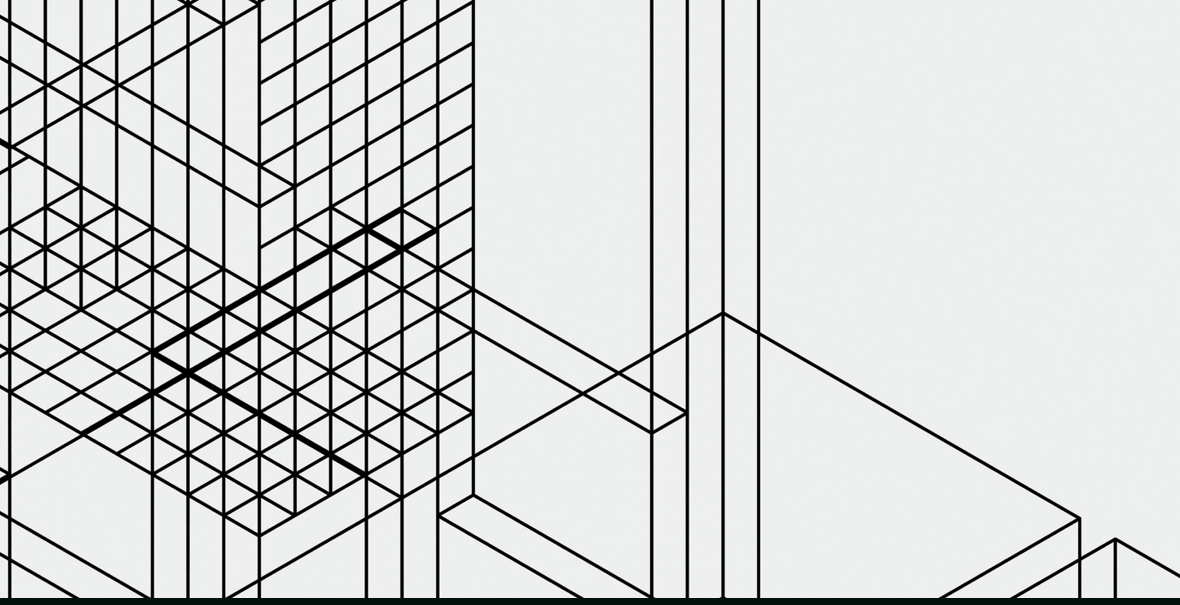
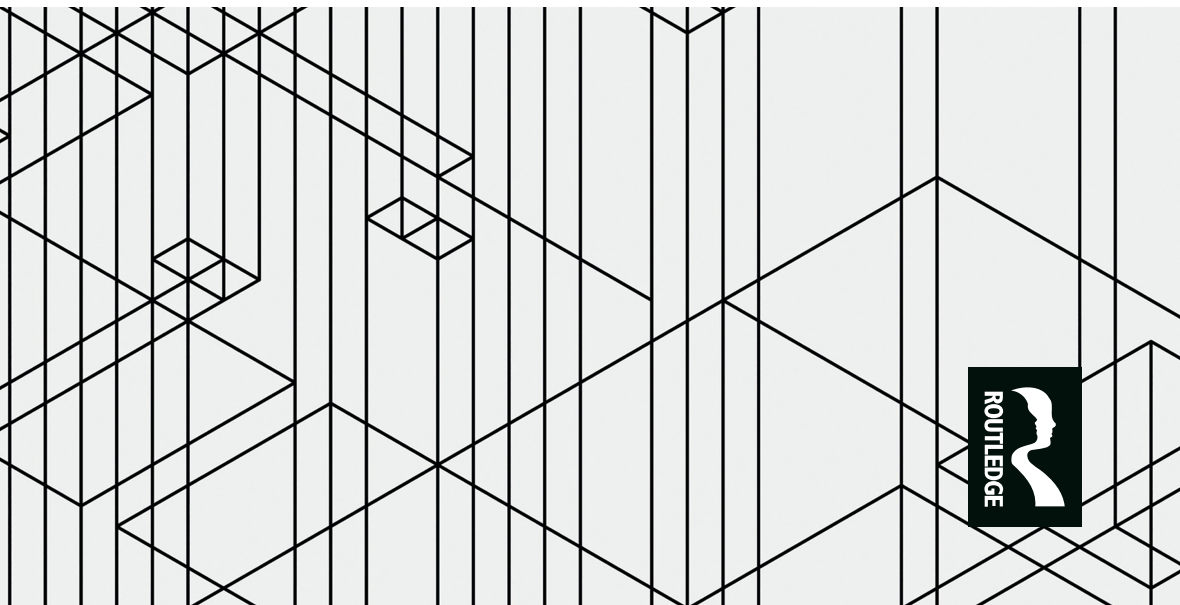


Routledge Frontiers of Political Economy

BERNARD SCHMITT'S QUANTUM MACROECONOMIC ANALYSIS

Alvaro Cencini



Bernard Schmitt's Quantum Macroeconomic Analysis

The aim of Bernard Schmitt's analysis of the monetary economy of production was twofold: to introduce and to explain the logical character of the macroeconomic laws governing our economies; and to explain the origin of the pathologies that follow if these laws are not complied with. Schmitt's main original contributions concern the theories of value, profit, and capital, as well as his explanation of inflation, unemployment, and international payments, unified as quantum macroeconomic analysis. This book expounds on the key principles of quantum macroeconomic analysis as he conceived and developed them.

Schmitt's starting point was the analysis of bank money and the way it is associated with produced output. His macroeconomics was not founded on microeconomics nor derived from the aggregation of microeconomic variables. Schmitt's theory does not rely on mathematics and modelling either; instead, it is based on logical laws derived from the nature of money and monetary payments. Part I of this book deals with the quantum macroeconomic analysis of capitalism and its pathologies developed by Schmitt and provides the elements necessary to understand its 'structural' mechanism. Parts II and III deal with the principles of two reforms that enable the passage from capitalism to post-capitalism and from the present non-system of international payments to an orderly system.

This book provides essential reading for all those interested in heterodox approaches to macroeconomics, monetary economics, banking, international economics, and the history of economic thought.

Alvaro Cencini is Emeritus Professor of Economics, University of Lugano (USI), Switzerland.

