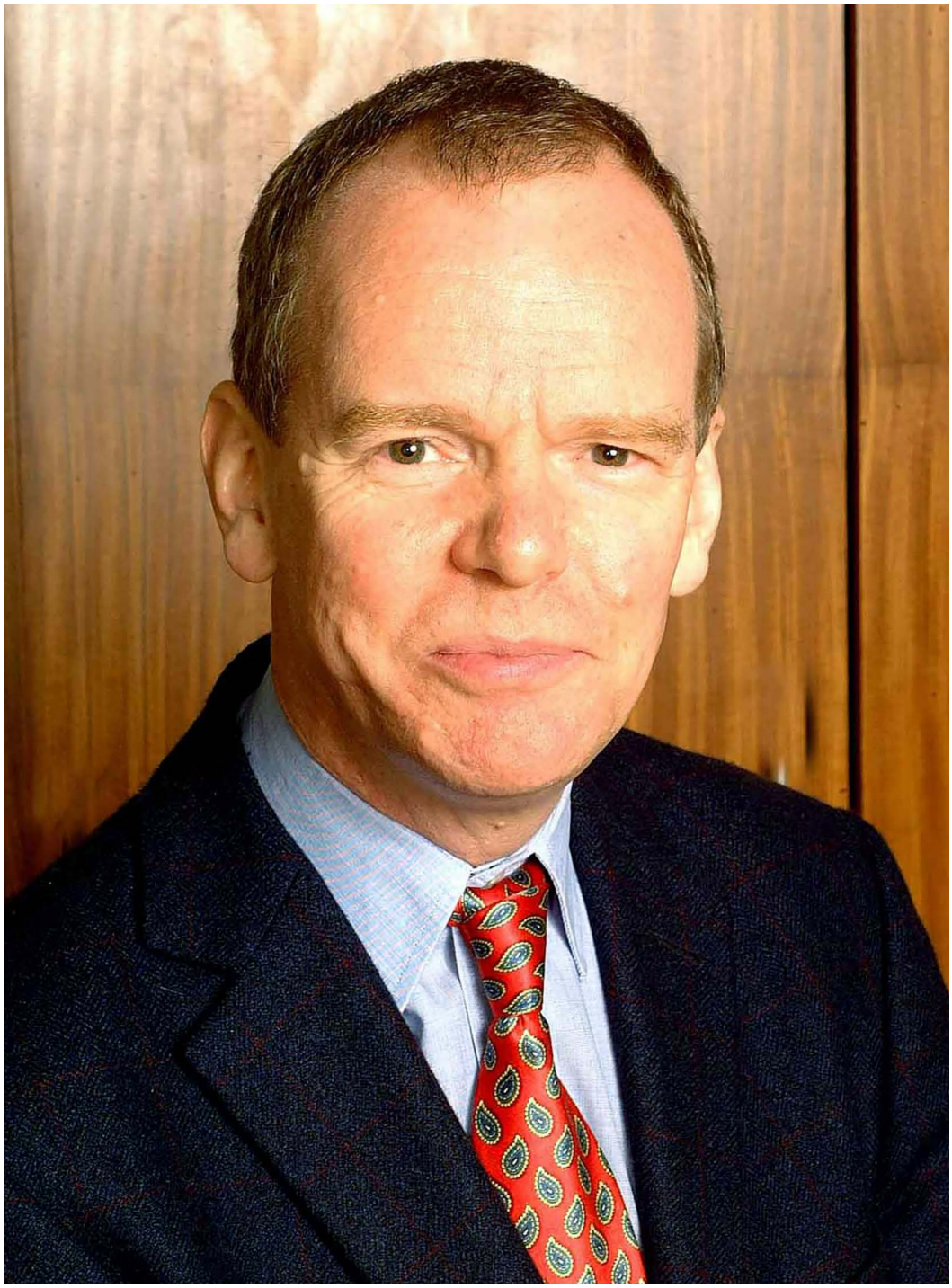

Peter Neary, a master of the understanding of international trade, and an international leader in the organisation of the economics profession, is generally regarded as the greatest Irish economist since Francis Ysidro Edgeworth FBA (1845–1926).

Born James Peter Neary in Drogheda on the east coast of Ireland, he was the eldest son of Peter Neary, a successful and popular general medical practitioner, and his wife Anne (née Loughran). He was a quiet child who collected Dinky cars, built Airfix planes, and turned a shed in the back garden into an imaginary palace for himself, which he named Petrogradia. He read voraciously from an early age, pencilling in notes and comments in the margins as he got older. He was close to both parents, enjoyed accompanying his father on his house calls around Drogheda and became an expert on the local by-roads. He remembered fondly his first two years of secondary schooling in the Christian Brothers School in Drogheda where he was a diligent student.

In September 1963, he moved to Clongowes Wood College in Co. Kildare, a Jesuit boarding school dating back to 1814 and run with quasi military regimentation, where he nevertheless thrived, embracing the opportunities offered: academic, cultural, social and even sporting – though his sporting performance was not noted for athleticism.

