

# Palle Schelde Andersen: a practical economist

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## Introduction

Palle Schelde Andersen had prodigious abilities as an economist, as an econometric practitioner and as an astute observer of economic developments. A man of modest demeanour, with a wicked sense of humour frequently aimed at the self-important, he often dominated the internal debates on macroeconomic analysis at both the OECD and the BIS. Those who worked with him know that his anonymous inputs to the unpublished and published work of both institutions were extensive. The list of his publications that appears in this book is but the tip of the iceberg.

We were close colleagues for almost 30 years. Just after completing my studies in the United States, I began working with him in the Economics Department of the OECD in 1976, first as his assistant on the US Desk and then in the General Economics Division. He left the OECD for the BIS in 1982, and was instrumental in my coming to the BIS in 1989. He was a great colleague and leader who had the capacity to stimulate, to encourage and to learn from younger economists. He would often give credit to staff for work that was really his. His kindness brightened the life of many. And how hospitable were Elsebeth and Palle, often inviting travelling economists to stay!

## 1. The University of Århus and the Nordic connection

His first academic appointment was in 1966 at the University of Århus in Denmark, where he was first an Assistant and then Associate Professor. His pedagogical skills were much appreciated by his students. The first major publication was in 1969, when he contributed to a report that estimated price and income elasticities of demand for a large number of agricultural commodities (PSA et al (1969)).

Next came an impressive book on a theoretical topic that has long exercised economists: the welfare economics of the choice between direct and indirect taxes (PSA (1971)). This was a product of a year or so in the United States, first as a Visiting Professor lecturing on public finance at Hamilton College (New York) and then as a Visiting Scholar at MIT. It was unusual at that time for a course in public finance to start squarely as he did with Ramsey's Rule: welfare losses from taxes are minimised if prices change so that the relative quantities of goods consumed are held constant. If goods are produced with labour as the sole input and all commodities are perfect substitutes in production, then an optimum tax rate must be the same for all goods. Palle showed, among other things, that this conclusion of equal tax rates for all commodities breaks down once account is taken of the fact that leisure (or indeed any other good) is not taxable: in such circumstances, the second best solution is to subject goods that are complementary to leisure to a higher rate. The demonstration of this, republished in PSA (1972), won him the David Davidson Prize in Economics.

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<sup>1</sup> I am indebted to former colleagues of Palle, some mentioned here, who made so many useful suggestions for this note. The need for brevity has forced me to omit mention of many of the colleagues and friends who played big parts in his professional life.

From 1972, he worked extensively with Svend Hylleberg on a macroeconomic model of the Danish economy. Although the project was not completed before Palle's departure for the OECD, three working papers that resulted are listed in the bibliography. At about this time, he began to explore a topic that he was to work on extensively at the OECD: the macroeconomic stabilisation properties of fiscal policy. One theoretical paper (PSA (1973a)) approached the issue of automatic stabilisation by comparing simple static and dynamic models. He showed that the conclusion from static models that higher marginal tax rates would increase the usual measures of automatic fiscal stabilisation did not necessarily extend to simple dynamic models. This was particularly the case once fiscal policy influenced, via fixed investment, the growth of the capital stock and thus potential output. A second, and related, paper on the Danish tax system (PSA (1973b)) is a model for what careful research can extract from very limited data (less than 20 observations of annual data). He measured the elasticity of tax payments with respect to GDP in Denmark and found it was much higher than in other countries. But he also found that taxes in Denmark responded with a considerable lag, which could compromise the automatic stabilising properties. He maintained his contacts with Århus over the years, being appointed in 1998, after a positive evaluation from an international panel of experts, to an Honorary Professorship.

## 2. The OECD

He joined the OECD in January 1974 as the Head of the Scandinavian Desk, in Friedrich Klau's division. He was responsible, with Niels Westerlund, for writing the OECD country surveys on Denmark, Norway and Sweden.