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Bernard Schmitt's Quantum Macroeconomic Analysis

Alvaro Cencini

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Foreword: A biographical note on Bernard Schmitt

From birth to professorship (1929–1970)

From Alsace to Burgundy

Bernard Schmitt, son of Marguerite Schneider and Marcel Schmitt, both residents of the tormented region of Alsace, was born in Colmar on 6 November 1929. A month later his mother died, leaving him to spend the first seven years of his life with his father and his sister Simone, two years older than him. In 1936, Bernard's father remarried. His second wife was Emma Pitoizet from the Burgundy region. The family settled in Colmar. The first years of their life together were not easy for the two siblings and their stepmother, but as time went by, an intellectual rapport developed between Bernard and Emma. Manon Schmitt-Lab, the first child of the new marriage, describes the evolution:

> Bernard is more vulnerable [than his sister], of a less practical attitude. In 1936 he is seven: good-looking, terribly strong-willed, and stubborn. Beginnings are hard. The atmosphere is tense, Emmy is the intruder. The second wife. He rebels. She tenses up. But little by little, through living under the same roof, and quite naturally, a tacit, mutual understanding on intellectual matters develops between them, a shared enjoyment of juggling ideas, a knack for manipulating abstractions, which will firmly bind them together.
>
> (Lab 2015: 55, m.t.)

The caring presence of his father and the birth of Manon (1937), Bruno (1938), and Claudie (1940) contributed greatly to consolidating the new family, which was soon to be confronted with the dark years of the German annexation of Alsace. In this period, Bernard spoke Alsatian for the most part, but also French and German. In 1940, during the German occupation, he and his father left Colmar and moved to Mannheim. They both returned to Alsace in 1941 and re-joined their family in Turckheim, where they had moved to in Summer 1940. In this small town near Colmar Emma gave birth to her third baby girl, Christel (January 1942) and they all lived there until the end of WW2. During

the years of the Nazi occupation of France and Alsace, Bernard and his sister were forced to attend a German school so that, in 1945, he became more fluent in German than he was in French. Only later, during his academic studies at the University of Nancy, was French to become his 'intimate' language.

From 1945 to 1948, Bernard and his sister were sent to Dijon, where he attended the Lycée Carnot as a boarder. He obtained his Advanced-level General Certificate of Education, majoring in mathematics (*Bac Mathématiques*), with excellent grades in both philosophy and mathematics. In a small village, Segrois, less than ten minutes' drive from Nuits-Saint-Georges, lived the father of Bernard's stepmother. Bernard later settled there with his wife Denise; there and in Dijon, they raised their three daughters, Isabelle, Anne-Claire, and Marielle.

Academic studies and family losses

After his *baccalauréat*, Bernard entered the Faculty of Law of the University of Nancy, where he graduated in 1952. In the meantime, Bernard's and Simone's stepmother gave birth to her last son, Dominique, in 1950. After graduating, Bernard decided to pursue further academic studies and started working on a PhD thesis at the University of Strasbourg, under the supervision of Professor Goetz-Girey. During this period, he spent a year at Trinity College, Cambridge (1953–1954) as a research student working under the supervision of Dennis Robertson and Richard Kahn, his official supervisors, as well as Piero Sraffa, Maurice Dobb, and Joan Robinson. His stay in Cambridge was extended for a further three years. During this time, he shared a flat with his friend Derick (Frederick Hemming) McClintock, a criminologist, and went regularly back to France.

While a research student at Cambridge, he clashed with Joan Robinson, who did not like his questioning of her interpretation of Keynes's thought, and with Sraffa, who did not accept his critical appraisal of Marx. Sraffa went as far as to ask Robinson, who was administratively in charge, to write to Professor James in France recommending that Bernard be excluded from his PhD programme. Professor James did not give in to Sraffa's request and instead showed Robinson's letter to Bernard. It is to Schmitt's credit that, despite what had happened in 1954, some years later he agreed to translate a book by Joan Robinson into French.

1957 was a dreadful year for Bernard, who was confronted first with the death of his father Marcel from a stroke, and three months later by that of his sister Simone in an accident. Bernard coped with these terrible events as best as he could and helped his stepmother to deal with the ensuing legal and administrative fallouts.

His doctoral thesis was well advanced, and he submitted it the following year in Paris-Panthéon as a *Thèse d'Etat*. The members of the examining commission were Robert Goetz-Girey, supervisor, Pierre Dieterlen, research director at the CNRS (Centre national de la recherche scientifique), Alain Barrère, and

Jean Weiller. Professor Dieterlen was also to become Schmitt's 'parrain' (godfather) at the CNRS, of which Bernard became a member in 1959. His thesis was published two years later by Sirey, Paris, under the title *La formation du pouvoir d'achat*. It is a dense and thought-provoking volume in which Schmitt introduced the founding elements of his ground-breaking analysis of monetary macroeconomics; it also contains many of the intuitions he later developed, and which are analyzed in the present book.

Marriage

1960 was a crucial year in Bernard's life, not only for the publication of his first book, but most importantly because he married Denise Fauvet on 28 May, in Paris. Born in Nancy on 19 April 1933, Denise was a brilliant scholar herself, who graduated in classic literature (*Lettres classiques*), French, Latin, and Greek, at one of France's 'grand écoles', the Ecole Normale Supérieure, Sèvres. After graduation, she started teaching classical literature at the Lycée Camille Sée in Colmar. Among her first students was Claudie Schmitt, who liked her very much and invited her home. It was during one of her frequent visits during the school year 1957–58 that Denise met Bernard.

Their intellectual understanding and affinity would bind them together for the rest of their lives. Their relationship was strongly shaped by Bernard's tireless research in economics. Yet, though he was often physically absent or lost in thought, they were true soulmates. He shared all his worries and his excitements with her; when away from home he called her every day, and she never stopped encouraging him. They addressed each other using the formal '*vous*' instead of the common, familiar '*tu*', which is only in appearance a sign of distance: in reality it created complicity between them that was much stronger than the artificiality of a '*tu*'.

The burden of handling the family's daily life rested on her. She looked after their three daughters and after the house and taught classical literature first at the Lycée Marcel Pardé and then at the Lycée Carnot, in Dijon, until 1972. Then, from 1972 to 1986, she taught Latin at the University of Dijon. Her French was outstanding, and Bernard called on her regularly for advice. His own French was extremely good and rigorous, but he often looked for her approval and enjoyed listening to her literary comments. She was also a good cook, and I still remember with pleasure our meals under a big, old walnut-tree in their garden in Segrois and her delicious apple pie '*renversée*' (*Tarte Tatin*). He called her 'Fauvette', a nickname that plays on her maiden name, Fauvet, and its resemblance to the name of a lovely songbird living in the bushes.

Bernard never tired of repeating that without his Fauvette he would never have been able to achieve what he had. She provided him with the balance and strength, not to say the time and the quiet, he needed to develop his thoughts and work out his quantum macroeconomic analysis.