Remembered as warm, unassuming, gentle and humorous, he threw himself wholeheartedly into the school's cultural and social activities, becoming for example secretary of both the school Debating and Current Affairs Societies. 'We were quite a clever group', one of his schoolmates recalled, 'so he didn't stand out above all others. He quietly excelled. He had a rocky inner resolve that couldn't be budged, even by bullying teachers. I remember a spat with one of the fiercest where JP – as he was always called – simply did not back down.' Keen also at that time (though not later) on religious affairs, he was made 'Prefect of the Sodality' at the school. He was also selected as a Final Year School Prefect, reflecting both his popularity with peers and the regard in which he was held by the school authorities.

In his final year at Clongowes, Peter was prizewinner not only in Mathematics (he had taken to the 'New Maths' with gusto), but also in Latin, Irish, French and History. A substantial essay on the Spanish Civil War, prepared for 'The Academy' – the school's elite literary society – is remembered. These successes at school reflected not only his intellectual ability, but also an ethic of extremely hard work, which he retained throughout his subsequent career.

In 1967, after Clongowes, Peter won a coveted Entrance Scholarship to University College Dublin, where he studied Economics, Politics and Statistics. In UCD, then located in Dublin's city centre, he stood out among a very bright cohort studying economics at a time when change was already afoot in the traditionally sleepy Department of Political Economy. Just at that time, some inspirational younger lecturers were exposing undergraduates to previously unheard of concepts such as inside money, linear programming, CES production functions, and IS/LM modelling. Academic standards

may have been more lax than a decade or two later, but student enthusiasm was reflected in a very active Economics Society, where Peter was a regular participant. The Society minutes jocosely refer to Peter illustrating a point with his 'weird and wonderful curves' – an early foretaste of his talent for graphical representation. Peter thrived in this atmosphere and again made some lifelong friends. A fellow student who often sat beside him at lectures still remembers his notes, done in real time, as 'a work of art in red, green, blue and black biro and pencil'. At exam time the academic cream reached the top.

While in UCD Peter was elected a member of the Student Representative Council. That led to his involvement in the gentler side of UCD's 'Gentle Revolution' of 1969, and to his choice as chair at a mass meeting of students in the Great Hall (now the National Concert Hall) in February of that year, at which the college authorities sat and listened to student grievances. The main focus was less on world revolution than on how the transfer of the UCD campus to a new poorly-equipped suburban site at Belfield would be managed. Hilariously, Peter had forgotten to announce to his audience that the college representatives would be leaving at 10 p.m. and when they duly did so, their departure was misread as a walk-out, whereupon some of the more radical students (though not Peter) occupied parts of the campus administration offices.

After graduating with first class honours from UCD, Peter worked for two years as a research assistant at Dublin's Economic and Social Research Institute, where, in addition to studying part-time for an MA at his alma mater, his main remit was to contribute to the Institute's Quarterly Review of the Irish economy. Then as now, the ESRI provided a rite of passage for Ireland's best undergraduates in economics, often before they headed off to graduate programmes in top universities in the UK and USA. While at the ESRI Peter also produced *RegrEcon* (Neary 1972), a card-based econometrics package written in Fortran that would remain the main workhorse of Irish econometricians for several years. At the time University of British Columbia econometrician Ken White, creator of the highly successful *Shazam* package, expressed bemusement that Dublin was the only European city with active researchers that had not purchased his regression programme – they were all using *RegrEcon*! On being congratulated on *RegrEcon* by Kenneth Whitaker, head of the Irish civil service and later governor of the Central Bank of Ireland, Peter quipped that 'only afterwards did I think to say that I never intended to rival Whitaker's own programme', meaning Whitaker's famous Programme for Economic Expansion (1959–63), Ireland's first experiment in economic planning. Indeed, Peter's first refereed papers (Neary 1972; 1973) were in econometrics, and those who knew him before he left Dublin would have predicted that his future career lay in econometrics rather than in trade theory. His time at the ESRI also led to a substantial econometric analysis of the Irish postal service (Neary 1975), which concluded that the only choices facing the postal authorities at the time were 'either regular increases in postal charges at a faster rate than increases in general prices, or a gradual running down of the service'

– an early case study of what would come to be known as 'Baumol's disease' (Baumol & Bowen 1966).

After a productive stay at the ESRI, where he published several co-authored papers on the state of the economy, Peter worked in Trinity College Dublin as a junior lecturer (1972–4). The ESRI had established a programme of research fellowships to enable the most promising Irish economics and social science graduates to pursue postgraduate studies abroad. Peter was duly awarded one and, in the Autumn of 1974, with his wife, fellow-economist Frances Ruane, headed to Nuffield College, Oxford, where he spent the next four years. At Nuffield his mentors included James Mirrlees, Max Corden, Christopher Bliss, Nicholas Stern, and (from 1976) Joseph Stiglitz. His performance in the BPhil (1976) led to a Heyworth Research Fellowship for the final two years of his doctoral studies.