This period was in the middle of the first oil shock, the most significant macroeconomic disturbance since the Korean war. The coincidence of high inflation, a sharp rise in unemployment and very large budget deficits forced a radical re-examination of many well accepted beliefs about macroeconomic theory and policy. Because the international transmission of shocks was central, this period was in many ways the heyday of the Economics Department at the OECD. In those days, the forecasts published twice yearly were the most authoritative global economic projections. The OECD's evolving assessments of demand trends were keenly watched by economists everywhere.

In 1976, he was asked by Kjell Andersen to head the United States country desk. This assignment gave him a key role in the preparation of the OECD's projections; in practice, his influence on the Department was becoming even wider. He took these forecasting responsibilities very seriously. He was constantly alert to the possibility of change in well established relations embedded in macroeconomic models we used in the preparation of our forecasts. He re-tested key model relations and attempted to distil the possible implications of alternative specifications. The annexes to the OECD Country Surveys he drafted frequently contained econometric analysis to back up points made in the main text – which was rather unusual in those days! At the same time, he built up a formidable knowledge of macroeconomic data, learning a great deal about the relative strengths and weaknesses of various data. He often knew which data releases to discount.

His evident capacity not only to do economic research himself but also to encourage others made him an obvious choice for promotion to Head of the General Economics Division towards the end of 1977. Under the direction of Chris Higgins, Stephen Potter and Yves Ullmo, the general branch of the Economics Department at that time began path-breaking work on the quantification and modelling of macroeconomic relationships. Palle played a key role in much of this.

His division serviced in particular Working Parties (WP) 2 and 4 of the Economic Policy Committee. During this period, one WP essentially examined inflation and the other growth

issues. Many felt that the “old” analyses of inflation and growth no longer fitted the post-oil-shock world. Faced with this uncertainty about macroeconomic mechanisms, some academics sought comfort in simple prescriptions that self-consciously reversed the conventional macroeconomic wisdom based on the income and expenditure models of the 1950s and 1960s. Monetarism, rational expectations, new classical models and so on were all part of what can only be described as a ferment of macroeconomic theorising. Palle certainly read these theoretical papers with great interest. He always believed that simple models in economics could help clear thinking. And he was uncomfortable with a certain Keynesian complacency that afflicted many in the early 1970s.

But he was too honest and practical a man to fall into the trap of beguiling simplicity – either in research strategy or in sweeping policy prescriptions. In his research, he always tried to frame alternative hypotheses clearly; but did not delude himself into thinking that major controversies could be settled by constructing highly aggregate models or by inappropriate generalisations from simple microeconomic theory.

Larry Summers (Summers (1987)), arguing against what he termed “the scientific illusion in macroeconomics”, viewed

“pragmatic empirical research [in macroeconomics] as providing striking facts to be explained, or demonstrating the existence and magnitude of causal relationships between economic variables. It seeks evidence whenever it can and makes little pretence of estimating full-blown models [based on microeconomic optimising behaviour]. The final product of successful empirical work is a persuasive collage”.

This description fits perfectly Palle’s approach to macroeconomic analysis and research. He felt that it was essential to understand and to quantify the many mechanisms of economic processes. Typically, he sought to do this for as many countries as possible simultaneously. For Palle, an important test of the robustness of any empirical generalisation (eg based on US data) was whether it could be replicated with the data of different countries. When he noted differences across countries, he asked, “Why?”. His grasp of international economic “factuals” was legendary.

Let me cite one example of this. He believed that the actual operation of labour and product markets – which differed across countries – was key to understanding the *dynamics* of inflation. It was needed to analyse not only changes in fundamental macroeconomic determinants, but also the changes in distribution of income between wages and profits. These are huge, controversial questions, which are still far from settled. Inflation and wage determination was probably Palle’s most important research interest at both the BIS and the OECD. The following section very briefly summarises some of his work in this area.