A year after their marriage, on 25 April 1961, Denise gave birth to their first daughter, Isabelle, nowadays an English teacher. In the same year, the CNRS

awarded him the bronze medal for his research achievements. He started teaching as Professor of macroeconomics at the University of Dijon, but he maintained the status of a CNRS researcher. A second daughter, Anne-Claire, entered the world on 19 January 1964. A year later, the University of Fribourg, Switzerland, offered him a tenure-track position. He started in 1965 as a lecturer in economics, became '*Professeur extraordinaire*' a year later, and in 1970 he was promoted to full professorship.

Early teaching years

Bernard Schmitt was an engaging, brilliant teacher; his students were fascinated by his enthusiasm as well as by the depth and logical rigour of his analysis. His teaching was thought-provoking; he guided his students into the intellectual adventure of scientific discovery through a process that often took the form of dialectical progression. He started with a well-established theory, explained it accurately and logically, and convinced his students of its correctness. Then he told them that the apparently correct theory is in reality wrong and proved why it is so. Finally, he re-examined the entire problem from an alternative viewpoint and provided its correct analysis. Even students who got lost in Schmitt's rigorous analysis recognized his uncompromising passion for logic and his constant research of the root causes of macroeconomic events.

When I started my undergraduate studies in Fribourg in 1968, Schmitt was teaching monetary macroeconomics to students in years 3 and 4 of the undergraduate programme, but his courses had already become a topic of discussion even among freshmen, so much so that some decided to attend them well before their third year. University education is first of all about teaching critical reasoning, teaching students how to develop their analytical skills in order to obtain a better understanding of the world. Bernard was a master in this. His students learned how to use logic to explain the hidden nature of economic events and to unmask the mistakes of mainstream economics.

Like any great researcher, Bernard did not hesitate to introduce his students to the latest findings of his analysis. The classroom became a laboratory, where old and new ideas were thrown together, dissected, and placed under the microscope. Logical argumentation was the only instrument – the only tools he needed were blackboard and chalk. He never used slides, nor did he read from a text: he stood in front of his students, walked around, drew some figures and diagrams on the blackboard, and spoke freely about the topic of the day without a scrap of a note – and all the time he followed a rigorous, logical thread. He invited his students to capture his presentation only in outline or not at all, because later he would provide them with a written, fully developed text.

In each term he analyzed different topics or, when he came back to the same problem, he analyzed it from a different angle or in a totally different way. He never taught the same thing in the same way, which is emblematic of how his investigation developed, and which also explains the great number

of manuscripts distributed to his students in Dijon and Fribourg during his teaching years.

Fully devoted to his research, Schmitt endeavoured to convey his enthusiasm to his students and did so without sparing himself. But he was irritated by lack of attention; if he caught a student chatting to another or yawning, his first thought was that the student was uninterested or bored; and if so, he invited them to leave the room. While he was very sympathetic in other areas, when it came to logical rigour, he was uncompromising; extremely demanding with himself, he applied the same standard to his fellow economists and students.

Weltanschauung

He treated people around him with great respect and sympathy, irrespective of their cultural background or their social status. He admired any form of intelligence, from the practical one of the Portuguese bricklayers who built his and Fauvette's Burgundy tower in Segrois to the analytical one of Józef Bochenski, a Polish Dominican Professor of philosophy at the University of Fribourg. Indeed, his interest in philosophy dated back to his college years and never faded. Starting with the Greeks, he read all the great authors and enjoyed discussing their ideas with his wife as well as with his closest collaborators. He liked Spinoza, St Augustin, and Wittgenstein; he was impressed by Kant's considerations on quanta and read with interest Heidegger, Bergson, and Sartre, among others. In many ways, his approach to economics was philosophical: he investigated the very foundations of crucial concepts such as economic value and prices and looked for their root causes.

Socio-political and economic events interested him, and he kept up to date by listening regularly to BBC radio on a very good portable radio-set he carried around with him. He also enjoyed taking pictures and owned several very good cameras – his favourite was a Leica. In his early twenties and thirties, he used to develop and print his photos himself. I still remember installing for him a sophisticated darkroom for the printing of colour photos with the help of Claude Gnos, one of his PhD students in Dijon and a faithful collaborator ever since, who shared his passion for photography and bikes.

Classical music was another interest of his. He kept reading about the best high-end music apparatus and owned a top-quality one, on which he played his favourite recordings. He liked the Classics and the French composers but enjoyed also listening to Wagner, Verdi, Puccini, and Rossini. In his teens he used to play the piano; his sister Simone was a good piano player, and so was his father, while his stepsister Manon still devotes part of her time to piano playing. Like his father, who was a passionate connoisseur, he particularly enjoyed listening to opera.

Intrigued by his analysis, several of his young students decided to pursue PhD studies and undertake an academic career first as research and teaching assistants, then as lecturers and readers. At the time, I was working as Schmitt's research and teaching assistant at the University of Fribourg, and I often went

to see Bernard in Segrois and became acquainted with his family and with the group of researchers working on his theory at the University of Dijon.

Even though most of his followers had a Marxian background, one would be mistaken to believe that their interest in Schmitt's analysis was politically driven. He himself never was a member of any political party and never took a stance in favour of any of them. Yet, this did not prevent him from following with great concern the events of the day and speaking out about his opinions. His existential stance was to have an open mind and deep empathy for the victims of injustice or violence. His engagement was thereby political in the broad sense of the term: he aimed at providing society with an economic 'structure' free from capitalist pathologies, thus supplying the 'neutral' framework on which a more human an equitable system can be built.

He believed in the power of thought, in the capacity of humankind to improve its understanding of itself and of the cultural and natural world and their interdependence. He was well aware of the evil surrounding us all, of the destructive and wild instincts we are so often confronted with. In his view, this was due mainly to ignorance in all its manifestations and was convinced that, by exercising intellectual and spiritual wisdom, we can contribute to building a better future.

As Xavier Bradley recalls, during a lecture at the University of Dijon in 1977, Schmitt severely criticised Michel Debré, prime minister in General De Gaulle's government, for his plea in favour of the gold standard, which pleased Bernard's left-wing students. Yet, Bernard's arguments were scientific, and a few weeks later these same students were presented with a devastating critique of Jacques Attali (a left-wing economist) with an argument as rigorous and objective as the one against Debré.

Bernard was not a religious person in the traditional sense. He did not believe in any religion, even though he formally remained a member of the Catholic church. However, he strongly believed in the spiritual dimension of mankind. He rejected the idea that our earthly death is the final act of our existence and suggested the possibility, derived from his analysis of time, that each moment of our earthly life is for ever inscribed, recorded in time. Be that as it may, Bernard Schmitt's faith in the spiritual component of our existence grew out of an existential crisis in which he was confronted with the dismal, unacceptable prospect of considering death as a point of no return, a dead end. I remember discussing this with him in July 2007 while walking in nature – as he liked to do – after working on his concept of quantum time and the need to apply to economics a more advanced logic than the binary one.