With the Oxford DPhil under his belt, Peter returned in 1978 to Trinity College Dublin as a lecturer in Economics. But then, in 1980, before his thirtieth birthday, he was appointed to a full professorship at University College Dublin. It was a defining moment both for Peter and for UCD. Though already an academic star, some of his colleagues took to referring to him jocosely (although not to his face!) as 'the boy professor', but they soon recognised him as also an effective and determined administrator. He regarded his title, 'Professor of Political Economy' as archaic and not evoking the modernising and mathematical approach to which he was committed.

Together with his colleague and friend the late Brendan Walsh, who was appointed Professor of National Economics at the same time, Peter transformed teaching and research at UCD, and set a standard which other Irish universities sought to emulate. Together, Neary and Walsh enriched academic life in UCD. Hiring seminars, workshops, working papers, a taught master's programme, and rewards for research became the order of the day.

Peter proved to be a superb and inspirational teacher and a conscientious and supportive research supervisor. His introductory lectures to first-year students in UCD's Theatre L, using index cards containing meticulously prepared multi-coloured notes, were standouts; and masters' students in the 1980s were privileged to have him as their macro lecturer at a time when the neoclassical synthesis was being replaced by the new Keynesian disequilibrium models which Peter had helped to build and the New Classical models based on price clearing and rational expectations. A colleague described Peter's teaching as 'tour de force courses which covered an incredible amount of material in a short time, yet without sacrificing depth'.

As a reformer of university life Peter was passionate and driven. He could be judgemental and not all his opinions and decisions pleased everyone. One colleague likened him to the great Irish footballer, Roy Keane: you might not join him in the bar, but you certainly wanted him on your team. But Peter was also fair and considerate, and

nobody held grudges for long. During his 26 years in what is now UCD's School of Economics, Peter helped transform it from an inbred male-dominated institution to a well-known cosmopolitan centre of teaching and research. As head of the UCD School of Economics for much of that time – a role he rotated with Brendan Walsh – Peter led by example, combining magnificent teaching, hands-on management, and a prolific publication record.

As an economic theorist who steered clear of the media, Peter Neary never became a household name in Ireland, but in academia and among the economics confraternity he was highly respected – indeed, a revered superstar. He served as president of the Irish Economic Association in 1990–2. The Royal Irish Academy elected him a member in 1997 and awarded him its first Gold Medal in the Social Sciences in 2006. No wonder Dublin was sorry to lose him to Oxford in 2006 after an innings of twenty-six years on UCD's Belfield campus. (Poignantly, at a virtual Covid event on the day of his death, the National University of Ireland conferred on him an honorary doctorate in economics in absentia.)

Peter's time in Oxford (2006–2020) as a Professor of Economics and a Fellow of Merton College was productive and rewarding. The move, followed a year later by that of Tony Venables, made Oxford the premier centre in Europe for trade research and a great attraction for a very active and lively group of younger researchers. Peter also played a very active role in both departmental life and college life. After trade seminars he loved nothing more than to take speakers to dinner at Merton College, followed by lively and convivial evening discussions on trade theory and much else. While at Oxford, Peter deepened his involvement in the leadership of the Economics profession in both Britain and more widely in Europe. He served the broader economics profession well, taking on important responsibilities in teaching, in administration and in promoting the profession.

Already, when the Centre for Economic Policy Research (CEPR) was founded in 1983, based in London but with a European scope, Director Richard Portes had chosen Peter to be inaugural director of the CEPR's International Trade programme. It was an inspired choice. Peter later became the driving force behind the CEPR-funded European Research Workshops in International Trade (ERWIT), held annually from 1995. His intellectual curiosity and sociability were perfectly suited to the relaxed atmosphere encouraged by ERWIT, where participation has been a launching pad for scores of young trade economists. Peter's legendary dinner speeches at ERWIT, full of wit and vitality and charm, were a regular feature for several years.

Peter was among the group of young economists who came together in the mid–1980s determined to create a European Economic Association, filling a gap in the European profession comparable to that which had long been filled in the United States by the American Economic Association founded a century earlier. He was a member of

the three-person nominating committee which proposed Jacques Drèze as first President of the new Association in 1985. By 2002 he was himself President, in which role he was mainly responsible for launching the association's own *Journal of the European Economic Association*, a step which entailed sundering the association's links with the Elsevier-owned *European Economic Review* (which he had edited for several years) (Tirole *et al*. 2003). This involved a tense day-long set-to in Dublin between Peter and a representative of Elsevier, with Peter giving no quarter.

He was also President of the International Economics and Finance Society in 1999–2000; president of the Economics Section of the British Association for the Advancement of Science in 2005; and president of the Royal Economics Society in 2018–19. He was elected a fellow of the Econometric Society in 1987.