Much of the policy debate about macroeconomic issues depends on questions of which broad empirical generalisation is best supported by the evidence. The debate depends rather less on the logical consistency of rival views. An important research skill in this area is therefore the ability to construct variables that correspond adequately to theoretical concepts. At both the OECD and the BIS, he made major contributions to the measurement of key macroeconomic forces from imperfect or incomplete economic data. A very large number of researchers and policy analysts have since used these constructs. Three examples will serve as illustrations.

The first was the measurement of the stance of fiscal policy. Sizeable increases in government budget deficits after the first oil shock in the mid-1970s were partly the result of recession. In order to quantify the impact of fiscal policy changes, it was essential to decompose changes in budget balances into the operation of (a) built-in stabilisers (that is, changes in balances resulting when different marginal tax or benefit rates were applied to the difference between actual and potential growth) and (b) the effect of discretionary policy changes. Everybody knew this. But, for most OECD countries at that time, such calculations simply did not exist; and the national computations that were available were not comparable

in methodology. Although beyond the area of his direct responsibility, Palle was put in charge of the technical fiscal policy analysis in the McCracken report. He played a major role in helping Hermann Dudler to develop the OECD budget impact measures. He worked on this issue closely with Fabrizio Galimberti, Ebbe Yndgaard (a colleague from the University of Århus) and Kasumasa Iwata, among others. The methodology is described with great lucidity in OECD (1978). The desire to cover as many OECD countries as possible created a severe data constraint. As only the budgetary data in the OECD national accounts were used, they restricted themselves to two identities, two behavioural equations and just 14 variables. Their approach was elegant, simple and of great policy use. These measures have been subsequently refined by later generations of OECD economists, but the basic framework remains the same. They are still a standard international reference today.

The second example was the calculation of effective exchange rates. He drew on the earlier work of Paul Masson at the OECD to develop, with Elmar Koch, the BIS's indicators of competitiveness. These indicators used the exchange rates of 21 currencies weighted according to the bilateral import shares and the bilateral and multilateral export shares of 21 industrial countries and 10 developing countries. Their novelty was in using broader trade and output concepts than in the indicators computed at the OECD and the IMF. This methodology has since been adapted by several other institutions. It was, for instance, taken over by the European Monetary Institute (and then by the European Central Bank). The framework Palle helped to develop proved to be highly adaptable to changing trade patterns. The BIS has updated this approach on several occasions, and it is still in use.

The third example was the real wage gap. This excellent simplification for measuring the impact of a major supply shock was developed after the 1970s oil shock. The slowdown in the growth of output per employee and changes in the terms of trade determined a so-called "warranted" rate of growth of real wages – that is, the wage growth that a country could "afford" in the sense of keeping the labour share of national income constant. In the late 1970s, however, real wages grew much faster than this warranted rate. This reduced profit shares in many countries and, in the view of many, led to much-increased unemployment. Much of Palle's work addressed this question: once again, he developed measures of the wage gap for a large number of countries.

### **3. Inflation, wage determination and the distribution of income**

Palle made major contributions to the analysis of inflation. It was central to the work of WP4 at the OECD and to the BIS *Annual Reports* in the 1980s. His work in this area is too large and too varied to summarise. One paper, however, brought together a good deal of the analysis he did both at the OECD and at the BIS: his 1989 review of the wage-price mechanism, which remains to this day an excellent survey of empirical research on this topic (PSA (1989)). The theoretical section of this paper expounds several models with great clarity, explaining the strengths and the shortcomings of each. He saw the strengths of the new classical model over simple short-run Phillips curve approaches: the focus on long-run equilibrium conditions; the forward-looking nature and expectations; and the recognition that the adoption of credible policy regimes could directly affect behavioural parameters. Nevertheless, he argued that models based on non-market clearing (or "sticky") wages and prices better illuminated the transmission of policy changes to the real economy. The evidence he marshalled suggested that early signs of inflationary pressures are to be found in labour and raw materials markets, and not in markets for finished goods. Over periods as long as four to five years, he found, there is a trade-off between output and inflation – not well determined (large standard errors) but still quite clear. As this is well within the time horizon of most elected governments, there is a danger that policy decisions will be myopic. Furthermore, there were grounds for following Keynes in believing that, when shocks

originated from the demand side, real wage rigidities could be less destabilising than flexible wages.