There was a scientific source to Bernard's spirituality, which rests on the idea that time must be conceived as a radiation, as an emission. As is the case for light, time too might have a speed; its speed would be greater than that of light. We should therefore speak of the creation of time and of a time frame where it is possible to go beyond the speed of light but not that of time. Time, too, would have corpuscular and wavelike aspects. The corpuscular aspect would be the material or dimensional one (the space–time dimension), whereas the

wavelike aspect would be the immaterial or spiritual one. Time would thus be an emanation of the spirit that materializes in the real world.

Research, teaching, and family: a difficult balance

In 1966 Presses Universitaires de France (PUF) published Bernard's second book, *Monnaie, salaires et profits*. The book is an expansion of his 1960 volume; it explores the fundamental distinction between *nominal* and *real* money and is one of Schmitt's milestones in national macroeconomic analysis.

In 1969, Guy Devillebichot, a well-known French economist, wrote an enthusiastic review of the book in the *Revue d'économie politique*. Devillebichot, who would write another review article on Bernard's analysis in the same journal ten years later, can undoubtedly be considered one of Bernard Schmitt's best friends and supporters. Henri Guitton was another major supporter of Schmitt's analysis. One of the most influential French economists, in 1984 he wrote a long preface to Bernard's masterly book on inflation, unemployment, and capital malformations. I must not forget to mention Jean Claude Eicher, together with Devillebichot and Guitton, a professor of economics at the University of Dijon, member of the *Commission d'agrégation* that examined Schmitt in Paris and a true friend of Bernard and his family, as well as Pietro Balestra, Professor of econometrics at the Universities of Fribourg and Dijon, whose friendship and support never wavered until his premature death in 2005. Gérard Destanne de Bernis was also among Bernard's close academic acquaintances, together with Professors Jean Valarché, Maurice Villet, Gerhard Aschinger, and several others, who will I hope forgive me for not mentioning them.

On 31 March 1968, two years after the publication of his pathbreaking book, Bernard and Denise celebrated the birth of their third daughter, Marielle. By now Isabelle was about seven years old and Anne-Claire four; the family lived in a rented flat in Dijon and in their nice country house set in a vast park in Segrois, where Fauvette tended a vegetable garden and flowerbeds and where Bernard, with my help first and then with that of Wulf Rohland – a German economist who wrote his PhD thesis under Bernard's supervision and who later translated Schmitt's book *Théorie unitaire* into German – planted numerous fruit-bearing trees. To work in isolation, Bernard had a small cottage near the house transformed into a study, where, between 1961 and 1975, he wrote six books and three articles.

Although he was quite interested in people, he preferred to work alone. This did not mean that he avoided confrontation; on the contrary, he submitted his analysis to the scrutiny of his students and assistants and looked forward to the criticism of his fellow economists. In fact, he was the most uncompromising and rigorous critic of his own theories and the first to notice their shortcomings, if any.

He worked relentlessly; his analysis became more general and encompassed the fields of national and international macroeconomics, but this was not

without consequences for the rest of the family. His wife and his daughters were very important to him and at the centre of his affective concerns; yet he was too absorbed in his work to devote them the time and attention they needed. He knew it, but this did not help him find a way to make up for his absence. Reality made it harder to find a balance: he lectured weekly in Dijon and Fribourg and had to travel back and forth by car, crossing the French and Swiss Jura; she taught in Dijon; he needed to work at Segrois; she had to look after their daughters mainly in Dijon; he was invited to talk in various universities and travelled across the UK to promote his English book on macroeconomics; they could not enlist the help of their own parents, and so their daughters did not get the opportunity to be looked after by their grandparents.

1970–1984: intense and dramatic years

The drama

The period from 1970 to 1984 began with a major drama in Denise's and Bernard's life. In June 1972, a careless driver ran into Fauvette's car; the collision was violent and its consequences severe: Fauvette and Anne-Claire were badly injured, the mother spent a long period in hospital and the (second-born) girl suffered brain damage, which affected her mobility and intellectual capacities for the rest of her life. Isabelle and Marielle were only superficially injured, but the shock was devastating; the eldest, then 11 years old, still remembers clearly the blood all around her and her despair while attempting to help her mother and sister. Marielle was only four years old, but it is easy to imagine how deeply the incident must have affected her too.

Bernard was powerless and did what he could to cope with the situation at best. As time went by, the wounds healed a bit, but their consequences remained. To forget them was impossible: Anne-Claire was the helpless victim and a constant reminder of the dramatic accident. Her condition improved greatly thanks to her own efforts and the loving support of Denise. Bernard worked hard to stimulate her by setting physical objectives. For example, they cycled together all the way from Dijon to Lourdes twice, and once he walked with her from Clermont Ferrand to Lourdes in an attempt to improve her physical performance and encourage her to go on fighting against adversity. Yet, despite some relevant, positive progress, family life would never recover the relative harmony it had known before June 1972.

From 1972 to 1984

After the life-changing experience of that car crash, Bernard worked harder than ever on his earlier insights with the explicit intent to build a unified theory explaining the monetary working of economics, nationally and internationally. In 1973 he was awarded a silver medal by the CNRS for his research work, the highest award in any single discipline. In 1977 he sat his *agrégation*

in Paris. Until then, his professorship at the University of Dijon had been on secondment from the CNRS. From 1977 until his retirement, his status remained that of a full professor, and his appointment was officially endorsed by the *Commission d'agrégation d'Etat*. Nothing changed substantially apart from the certainty that he would go on teaching in Dijon until his retirement.

At the time, he was already surrounded by a group of students working on their PhDs under his supervision, both in Dijon and in Fribourg. Some of them were to form the hard 'core' of his followers. Among them was Jean-Jacques Friboulet, who later was appointed to a professorship at the University of Fribourg but then abandoned his research in quantum macroeconomics; Jean-Luc Bailly, who has consistently investigated Schmitt's concept of production; Claude Gnos, whose attempts to disseminate Schmitt's analysis among Keynesians and post-Keynesians deserves a special mention; and Xavier Bradley, who is still teaching Schmitt's analysis at the University of Burgundy (the former University of Dijon). In Fribourg, Schmitt's first research and teaching assistant, Gianluigi Socchi, stopped working as a researcher after his PhD thesis; and it was only in the Nineties that the circle of staunch scholars of this unique French economist was joined by Sergio Rossi, now full professor at the same University and whose intense activity contributes to the circulation of Schmitt's analysis among the post-Keynesians, and Nadia Piffaretti, economist at the World Bank and still true to Bernard's teachings.