Peter held editorial positions with eight different journals between 1980 and 2011. He was a 'go-to' person as external adviser on senior academic appointments, and his reputation for being sound and sensible carried weight with vice-chancellors.

Peter had carefully thought-through views on how to define and evaluate top-class research. He was a strong believer in a form of research evaluation that focused on outputs, and not on funding (which Peter believed was only weakly correlated with research excellence) or the institutional research environment (memorably likening the latter to awarding Olympic medals for the quality of sports facilities). He served as chair of the economics sub-panel of the UK Research Excellence Framework (REF) in 2010–14.

The approach to research

Perhaps what most impressed his professional colleagues was the elegant rigour and precision with which Peter presented the arguments and evidence in his research papers. The topics he covered were broad. But, despite the wide variety of influential theoretical and applied scholarly publications produced by Peter in his work over half a century, there are unifying themes in both in the topics studied and the methodological approach.

Peter would time and again be drawn to questions relating to the determinants of the flow of goods and investments within and between countries in a market economy, to the prices that were determined in those markets, and to the actual and potential impact on economic welfare of government measures that seek to influence the flows. This suite of questions had long pre-occupied leading economists, though it had been challenging to move beyond the assumptions of equilibrium in friction-less perfect competition, flexible prices and homogeneity of capital goods across sectors. Clearly the real world deviates in important ways from those assumptions, and is often in the process of moving from one equilibrium towards another, without having reached that destination. Peter

found ways of crisply and convincingly analysing the complexities introduced by these real-world deviations.

One by one, he addressed the impact of considerations such as the concentration of market power in large firms, increases and reductions in barriers to trade, quotas and rationing associated with fixed or rigid prices, sector-specificity of capital (the fact that many important capital goods cannot easily be adapted to work in sectors for which they have not been designed), and the impact on the rest of the economy of sudden shifts in the profitability of an important sector (such as the petroleum industry). In each case, he was able to distil the essential features of the distortion being analysed into a tractable mathematical model, potentially quantifiable. Analysis of these models revealed the mechanisms that are at work with a precision that had eluded the informal verbal reasoning that had hitherto predominated in discussion of these important issues.

When we consider how much of subsequent national economic policy discussions and debates have centred on the likely impact of tariffs, on the rise of dominant multinational corporations and on the role of industrial policy, the prescience of Peter's choice of topics to elucidate is beyond question.

The conventional economic approach to modelling business or household behaviour, focusing heavily on the relationship between prices and quantities, whether this relates to cost of production, or to sales and purchases, generally requires assumptions to be made about the cost, profit or utility functions that link prices and quantities in this way. A signature characteristic of Peter's work was his ability both to select and to manipulate the most useful and relevant mathematical functional forms for the problem at hand.

By his skilful choice of specific mathematical functional forms that both effectively captured the essence of the problem at hand and were tractable in analysis, Peter presented the profession with tools that could be used to develop further theoretical insights, and used to construct invaluable data sets which could be used to quantify practical policy questions either directly or in econometric or statistical analyses.

The early papers

It was in his student days in Oxford that Peter quickly discovered how good he could be; he was competitive, so from the outset he aimed for the top. Four chapters of his dissertation, 'Factor-Market Disequilibrium in Neoclassical and Neo-Keynesian Models', were quickly published in top journals and established him as a leading economic theorist and set the pattern for a lifetime of research. Although his preferred habitat was already trade theory, these dissertation chapters, and a handful of co-authored papers which quickly followed, illustrated the range of his interests from micro to macro, and the ease

with which he was able to encapsulate – in a pragmatic manner – an important and hitherto neglected real-world feature into widely used paradigmatic models.

The most striking output from this massive flowering of work from his student days at Oxford is his 1982 *Economic Journal* paper with Max Corden – a true classic which continued to be cited more than 250 times a year four decades after publication. It presented a way of analysing why and how a sectoral boom caused by, say, an oil discovery could divert labour from other sectors and result in deindustrialisation, such as had happened in the aftermath of the discovery in 1959 of a major natural gas field in the Netherlands (whence 'the Dutch disease'). The paper changed how people think about resource windfalls and how to avoid their potential downsides.

As the authors noted at the time, the model they proposed could equally be applied to booms resulting from factors other than resource discoveries, including a sectoral change in world prices. Indeed, although it was the discovery of North Sea Oil that motivated their study, Corden and Neary were careful to remind the reader that the use of exhaustible resources also entailed long-term policy questions which their model was not designed to address. With appropriate modifications, the model could be used to consider purely domestic sectoral booms such as the construction boom in China in recent years.

The modelling device used in the paper is to postulate an open trading national economy in which there are three sectors: two of them, thought of as a manufacturing sector and an energy sector, sell their output in a competitive world market; the third sector produces non-traded services (i.e. sold only on the domestic market). A boom in the energy sector could suck resources from the other two sectors, and would also increase spending on services. Whether employment in services would increase or fall would depend on the relative strength of these two effects: resource movement and spending. These in turn would depend on such parameters as relative factor intensities (as between capital and labour) and the elasticities of demand.