Another article worthy of note is his 1999 paper with Bill Wascher of the Federal Reserve Board (PSA and Wascher (1999)). This paper explored a topic of great importance: whether the greater prevalence of nominal and real rigidities at low rates of inflation had increased the “sacrifice ratio”.<sup>2</sup> This is a question of considerable importance to monetary policymakers. Using several alternative approaches to estimating sacrifice ratios, their analysis of 19 industrial countries found that sacrifice ratios had increased between the 1980s and the 1990s in nearly every country in their sample, and that the average sacrifice ratio had risen from around 1.5 to 2.5. Because aggregate supply curves are thus flatter at low rates of inflation, a tightening or easing of monetary policy has stronger real output effects than in the past, while the adjustment of prices takes somewhat longer. He contributed many articles on the determination of inflation in the Nordic countries.

Another question related to issues of price and wage determination that Palle pursued over the years was what caused changes in the distribution of income between wages and profits. A good example of this genre is his 1999 paper with Marc Klau and Ebbe Yndgaard. The paradox was the simultaneous rise over many years in both unemployment and the profit share/return to capital in Europe. This is a puzzle because a parallel rise in both profits and unemployment should not be sustainable. In theory, higher returns to capital should lead firms to increase output and capital/labour ratios. Both profit shares and unemployment should therefore fall back to the equilibrium levels. Their explanation of this paradox was that firms adjusted capital/labour ratios to changes in relative factor prices (putty-clay production functions) only very slowly. Firms remained in disequilibrium for many years, preferring to invest their profits in financial assets rather than to expand their own real assets.

#### **4. The Reserve Bank of Australia**

While at the BIS and the OECD, Palle took two extended periods of leave to take up positions related to the Reserve Bank of Australia (RBA). He found Australia most congenial for many reasons. During his time at the OECD, he had worked with an unusually large number of good economists from Australia. Ian Macfarlane and Mike Keating were early OECD colleagues and many others followed: Victor Argy; Adrian Blundell-Wignall; Steve Grenville; and Chris Higgins (an equally assiduous cross-country runner!). At the BIS, he had many exchanges with John Hawkins, Warren Hogan, Philip Lowe and Glenn Stevens. He very much liked the straight-talking and egalitarian approach of the Australians.

His first stay in Australia was in 1979–80. Ian Macfarlane encouraged him to apply for an RBA fellowship tenable at an Australian university. He won one and chose the University of Sydney so that he could be near the RBA. At the invitation of Steve Grenville, he returned in 1994 to be interim Head of Research at the RBA. Once again, he demonstrated his ability to stimulate and guide younger economists and, simultaneously, to learn from them. He was instrumental in deepening the relationship between the RBA and the BIS, which in the mid-1990s was much more Europe-centred than it is now. The strong links he forged have been maintained – in no small part thanks to the economists who worked with Palle.

The paper he wrote at the RBA with David Gruen (PSA and Gruen (1995)) examined how far macroeconomic and other policies could lift growth. They found little evidence of the positive

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<sup>2</sup> That is, on Okun’s original definition, the cumulative loss of GNP to bring about a permanent point reduction in the inflation rate.

externalities of capital formation assumed by some endogenous growth models; hence special measures to boost investment were not justified. Because a low domestic saving rate had become less of a constraint on domestic investment in a world of liberalised capital movements, they were sceptical about measures to boost saving. They argued that foreign investors would view Australia, with abundant natural resources and a stable political environment, as a good bet; there was also evidence that stronger growth would itself raise the saving rate. They were agnostic on whether small differences within a range of moderate inflation had any influence on growth at all.