But there are many more former PhD students of Schmitt. Some of them have not pursued an academic career for different reasons; other have turned their back on Schmitt's theory, either because they deemed it too difficult and demanding or because they thought it likely to hamper their professional career. Swimming against the tide is never easy and seldom rewarding. Of those who decided not to remain in the academic world, some have played an important role in Bernard's life both because of their friendship and of their external support for his research. I shall mention them as the opportunity arises in the context of this biographical note.

Between 1972 and 1984, Schmitt developed his analysis of the main topics of national macroeconomics: value, price, profit, capital accumulation, inflation, and unemployment; as well as of international macroeconomics: duplication, interest payment, exchange rate fluctuations, the international system of payments, and its reform. He analyzed the problem of European monetary unification and advocated a *new* 'theory of the circuit' (monetary circular flow analysis).

His teaching and research activities were very intense. With the intent to isolate himself as much as possible and in order to split his weekly trip to Fribourg into two parts he bought a small studio in Métabief, a village in the French Jura near the border with Switzerland. He drove a Citroen 2 CV and was not afraid of long distances. In May 1977, he drove all the way from Fribourg to Poland, accompanied by me, his teaching and research assistant in Fribourg at the time, and by Jean-Jacques Friboulet, his teaching and research assistant in Dijon. It was a long journey; we travelled through East Germany

and reached first Poznan, then Lodz. There, Bernard gave two lectures that sparked great interest in the audience, because he introduced his own analysis through that of Michal Kalecki. He was often invited to speak, mainly in French universities, and for a while taught a course at the European University of Nancy, where he met Taïeb Chtioui, a young Tunisian economist who became a faithful follower of his theory.

In January 1978, he travelled from Dijon to Salerno, this time by plane and train, to be the best man at my wedding to Ginevra Mauro. Two years later he came to visit us in London, where Ginevra and I were spending the first five years of our marriage. At my suggestion, Professor George Akerlof invited Bernard to give a lecture in the seminar on money he was directing at the LSE. Victoria Chick and Meghnad Desai attended the seminar. The reaction to Bernard's presentation was positive, and the ensuing formal and informal discussions promising. However, as was to become the norm in future years, projects and promises were not followed up, and the meeting at the LSE remained a pleasant but inconsequential memory. This did not prevent Bernard from increasing his efforts to get at the core of capitalism by investigating the fundamental laws of monetary macroeconomics.

1984: a hallmark in Schmitt's scientific production

This all-important period of his research activity led Bernard to the publication, in 1984, of one of his masterpieces, *Inflation, chômage et malformations du capital*. Published by Routledge in 2021 in English translation, this volume is the manifesto of *quantum* macroeconomic analysis. It opens the way to a new conception of economic production and its relationship with time. The ensuing theory of *emissions* is a new paradigm in economics, drawing a line of demarcation between the traditional Newtonian conception, shared by Neoclassical and Keynesian economists alike, and a new quantum approach based on the concepts of creation, destruction, instantaneity, and time quanta.

A few years earlier, just before starting to work on the book, Bernard had considered the possibility of writing it with Henri Guitton, who wholeheartedly supported Bernard's analysis and admired his scientific rigour. Gradually, Guitton withdrew from this project and decided to limit his contribution to a long foreword, leaving Bernard to write the book alone.

But 1984 is also the year of a major publication devoted to monetary sovereignty and international payments. Less well known than the volume on quantum analysis, *La France souveraine de sa monnaie* is no less important. It deals with the problem of countries' external debt in a revolutionary way, which became the hallmark of Schmitt's analysis of international payments and provided the element for a one-country solution, set to remain substantially the same all through his investigation. Several other pieces would be added later to the mosaic of Bernard's analysis of 1984, yet his main insights are all there in his 1984 volume, which no doubt takes pride of place in his scientific production.

In 1984, Treccani, a renowned Italian publisher, commissioned Bernard to write a substantial introduction to the Italian edition of Ricardo's monetary writings. Bernard accepted the request, which had been mediated by Marcello Corti, one of his PhD students in Fribourg, who translated Bernard's introduction to Ricardo in Italian and became a good friend of Bernard and his family. The brilliant investigation into the nature of Ricardo's analysis of money throws new light on the Anglo-Portuguese economist's insights, thereby helping the reader to grasp all the originality of an author who Bernard considered the most logically rigorous in the field of economics.

This same year, Schmitt was invited to a two-day meeting organized by Professor Augusto Graziani at the University of Naples; the invitation included research assistants and readers working with him in Dijon at the time, and myself. The topic of discussion was circular flow analysis. Graziani was the perfect host. He welcomed us as guests of honour and invited us to a party at his own house, where we had the pleasure to meet his family. This was to be the first of numerous subsequent meetings Bernard and I were to enjoy with the famous Italian economist over the years.

At the end of those two days, Bernard and I rented a car and drove from Naples to Salerno to visit my parents-in-law and to enjoy the Amalfi Coast. It was the ideal setting to discuss quantum time, Bernard's main concern at the time, taking walks on the seashore and admiring the seascape. Reasoning, following a line of thought, while immersed in nature was what Bernard liked best, as many of those who worked with him know well. The journey to Naples and Salerno was also an opportunity to eat good fish, his favourite dish, and to smoke cigars. Together with a good glass of wine (he was a connoisseur of Burgundy, and his wine cellar in Segrois was well-stocked) these are the main good vices he indulged in.

The years of international activity (1984–2005)

The year 1984 was a milestone in Schmitt's research activity also because it marked the end of the period of his major publications. From 1984 onwards, all his manuscripts except one would remain unpublished. This was so partly because he did not want to spend time searching for a publisher and on the drudgery that accompanies the process of publication; and partly because he was constantly looking for new ways of giving the best possible form to his ideas. This does not mean that he was writing less. On the contrary, his texts were numerous and well thought out; many were distributed to his students, and some were planned and worked out as fully self-contained manuscripts practically ready for publication. Yet, his research drive was so relentless and demanding that he no longer felt the need to publish his texts.

He saw himself as an instrument chosen to achieve an end – convey the idea of quantum macroeconomics – acting as a kind of intermediary at the service of this revolutionary new idea, a duty he would be ready to discharge when called upon. His working hours were not regular; he would write down his analytical

considerations whenever an intuition presented itself, day or night, and worked on it until he succeeded in grasping it entirely. This did not prevent him from accepting invitations to write papers for economic reviews, as contributions to edited volumes or in the series of working papers of the RMELab (Research Laboratory in Monetary Economics), of which he was the co-director (with me) and which is part of the Centre for Banking Studies in Lugano.