The essential features are already present if each sector depends on a specific type of capital. The specific-factors model is an ideal framework for analysing a situation in which the profitability of one sector is squeezed by a boom in other traded goods sectors. But the paper also assesses what will happen if capital can be reallocated freely between sectors.

As well as addressing a matter of considerable public policy interest then as now, the booming sector paper illustrates distinctive characteristics of Peter's work. First, three full pages are devoted to a non-technical summary which made the main arguments transparent even to readers unequipped or reluctant to follow the details of the argument that was to follow: this characteristic helped make Peter's work highly relevant for public servants and policy analysts. Second, the main argument is presented by means of a combination of verbal reasoning and graphical analysis. As was to be the case in much

of his future work throughout his career, geometric graphs help the reader to follow the verbal argument and provide at a glance a succinct summary of the reasoning. In this case, the full argument can be presented without the use of algebra, because the chosen model is locally linear. Nevertheless, an algebraic treatment is included as a six-page Appendix, ensuring that the reasoning can be tested for rigour and consistency and providing precise formulae relating the various parameters (demand and supply elasticities, factor intensities) to the predictions about output and employment in the different sectors.

Two papers from his PhD dissertation resolved long-standing puzzles in the theory of international trade. One of them (Neary 1978b) addressed a literature highlighting paradoxical ways in which distortions to commodity and factor markets might impact trade patterns. Worryingly for those who believed in the welfare implications of standard trade theory, that literature had been generating some unorthodox predictions about when the presence of distortions might make free trade worse in welfare terms than autarky and, more generally, had called into question some of the core propositions of standard trade models. For example, some authors had highlighted conditions under which a subsidy to a particular sector would lead to a fall in the output of that sector. Neary showed that the paradoxes which had caused such consternation among trade theorists can be dismissed by invoking standard stability of equilibrium arguments. As he put it, 'the paradoxes will almost never be observed in real world economies'. Indeed, economic forces would tend to drive the economy away from the configurations required for the paradoxes to occur.

Exploring out-of-equilibrium dynamics was also the underlying focus in his 1978 *Economic Journal* paper (Neary 1978a) which built a bridge between the two predominant models of international trade, the Heckscher-Ohlin-Samuelson equilibrium model (which assumed that capital could move smoothly from one sector to another) and that of Harrod and Marshall (which assumed a fixed international distribution of sector-specific capital). He observed that, although labour might move easily from one sector to another in response to a disturbance, in the real world 'in the short run capital goods are not mobile, while in the medium and long runs their total stock is not fixed'. But how to analyse the complexities generated by this middle ground between immobility and change? Peter found a neat way to analyse the process of sectoral adaptation to shocks, exploiting the role of capital rental differentials in driving longer term inter-sectoral capital flows. The stickiness of capital helped explain, for example, why workers in a labour-intensive sector may have an incentive to press for higher wages, even though that action might lower all wages in the longer run. The expositional insights of this early paper have found their way into most textbooks on international trade.

Following the major economic dislocation in the world economy that followed the oil price crisis of the early 1970s, economists who wished to be relevant faced the

challenge of analysing hitherto understudied situations of involuntary unemployment and rationing. In a tribute paid to Peter shortly before his death, Nobel laureate Joseph Stiglitz highlighted his early contributions to macroeconomics, both in the doctoral thesis and publications arising out of it, noting in particular how their stress on factor immobility influenced later research in macroeconomics. Stiglitz had in mind not only some of his own work with Peter in the late 1970s but also Peter's 1980 *European Economic Review* paper with fellow student Kevin Roberts. The latter paper in particular developed a powerful method of applying the standard theory of consumer demand to the decisions of a rationed household. They showed that this behaviour could be modelled as if the household were unconstrained but facing a virtual set of prices that captured the impact of the ration. Using this insight, they were able to describe how the demand response for unrationed goods to a change in the ration could be broken down into an income and a substitution effect, and how standard concepts of substitution and complementarity between different goods carried over into the case of rationing. In his tribute, Stiglitz highlighted the analysis of how macroeconomic externalities in the presence of rigidities lead to situations where invisible hand theorems do not hold and where, therefore, there is a role for macroeconomic policy. Stiglitz ended his tribute by noting that macroeconomics' loss was trade theory's gain.

While Peter's research continued to focus on issues related to international trade and competition, the complexity of the topics studied deepened. Three broad areas can be highlighted: (i) oligopoly, including the required role of national industrial policy; (ii) international comparisons of real income and (iii) measuring policies of trade restriction. Some examples of his most significant contributions in each area illustrate the range and depth of his analysis.