## 5. The BIS

It was Warren McClam, Head of the Domestic Economy and Statistics branch of MED, who lured Palle to the BIS. Warren was in charge of research and he used to represent the BIS at many macroeconomic and research-oriented meetings at the OECD (notably the Economic Policy Committee and its Working Parties). He was therefore well aware that research at the OECD prepared under Palle's direction led to many lucid papers that were of great interest to the senior policymakers who attended such meetings – even if comparatively little was published. Palle took up his post as Head of Statistics and Research in the Monetary and Economic Department of the BIS in April 1982.

In this function, he became something of the macroeconomic brain of MED. His post initially involved overseeing, as an economist, the development of an increasingly ambitious data bank of macroeconomic and financial statistics. As this work later was carried forward by a number of first-rate BIS statisticians and computer experts, Palle spent more time on his forte – macroeconomic analysis. He was responsible for the documentation on macroeconomic issues for each monthly meeting of the G10 Governors, for the organisation of the twice-yearly meetings of central bank economists, and for writing the real economy chapter of the *BIS Annual Report*. He was delighted by this move from an institution that had become a redoubtable treadmill of long papers for committees to a smaller, very collegial institution that produced short notes focused on questions of interest to central banks. He loved too the move to Switzerland and was very happy about the better employment opportunities for Elsebeth, who, as a research biologist, thrived in Basel.

His combination of macroeconomic sophistication and deep knowledge of economic statistics, unrivalled at both the OECD and the BIS, equipped him perfectly for this job. Convinced that answers to economic policy questions were to be found in analysis based on good economic theory and honest, careful, empirical investigation, he continued to work hard on his research. I never managed to find out how he managed to combine his day-to-day work following economic developments with extensive reading of macroeconomic research articles. He was always wary about jumping to facile conclusions about current economic developments. Equally, he was imaginative about how to present macroeconomic analysis in a convincing way to busy people.

He never seemed to miss any economic trend of importance in his reading of the financial press. He took pains to be objective. In a conscious effort to inoculate himself against the biases of the anglophone press, for instance, he was also most assiduous in his reading of the *Neue Zürcher Zeitung*, *Le Monde* and the Scandinavian press. He was, in addition, a noted connoisseur of commentary on international football matches ... but that is quite another story.

Economists in policy institutions are often tempted to overstate how far research – often their own research! – supports the positions their institutions wish to take in the wider policy debate. Palle had too much integrity to accept this. Those writing policy papers could sometimes find his unbending attitude to what logic and evidence really supported quite frustrating. But, as one senior official remarked: “He keeps us honest!”

The regular assessment of current macroeconomic trends was central to his responsibilities. Such trends were a main subject of the discussions of G10 Governors at their monthly meetings in Basel. Until the mid-1990s, the BIS provided for this meeting only background statistics supplemented by occasional analyses of specific topics. Andrew Crockett, who became General Manager in 1994, felt that BIS economists could contribute more to such meetings. With the agreement of the Chairman of the G10 Governors, it was therefore decided that the BIS would prepare short confidential notes on global economic and financial developments. The task of writing such notes fell to Palle. Much analysis went into these notes; he was most scrupulous with data and balanced in his assessments. In time, these notes would be addressed to the Global Economy Meeting of Governors, including the major emerging countries as well as the G10 countries. It was these notes that earned the favourable comment from Mervyn King that Bill White noted in his address. In the years just before his retirement, he built a small but formidable team of global macroeconomics – Dubravko Mihaljek, Madhusudan Mohanty, Bruno Tissot and Agustín Villar.