Washington DC, Mexico City, and Denise's lymphoma

In Summer 1984, Bernard visited Edouard Maciejewski, one of his former students in Dijon, who was working at the IMF and was to become Assistant Director. Bernard and Denise spent a week as Edouard's guests in Washington, and he met up with a historian of the IMF. It was his first attempt to establish contact with this institution. His second attempt took place two and a half years later, when he went back to Washington, alone, and again stayed at Edouard's and met Edouard's director at the IMF. The meeting was informal, courteous, and pleasant but unproductive from a scientific viewpoint. In August 1984, Bernard was invited to an international meeting on political economy taking place in Rio de Janeiro, where he presented a paper that was later inserted as an Annex in his 1984 pamphlet *Les pays au régime du FMI*.

A more interesting meeting took place in Autumn 1990, when Bernard was invited to the World Bank by Yves Tencalla, Swiss Executive Director at the World Bank, an acquaintance of mine, who was kind enough to organize a conference with the economists of the World Bank and to put me up for a week while Bernard was once more the guest of Edouard. The conference was well attended but, although Bernard's speech captivated the audience's interest, sadly there was no follow-up.

In 2000, Bernard returned to Washington to meet some of the members of the African department of the IMF, in particular Pedro Morais, the Angolan Executive Director for Austral Africa at the IMF, and Roberto Cippà, a former student of Bernard's in Fribourg and then Executive Director for Switzerland at the IMF. At the last moment, Cippà was unable to attend and asked the Polish member of the Bureau of the Swiss administration to stand in for him. The meeting went wrong, Bernard and the Pole quarrelled, and there was no follow-on. Edouard Maciejewski was also present at the meeting, together with José Cerqueira, an Angolan PhD student of Bernard in Dijon, who would play an important role in the following years as regards Bernard's activity.

There was one last attempt with the Swiss administration and the African department at the IMF in 2004. Schmitt was accompanied by José, but neither Edouard nor Morais could attend the meeting. This time everything went well, and Bernard's speech about the double payment of interest on countries' external debt was well received. However, the novelty of Bernard's approach and its intrinsic difficulty were such that, back to their daily engagements, the economists attending his lectures did not find the time to work on his suggestions, and his message gradually faded out of their memories.

Washington DC was not the only destination of his trips outside Europe. In 1985 he visited me in Mexico City, where I was spending two months teaching an advanced seminar to the academic staff of the Economics Department, Universitad Autónoma Metropolitana. He spent ten days with me and José, who had joined us, working on the presentation for a conference and on an article on the debt issue for a Mexico City daily.

The two following years were marred by medical problems. His wife Denise was diagnosed with a malignant lymphoma, which required an operation; she underwent surgery in 1987. Fortunately, the procedure was successful, and she was able to get back to normal life, once more showing her exceptional strength and resilience.

Angola

The year after Denise's surgery saw the start of Bernard's mission to Angola. Thanks to José, the Angolan Department of Finance asked Bernard to work on Angola's external debt and to elaborate a reform that avoided the pathological payment of interest on this same debt. Bernard asked me to join him in the project and in 1988 we flew together to Luanda to meet with José and the officials in charge of the Ministry of Finance and of the Angolan Central Bank.

The week in Luanda was very fruitful, and we were officially mandated to work on a joint project with a group of government experts. Because of a series of problems mainly due to political instability, the project took much longer than initially planned. After the visit of an Angolan delegation to Fribourg, during which we submitted and explained our results, Bernard flew again to Luanda, where he submitted his final report in 1996. Unfortunately, the report remained without follow-up: the financial gain Angola would have derived from the implementation of Bernard's reform would have been substantial but still not as high as the one the corrupt government of the country could derive from the royalties on petrol and from the huge gap between the official exchange rate and the parallel exchange rate of the kwanza and the US dollar.

Despite the lack of encouraging signals from the government, José did not give up the hope of finding enough support from one of the subsequent ministers of finance to implement Schmitt's plan of reform.

Our last attempt took place in 2005, when Bernard and I flew to Luanda one final time. After a week of pointless meetings, we returned to Europe having learned the lesson that next time we would have to target a more democratic country than Angola. However, it would be wrong to think that working for the Angolan government had been a waste of time. Quite the opposite: the experience with Angola prompted Bernard to work harder and step-up his work on the analysis of pathological external debt servicing, on the formation of countries' external debts and the development of a single-country reform.

1998 and 1999: two milestones

While devoting a substantial part of his time and efforts after 1984 to developing and presenting his analysis on international payments, Bernard also pursued his investigation of national macroeconomics and the fundamental critique of general equilibrium analysis. Thus, in 1988 he published a paper on the nature of money. In the same year the two of us were invited to a conference on *The Future of the International Monetary System* held at Glendon College, Toronto, where Bernard presented a paper entitled *External Debt – Eternal Debt* and where we met Professor Lorie Tarshis and his former student, Omar Hamouda.

In 1995 Bernard distributed to his students a manuscript on the topic of external debt, and in 1996 he wrote two contributions, one on unemployment and the other on money prices, published in two books edited, respectively, by M. Baranzini and A. Cencini, and by G. Deleplace and E.J. Nell. From 4 to 6 September 1998, Schmitt attended a Conference on the *Wealth of Nations and Economic Theory* held at Monte Verità, Ascona (CH), organized by Mauro Baranzini and myself. Luigi Pasinetti was among the leading contributors, and Bernard took the opportunity to devote his speech to a critical analysis of Pasinetti's input-output analysis and pure labour theory of value. A few years earlier, Luigi Pasinetti had invited Bernard to give a lecture in his seminar at the Catholic University of Milan, and the discussion that followed had shown that the main difference in their analyses lies in the role money plays in one or the other: almost absent in Pasinetti's theory, for Schmitt, money is the key concept.

1998 and 1999 were the two years in which Bernard produced a significant part of his most relevant contributions to both national and international macroeconomics. In particular, his new analysis in terms of prices of unemployment was written in 1998 together with two important, unpublished papers on relative prices; whereas in 1999, while he added two more relevant texts to his critical analysis of the neoclassical paradigm, he started writing extensively on the payment of interest on external debts. It was only after 2000 that Schmitt's analysis was to focus mainly on the problems of international payments. He still worked on his critique of relative prices, but most of his writing concerned the problem of external debt servicing and that of the very formation of countries' sovereign debt.

On 6 November 1999 Bernard was seventy years old. Marcello Corti organized a dinner in Fribourg to celebrate Bernard's birthday. He was in good health. He suffered from type-B diabetes, but he kept it at bay by riding his bike whenever he could. Biking was his favourite sport, and he would not give it up until his stroke in 2010. In his youth, he had also done a lot of skiing. At seventy, he was still physically fit and as intellectually productive as ever. Some years earlier he had retired from the University of Dijon; he was now coming to the end of his academic career in Fribourg. But official retirement from his teaching commitments did not slow down his research activity; on the contrary, it gave him more time to devote to his analysis and his international engagements.