Oligopoly

The assumption, implicit or explicit, of perfect competition is often relied upon to obtain a first approximation in describing some aspects of economic behaviour. But the modern economy is a place of imperfect competition, and understanding the implications of this began to feature largely in Peter's work from the early 1980s. Some of this work was with his doctoral students. For example, his enduring collaboration with Dermot Leahy focused first on contributions to the industrial organisation literature on research and development (R&D). Their 1997 *American Economic Review* paper, 'Public Policy Towards R&D in Oligopolistic Industries', examined the principles that should govern public intervention in R&D-intensive industries under different assumptions about firms' strategic behaviour and R&D co-operation. Subsequent work with Leahy explored the implications for strategic trade and industrial policy of allowing firms to have longer-run

commitment power than governments. This led to two important papers (Leahy & Neary 1999; 2000). In these, it is shown that firms' superior long-run commitment power can incentivise them to affect future subsidies from governments by, for instance, engaging in socially wasteful overinvestment.

Not only do many of the large firms that dominate much of international trade operate in an imperfectly competitive or oligopolistic market, but they also typically produce many different products. Globalisation affects both the range and the scale of production carried out by such firms. Some of Peter's work on oligopolistic firms focused specifically on the decisions made by such multi-product firms in the international environment. As an example, let us look at an influential paper with Carsten Eckel (Eckel & Neary 2010). Drawing on the modelling and findings of scholars that had studied multi-product firms in a closed economy, that paper focuses on the way in which access to foreign markets influences the degree to which, even while they increase overall production, such firms may choose to reduce their product range, as they shift production facilities from less profitable lines in order to boost production of their core products – those in which they are particularly cost-effective. With a large number of countries trading an infinite number of differentiated products, the mathematical complexities can be mastered only with a suitable choice of functional form of consumer preferences and production possibilities. In this case, a quadratic function over the continuum of differentiated products is both sufficiently flexible and sufficiently tractable to reveal how this process works.

It is assumed that each firm has a core product for which marginal production cost is lowest, but also that it can add product varieties, albeit with progressively higher marginal costs for each added variety. The firm's production decisions will take account of the fact that adding a variety will tend to reduce demand for all varieties, cannibalising its profits in a way that would not occur for a single-product oligopolistic firm (always assumed to behave in the Cournot manner).

In this set-up, globalisation is modelled as the arrival of additional countries into the marketplace. The new equilibrium established by these firms may entail the exit of some incumbent firms, but total output and productivity will rise. Among other findings from the analysis, two striking results are proved. First, in response to the additional competition, firms, while increasing their total output, choose to prune their product lines thereby becoming 'leaner and meaner', focusing on their core competencies. Second – more surprising, and in contradiction to theory based on a world of single product firms – the range of products available in the globalised world may be smaller: this will depend on the flexibility of the production process, and on whether wages rise or fall in response to the globalisation.

Comparing real incomes across countries

The index numbers used to measure average output and average productivity in the multi-product firm papers had been at the centre of an important contribution made by Peter in 2004 to the eminently practical question of comparing living standards across countries. When the average resident of one country consumes a very different bundle of goods to that of another country, and when the prices at which these goods are bought differ between the two countries, how are we to make cross-country comparisons of the relative position in terms of average purchasing power in the two countries? Comparing total expenditure will not do, because of the different price structures. One approach is to use the prices of a single reference country, but which one? As Gerschenkron had observed decades before, the more a country's price structure differed from the reference prices, the more this approach would tend to exaggerate its real income. This problem could be eased (as suggested by Éltető, Köves and Szulc [EKS] in an unpublished paper and as used in the official measures of the OECD and the European Union) by calculating relativities based on each country in turn and taking the average of the results. An alternative proposed by Irish statistician R.C. Geary, and used in the Penn World Tables, is to choose reference prices (and exchange rates) by the criterion that world expenditure on each good is the same if calculated at actual prices or at these reference prices (and likewise for each country's total expenditure). Neither of these averaging approaches is based on household preferences or utility, and as such each can seem arbitrary.

Wishing to anchor the problem in the conventional economic theory of demand, in which each consumer is assumed to maximise utility subject to budget constraints, Peter's 'GAIA' ('Geary-Allen International Accounts') approach was to devise a new set of reference prices consistent with the true utility theory-based cost of living index. In practice that does require the statistician to have an estimate of the utility function (assumed to be the same for all countries), and Peter showed how to go from there to constructing the GAIA reference prices in a manner quite similar to Geary's approach, but replacing actual consumption by the consumption that would occur at the reference prices.

Does all this matter? Peter shows that it does. He estimated the relevant parameters of the utility function on actual world data (using a functional form known as QUAIDS, and attributed to Banks *et al*. [1997]). This allowed him to compute measures of real income at 1980 for some 60 countries, using both the established methods and GAIA. The differences were profound: the GAIA measure indicated that cross-country inequality was much worse than the other measures implied. For example, the GAIA method produced an average real income for the UK 36 times that of the poorest country in the collection (Ethiopia), much more than the ratios produced by either the EKS method (25) or the Geary method (22).