A second major contribution of Palle's known mainly to central bank insiders was in the organisation of many of the autumn meetings of central bank economists. These meetings brought together central bank research on particular themes.<sup>3</sup> The papers written by central bank economists were published in the BIS's *Central Banking* series. Each volume contained an anonymous short survey by BIS staff that put the central bank contributions into perspective. Palle was usually an author, with Warren McClam and Joe Bisignano, of those that had dealt with real macroeconomic topics, notably business cycle theories and fiscal policy. He also worked hard editing the central bank papers. Many of these volumes are still highly instructive today.

A third major contribution was the organisation of several meetings on monetary policy. One was the Working Party on Monetary Policy in Central and Eastern Europe. These meetings, organised with Dubravko Mihaljek, have become a very popular annual meeting in the BIS calendar. Many participants from the region said this is the best forum for discussing monetary policy that they had. Another was the occasional meeting on monetary policy challenges in Africa. There were several meetings for the Nordic central banks: for instance, Stefan Gerlach and he organised an illuminating meeting on the management of monetary policy during the 1992–93 crisis.

Finally, Palle wrote very many articles in the *BIS Economic Papers* (more policy-oriented) and *BIS Working Papers* (more technical) series. They are included in the bibliography. The areas covered are too vast to summarise. They also deal with some complex, hard to understand subjects – as Joe Bisignano once put it: “Whenever I read an article by Palle, I have to take my wits for a walk.” Nevertheless, brief mention might be made of three themes: international imbalances; the macroeconomic impact of higher energy prices; and the impact of financial intermediation on macroeconomic mechanisms.

### **International balances**

The scale and persistence of international current account imbalances since the early 1990s took most economists by surprise. A major part of Palle's research at the BIS was spent in analysing the macroeconomics of this phenomenon. He felt that any convincing macroeconomic analysis had to go beyond the computation of price and income elasticities derived from trade equations. With free capital flows, there was no reason for current account positions to be in balance. What mattered were the saving and investment decisions that lay behind current account balances. He therefore preferred to start analysis from the

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<sup>3</sup> The volumes it can be assumed Palle contributed to are listed in the bibliography. These volumes are available from the BIS on request.

identity that a current account surplus represented an excess of saving over investment. Using standard national income account identities:<sup>4</sup>

$$(S_H - I_H) + (S_C - I_C) + (S_G - I_G) = X - M$$

In an ambitious 1990 paper, he reviewed the saving and investment balances of each sector (households, firms and government) and the interrelations between the saving/investment plans of these three sectors. He found that saving and investment equations (which are hardly ever used) outperformed standard trade equations in explaining balance of payments developments in 16 industrial countries. One original aspect of this paper is his inclusion of exchange rate as well as interest rate and cyclical effects in saving and investment equations. Another is the search for empirical relationships across sectors (eg increased corporate saving should enrich the households that own the firms). He was aware that the absence of statistically significant stock variables (eg stock of foreign assets or liabilities, household or corporate balance sheets) in such questions was a serious drawback. He tried to address this in some later papers that examined the role of balance sheet variables in some components of saving-investment flows. Much more work is needed in this area.

His 2004 paper with Karen Johnson of the Federal Reserve Board was prepared for an internal central bank meeting at the BIS. It analyses the possible macroeconomic implications of the increased supply of low-cost goods from Asia and the accumulation of foreign exchange reserves on an unprecedented scale. It also considers the pros and cons of alternative policies. This paper, which is published for the first time in this book, used a savings and investment framework to analyse global imbalances in the 2000s. The issues they identified in that paper are clearly relevant for current discussions about the international macroeconomic dimensions of the current financial crisis. The speculative excesses encouraged by such a long period of low long-term interest rates created a very difficult background for the regulation of risk and the setting of monetary policy for much of the 2000s. The question of the resilience of domestic demand once exports weaken could not be more relevant than it is now.