2004: World Bank and IMF

The last and most important attempt to present and test the theory with the experts of the World Bank and the IMF took place in June 2004. It is thanks to the open-mindedness of the Swiss Executive director at the WB, Pietro Veglio, that I was able to organize visits for Bernard to the two institutions. A former student of Bernard at Fribourg, Veglio arranged a series of meetings with various experts of the WB and the IMF that were to take place over a whole week, as well as a luncheon with François Bourguignon, the chief economist of the WB at the time, and his staff. José was also present at the meetings.

Bernard's presentations were well received, and the ensuing discussions were lively, but not aggressive, which was a state of mind that Bernard could not bear, as it never failed to trigger vehement reactions. The experts were genuinely interested; they did their best to understand the originality of Schmitt's message and to accommodate it within the traditional vision of economic theory they were accustomed to. They did so critically but constructively. None of their criticism came as a surprise, and Bernard was never at a loss for a response.

At the end of the week, we flew back, Bernard and I to Europe and José to Angola, with the clear sense that, even though the theory had easily survived the judgement of the WB and the IMF experts, we would have to wait longer and work harder before his breakthrough could be implemented.

From 2005 to 2014

From 2005 until his stroke in 2010 Bernard worked mainly on the problem of external debt servicing. In 2006, he spent a month in Lugano as an invited professor at USI (Università della Svizzera italiana). He held a series of advanced lectures to the PhD students in economics, elaborated on his analysis with me, whenever possible while walking by the lake in the outskirts of Lugano, talked with some of my colleagues, particularly with Mauro Baranzini, who considers him, together with Luigi Pasinetti, as one of his masters and whose support for our research never wavered along the years, and enjoyed the company of his wife Denise who joined him in Lugano. During his stay at USI, he kept working on his theory and produced two texts known as 'Lugano papers' on Brazil's external debt burden.

Brazil

In 2007, once more thanks to José's intervention, we flew to Brasilia for the first meeting organized by a friend of José, Raimundo Lima, with a foundation working for the Brazilian government, Aiporé, which was supposed to help us present Bernard's analysis and plan of reform to people closely connected with President Lula and, subsequently, with experts of Brazil's Central Bank. The two meetings with the director of the Foundation and his chief collaborator led

to the signing of a contract between the foundation on one side and Bernard, José and me on the other side.

The meeting with the Brazilian Central Bank's experts was less smooth; they were somewhat sceptical of Bernard's analysis and of the great financial gain that would be generated by the implementation of his reform. However, they were not against investigating the matter further and left us with the promise to read the paper that Bernard was willing to carefully draft over the following weeks.

In time it became evident that these promises would not be kept: the open letter Schmitt addressed to President Lula was never handed to him; neither was the letter promoting Bernard's reform with the Brazilian government. Bernard, for his part, never sent another paper to the experts at the Brazilian Central Bank. Instead, he went on working hard to find a new and simpler way to explain the pathological duplication of external debt servicing, as he was firmly convinced that the burden of proof rested with him and that it was his duty to go on looking for a version capable of convincing even the most unreceptive readers.

Two years later, February 2009, the three of us embarked on another expedition to Brazil. José's friend Raimundo told us that he had organized a meeting with the Governor of the State of Bahia, Jacques Wagner, whom we were supposed to meet in Salvador de Bahia two days later. In the afternoon of the following day, we met the Finance Secretary of the State of Bahia, Arno Augustin. During this long meeting, Schmitt explained the nature of the problem faced by Brazil, presented his plan for reform, and emphasized the gains that Brazil would derive from its implementation. At the end of the meeting, the Secretary assured us of his support, specifying that he would speak to the Governor before our meeting scheduled for the day after. He told us that he feared the hostility of the Central Bank, but he was not pessimistic.

The next day we waited for the Governor's secretary to call us with a time for our meeting with Governor Wagner: the call never came. Disappointed and angry, we decided to cut short our stay in Bahia and fly back to Europe, which we did the next day. Raimundo asked the Finance Secretary for an explanation and was told that, after his briefing, the Governor felt that Schmitt's project was too good to be true and that he was not prepared to take the risk involved in granting it political support.

Once again, Bernard was left facing the response of people unable to get their heads around the fact that indebted countries end up paying twice the amount required to service their external debt, whereas a simple reform would correct that, making sure that interest payment is carried out only once and the difference is claimed as their own, legitimate gain. Economists continue to find Schmitt's analysis too difficult and are unwilling to make the effort to understand it, while politicians are not enlightened enough to foresee the great advantages that his reform would provide to their country.

Bernard did not react negatively. He was unshakeable in his belief that, if a theory is correct, sooner or later it will be recognized as such and adopted by

the scientific community. As the history of scientific thought shows, this has always been the case, even though some theories have been known to take a relatively long time to be accepted. The speed at which a new paradigm is accepted depends on the general scientific background of the moment. If times are not yet ripe to accept a revolutionary theory, little can be done to accelerate its acceptance. Yet, with his love for scientific research Bernard was not one to sit on the fence. He saw the failure to convince the Brazilians as a sign that his analysis had to be further explained by adding new, more convincing proofs and be extended to encompass the formation of countries' sovereign debts.

Schmitt's last years

On 6 November 2009, Bernard turned eighty. I organized a one-day seminar at USI to mark the occasion. Bernard drove to Lugano accompanied by his colleague and friend Guy Devillebichot and by Christopher Chabin, one of his former students in Dijon. The seminar was attended, among others, by Mauro Baranzini, José Cerqueira, Jean-Jacques Friboulet, Sergio Rossi, and several research assistants and students. Bernard talked passionately about economics for three hours in the morning and two more hours in the afternoon and had still enough energy to liven up the dinner party organized in his honour in a restaurant on the outskirts of Lugano.

Schmitt's last years of intense research were devoted to explaining the fact that countries, considered as sets of their residents, carry an external debt, their sovereign debt, even though their residents pay for the totality of their imports, commercial and financial, net imports included. It was a daunting task, which increased Bernard's interest and spurred him to fully exploit the potentialities of quantum logic. Freed from any administrative and teaching burden, he devoted almost all this time to research. He wrote to me about his discoveries, his doubts, his new approaches, almost daily, and we spoke on the phone at least once a week.