Peter continued to work on the practical measurement of real incomes, notably applying his GAIA approach (in Feenstra *et al.* 2013) to understanding an important empirical debate which had broken out about the measurement of the real income of China and India. Just how poor were these countries compared to the advanced industrial economies? Different approaches gave widely different answers among which Peter and his co-authors helped guide choices.

Measuring trade restrictiveness

Before the work of Anderson & Neary (1994; 2005; 2016), the standard way of measuring trade restrictiveness was to calculate a trade-weighted average tariff. Notoriously, such a measure suffered from the double limitation of giving a low weight to high tariffs and excluding quota restrictions. The elegant Anderson-Neary measures of trade restrictiveness (TRIs) were not only based on coherent theoretical underpinnings, but were also designed to provide a useful practical way of combining tariffs and quotas on a commensurate basis. Although 'fairly complicated and computationally challenging' (Bown & Irwin 2017), Anderson and Neary's indexes have been employed by several economic historians, and they also provide valuable perspectives on current issues such as trade negotiations and the impact of diverse trade policies on economic wellbeing.

Historical case studies highlight the power of Anderson-Neary TRIs. A study of US trade policy over the century starting about 1860 (Irwin 2010) contrasts the outcomes produced by TRI and an imported-weighted average tariff (AWT) measure of trade policy. It shows that the latter underestimated restrictiveness by a wide margin, while the deadweight losses from protection dropped markedly over the period, due largely to the declining tariff rates and the rising share of imports allowed in duty-free. A study of Canadian protectionism before the First World War (Beaulieu & Cherniwchan 2014) suggests that trade policy as proxied by TRI was much more restrictive than generally believed, but that the deadweight losses from protectionism were a good deal lower than suggested by the previous literature. Applying TRI also revises the understanding of Italian trade policy between unification and the Great Depression, with aggregate welfare losses again having been lower than previously thought. In addition, in the cases of Italy and the US the link between trade policy and economic growth is sensitive to the measure of protection used. On the basis of such findings, Federico & Vasta (2015) argue that 'a systematic re-estimating of protection in the economic history of trade policy is needed'. Still, this is a tricky area, forcing users to think more deeply about what really constitutes protection, as O'Rourke (1997) put it, uncovering a historical debate which TRI has proved unable to fully resolve.

The continuing importance of such calculations became evident to a wide audience in early 2025, when the US Administration up-ended eight decades of global co-operation on trade restrictiveness by announcing high and differentiated tariffs on trading partners based on a deeply flawed argument of 'reciprocity'. However, even though the work of Anderson & Neary showed how to make a rigorous and logically sound evaluation of trade restrictiveness, the US Administration relied on the crude and illogical assumption that restrictiveness could be measured by the bilateral trade deficit expressed as a share of each country's exports of goods to the United States.

Geometry and communication

Clarity and wit characterised Peter's communications style. Sometimes the wit could be a bit sharp as, for example, in 'Of hype and hyperbolas' (Neary 2001), his widely-cited review article of a 1999 book by Fujita, Krugman & Venables presenting a new approach to Economic Geography. Suggesting that the authors had got carried away with a breathless prose style which induced them to describe their new theory as 'a story of breathtaking scope', he bemoaned that the authors' calculations had 'degenerate[d] at times into a near-impenetrable soup' of algebra. True to form, though, despite the criticisms he had of the work under review, he rolled up his sleeves and provided a much simpler, geometric, presentation of the main insights of the new theory. What determined if an industrial sector was likely to agglomerate in one country? For example, if a new firm entered the sector in a particular country, would that lead to a progressive consolidation or agglomeration of that sector's activity in that country? The diagrammatic exposition made it clear which conditions would matter. This was yet another example of that hallmark of Peter's work which was its ingenious use of geometry as an analytical tool (e.g. Jones & Neary 1984; Neary 2004).

In time, geometry gave way to algebra, often using the device of duality, in which a problem posed in terms of the quantities being chosen by an economic agent can be more easily analysed if transformed into the prices, real or virtual, which support or induce the choice of the quantities.

Peter's research started out with the sector as the unit of analysis, but he later worked more with firms. At first his approach was mainly theoretical, but later he also worked with data. In later years he dug more deeply into the mathematical structures conventionally used by empirical researchers, leading to results of remarkable generality. A prime example is his posthumous paper with Monika Mrázová and Mathiew Parenti (2021) (see also Mrazová & Neary 2017; 2024). Here the question explored is about the relationship between frequency distributions – for example, in a model which explores how the distribution of productivity levels across firms is related to the distribution of

firm size. Can an applied econometrician exploring monopolistically competitive markets safely assume (as many do) that these two distributions are of the same mathematical form? It turns out that this will be the case only if the demand function facing the firms is of a specific functional form uncovered in the paper.