### **Macroeconomic impact of energy prices**

Another issue of interest to Palle from his OECD days was the macroeconomic impact of large changes in oil prices. The earliest projections prepared in the late 1970s implicitly assumed that the demand for oil was completely price-inelastic. He was always very uncomfortable with that perspective. Using only aggregate data, he demonstrated that the long-run price elasticity of demand, while small (0.2 for industrial energy demand and lower for transport), was not insignificant. His 1991 paper with Henri Bernard provided evidence that demand responsiveness to oil price increases required investment in more energy-efficient machines, which took time.

### **Financial intermediation and macroeconomic mechanisms**

Palle's contacts over many years with central bankers kindled a sustained interest in the relationship between macroeconomic developments and financial variables. He thought very hard about how to extract information of interest to macroeconomists from financial market variables. His *BIS Working Paper* in 1999 on alternative measures of real bond rates in 17 countries is an excellent example. He constructed an error-correction model that allowed not only for "long memories" in the formation of inflation expectations but also for international linkages. Echoing the views of Fisher, he found that memory lags for the

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<sup>4</sup> The subscripts are for sub-sectors: corporates, households and government.

17 countries appeared to average almost four years.<sup>5</sup> Transitory foreign influences were important in virtually all countries. He showed that real rates defined by the use of an appropriate deflation mechanism were less volatile over time than when more simplistic deflation was used.

In 1993, a paper on the relationship between economic growth and financial market liberalisation in four Asian countries won him the Bronze Medal in American Express's annual competition. This paper marshals extensive macroeconomic evidence to support the view that the need for liberal financial markets depended in part on a country's stage of development. In the early phases of development, when countries were shifting labour from subsistence agriculture to new manufacturing industries geared to exports, government control could generate high domestic savings and direct it to investments with high returns. But once industrialisation had taken hold, liberal financial markets offered the best chance of allowing output to adjust to the changing demands of a more complex mature economy. Deeper and more liquid financial markets could also strengthen household spending. This theme is still highly relevant today – witness the debate about domestic demand in China.

A 1994 paper written with Neale Kennedy challenged the then fashionable view that house price inflation drove down the personal saving rate, by estimating a life-cycle model of consumption for 15 industrial countries. They found that, although current owners of houses would have incentives to save less during periods of rising house prices (and their ability to extract the equity stored in housing could ease credit constraints), current renters would be likely to save more. Hence the net impact of higher house prices on household saving could be small or even positive. But they then explained that higher property prices were more likely to lower the household saving rate where non-residents were free to buy houses and where household access to credit had been liberalised. Scores of papers have since been written further analysing this topic, but Palle and his co-author's analysis foreshadowed the main conclusions.

Perhaps the paper that best showed Palle's ability to identify a major issue early had the somewhat unappetising title "Forecast errors and financial developments" (PSA (1997)). Financial variables (such as money or credit aggregates, financial asset prices, banking system stress) are not easy to incorporate into the macroeconomic models that are used for forecasting. The question he asked was simple: is there any relationship between the errors in forecasts (heavily reliant on macroeconomic models) and the development of financial variables? He divided his sample into two periods – those when growth fell below forecasts ("bad" times) and those when growth exceeded forecasts ("good" times). He found that adverse financial developments could account for about one half of error margin in "bad" times. But he found no such relationship in "good" times. Hence it is in "bad" times – when financial variables turn adverse – that forecasters using macroeconomic models need to be aware that their projections are likely to be too optimistic. Did forecasters understand this during 2008, when major errors were made?

## 6. Epilogue

Palle worked cheerfully to the end, despite deteriorating health. He died only a few months after retirement. At the bimonthly BIS meetings that followed, the Governors observed a minute's silence at the beginning of the Global Economy Meeting in his memory. This was a unique tribute to a man who had served them and the BIS with devotion and distinction.

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<sup>5</sup> He noted with approval Mishkin's (1992) observation that "Fisher did not state that there should be a strong short-run relationship between expected inflation and interest rates. Rather he viewed the positive relationship between inflation and interest rates as a long-run phenomenon".

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