Much of what Peter wrote was complicated, but he had a gift for making it accessible, not least to policymakers. His public lectures were renowned for their lucidity. His last curriculum vitae listed over thirty plenary lectures presented between 1999 and 2019. His presidential address to the Royal Economic Society (based on joint work with Céline Carrère and Monika Mrázová) in 2019 is a good of example of Peter in top form. With the shadow of Brexit in the background, Peter, a fierce opponent, first outlined the facts of how trade is eroded by distance and, how therefore the UK economy would be hurt by Brexit, if modestly. He then theorised about the theoretical underpinnings of standard gravity models, and how some conundrums might be resolved.

Brexit was not the only hot policy topic with which Peter engaged, including in Ireland, where his voice was, naturally, one which would be heard in policymaking circles. He made important contributions both to live policy issues in Ireland and to the analysis of controversial historical episodes in Irish history.

In the run-up to Ireland's euro membership, Peter feared that Ireland was joining something that, without UK membership, was not an Optimal Currency Area. He was particularly concerned about the danger that a depreciation of sterling against the euro would be damaging when Ireland could not match the depreciation and, drawing on modern trade theory, he argued that 'standard measures of competitiveness greatly underestimate the vulnerability of national output and employment to a change in the bilateral nominal exchange rate with sterling' (Neary 2006a). With Rodney Thom (1996) he pointed out that 'Ireland is not typical of the European core and that the costs to participation in EMU may not be trivial' and wondered somewhat prophetically: 'Can we be sure that the Irish government would be seen as a premium borrower if its fiscal position were to deteriorate rapidly in the wake of a significant sterling depreciation?' Although that was not exactly what went wrong with Ireland's financial and fiscal system a decade later, his view that caution was needed was certainly well-judged.

Applying knowledge of trade theory to a key event in the history of Independent Ireland, in a paper with Cormac Ó Gráda in *Irish Historical Studies* (1991), Peter assessed the impact of the Anglo-Irish 'Economic War' of the 1930s. Carefully considering the likely welfare effects of the distortions related to the tariff war and the government's encouragement of labour intensive tillage, he concluded that the debt write-off in the eventual financial settlement of the dispute over Land Annuities may have more than compensated Ireland for the distortions. Still, that paper concludes with the 'surmise that economic policy erred less in following the world trend towards protectionism in the

1930s than in failing to follow the trend towards trade liberalisation after the second world war'.

The importance of distance in influencing the intensity of international trading relationships was never far from Peter's empirical work, and he applied gravity theory to assess the degree to which the border between the two jurisdictions on the island of Ireland represented an important empirical barrier to trade. In fact, his paper with Emla Fitzsimons and Vincent Hogan (1999) exploded the conventional view that the border between Northern Ireland and the Republic had a negative impact on trade flows. They showed that trade between the two Irelands exceeded what a standard gravity-based model would predict, estimated on bilateral manufacturing trade between twenty-eight developed economies for 1970–1992. Returning to the issue two decades later, his paper with Martina Lawless and Zuzanna Studnicka (2019), using a combination of aggregate and firm-level data, likewise found that 'Ireland exports more to Northern Ireland at both intensive and extensive margins relative to the average of all other export destinations'.

Peter was a loyal friend and a good neighbour. He was gregarious and loved parties. An out-and-out cosmopolitan, he loved to travel. He also loved to walk and to hike; indeed, he claimed that some of his best ideas came to him when he was out walking. He was witty and could be mischievous and very funny. Extremely well-read, he was invigorating company, and had opinions about practically everything except sport. In sports-mad Ireland he would sometimes steer conversations away from sport by reminding friends and colleagues that one of the things that endeared him most to Mairéad (whom he married after his first marriage ended in the early 1990s) was her total disinterest in the subject. His depiction of a gregarious Dublin economist as someone who 'raised the intellectual content and lowered the tone of every conversation' still draws laughs from those in the know. Always an avid theatre and cinema goer, perhaps the cultural highlight of his later years was the annual trip with friends to Garsington Opera in the Oxfordshire countryside. He remained close to his family – brothers John and Paul and sister Sheila. He regularly returned to Ireland to visit his mother in Drogheda, whom he adored and whom he predeceased. When on Christmas Eve 2008 a local newspaper carried the headline, 'Drogheda native in British *Who's Who* list', Peter's reaction was 'a great honour, but more importantly, my mother is delighted'. To his great amusement, the accolade led to him being included in the *Irish Independent*'s 'Who'll be hot, and who'll be not' for 2009.

Peter Neary succumbed to an incurable cancer on 16 June 2021, after putting up a brave fight for several months. He is survived by his former wife Frances Ruane and their two children, Philip and David Neary, and by his wife Mairéad Hanrahan, and their children Róisín and Eoin Hanrahan. Of him it can certainly be said *Ní bheidh a leithéid arís ann* (His like will not be seen again).

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Note on the authors: Patrick Honohan is Honorary Professor of Economics at Trinity College Dublin. Cormac Ó Gráda is Professor Emeritus of Economics at University College Dublin.

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[1] https://www.youtube.com/watch?v=YEXYdWr8LaU