In 2010 we decided to meet for three days at Edouard's country house in Clomot, where, together with Edouard and Pierlauro Lopez, my research and teaching assistant at USI at the time, we would work on the official data concerning countries' external debts. On 30 September, I drove from Lugano to Dijon with Pierlauro and took Bernard on board to join Edouard in Clomot. Bernard looked fit and in good spirits. The previous day, while cycling on the outskirts of Dijon he had a mechanical problem with his bike and was forced to walk a long distance to find help. Yet, he did not seem to be suffering any repercussions and was ready to work with us with his usual enthusiasm.

After supper we planned the activity for the next three days and went to sleep in the three bedrooms Edouard had prepared for us on the first floor of his house. For breakfast we were all supposed to meet in the spacious kitchen on the ground floor of Edouard's house, but Bernard did not show up. Surprised by this unusual event, since Bernard used to get up early in the morning, we went up to his bedroom to inquire about his health. He was awake and

perfectly conscious. He told us that he felt a little dizzy when he got up from his bed but that he was not ill and would simply rest for a while. He was perfectly lucid and reasoned as well as ever. He ate his lunch with appetite and agreed to see a doctor in the nearby village of Pouilly. Walking down the stairs to the ground floor, and then from the car park to the doctor's study, he was noticeably unsteady on his feet, but the young doctor who visited him did not find anything wrong with him. He gave him a drug that should have improved his balance and recommended rest.

Back at Edouard's place we worked a few hours, had supper, and retired to bed for the night. In the morning, we heard a noise coming from Bernard's bedroom; Edouard was the first to find Bernard at the foot of his bed tapping on the floor to attract our attention. Edouard telephoned Bernard's eldest daughter Isabelle, who told him to send for a doctor she knew. As soon as the doctor saw Bernard, he phoned an ambulance. Bernard was taken to the general hospital of Dijon. A severe stroke was diagnosed.

Denise, with whom we had been in contact from day one and who had warned us that Bernard would never accept to be taken to the hospital unless very seriously ill, was already waiting for her husband at the hospital. There was nothing we could do except wait for the doctors' response. Most likely, Bernard had suffered several brain strokes, and the last had caused the most serious damage.

After a few days in the hospital, where his condition stabilized, Bernard was transferred to a rehabilitation facility. His intellectual capacities had not been affected; he spoke, read, and reasoned well, but he could not walk because one side of his body was partially paralyzed. Fully determined to fight through adversity, Bernard tried to speed up his recovery by exercising with the aid of a walking frame. He was indeed making substantial progress, but, unfortunately, one day he lost his balance while attempting to leave his room. He fell badly and hurt his head. Nothing was broken, but for a few days he was confused, which made us doubt his capacity for recovery and worry about a possible effect on his mind.

Yet, once more Bernard showed great strength and resilience, which helped him to emerge from the 'dark tunnel' and begin the journey to recovery. He was transferred to another clinic, in Darois, near Dijon. Denise had been at his side all the time, even though her own physical condition was deteriorating; she went to see him daily and spent most of her time with him. Before he was again able to write with his computer, he dictated to her; she then transcribed on her computer the notes she had taken by hand and sent them to me.

Throughout his illness he was visited by many of his collaborators and by former students. In particular, I remember seeing Edouard Maciejewski, Jean Tramuset, and Christopher Chabin more than once while staying with him. Bernard very much appreciated and was touched by their affection. All his close collaborators and friends visited, and all were impressed by his intellectual lucidity and his undiminished enthusiasm for economic analysis, as well as by his interest in science and society. If there are some I do not mention by name, it is only because I cannot remember them all.

Thanks to his perseverance, Bernard recovered part of his mobility and started working again on a text about the problem of countries' sovereign debt. He typed it up on his computer, and we resumed our daily exchanges by e-mail. He had not lost an iota of his intellectual capacities, as the text published posthumously on SSRN testifies. In the meantime, he never stopped exercising physically and planned to go back to Segrois, where his half-brothers Bruno and Dominique had undertaken to restructure the ground floor of his Burgundy tower to adjust it to his new needs.

His wife was not in favour of this solution. Segrois is about forty minutes' drive from Dijon, where she had to stay because of her medical condition, and she could not drive back and forth to look after him. Ignoring Fauvette's advice, he settled in Segrois. He hoped to recover significantly and was looked after by two nurses, who visited twice daily and by a physiotherapist.

He worked as much as he could to finish his paper, since he was increasingly worried about how little time he had left. This concern became a certainty when his beloved wife Fauvette was hospitalized and died, without seeing him one last time, on 3 September 2013. From then on, knowing that he would join her soon, Bernard redoubled his efforts to complete his analysis, which he managed to do just a few days before his conditions worsened. He was taken by ambulance to Dijon, where he died on 26 March 2014.

Introduction

It is widely believed, nowadays, that economics is a science whose main concepts are fully established and need to be further developed only for statistical purposes. No deeper investigation into the nature of these concepts seems necessary in a discipline where mathematical models rule the roost. From such a standpoint there seems to be no room for fundamental insights since the integration of Keynes's contribution into the framework of general equilibrium analysis. However, a minority of economists refuse to share this view and contest the axioms of mainstream economics. Systematically marginalized, their chance of being taken seriously is extremely low as long as they are not prepared to accept the supremacy of equilibrium analysis – whether in its traditional, neoclassical version or in its Keynesian formulation – and limit their contribution to some marginal improvements of the established paradigm. Yet, the world never stops providing evidence – through the disorderly working of our economic systems – of the limits of economic analysis as currently practised.

Financial crises are a frequent, worrisome occurrence in today's economies; nobody has ever come up with a satisfactory answer to unemployment, in its various forms; the sovereign debt crisis increasingly weighs on deficit countries; poverty is rising throughout the world. Is it not too facile and callous to treat these problems as unavoidable side-effects of a process of economic growth that will eventually benefit everyone? The same question can be asked of those for whom this situation is the result of the unpredictable, irrational behaviour of economic agents and/or of unexpected external events altering the conditions under which the economy operates. Economies were already in serious trouble *before* WW2 as well as *before* the current coronavirus pandemic, and economic agents' behaviours are no more irrational and unpredictable than they have been in the past.

Instead of asking themselves whether something might be profoundly wrong with their presuppositions, mainstream economists keep developing new mathematical models in a hopeless attempt to mirror reality. In so doing they find themselves facing a dilemma:

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1) Should they try to build a model that meets the needs of an increasingly complex real world, which would be mathematically too complex to deliver sensible solutions, or
2) Should they build a series of simplified models delivering a mathematical solution while remaining indifferent to reality

As neither alternative is satisfying, mainstream economists ought to have re-examined their entire approach: specifically, a thorough review of the role of mathematics would seem to be in order, as well as a critical evaluation of their assumption that economics is an axiomatic science. What these economists are still far from acknowledging is that their sophisticated models rest on rather poor conceptual foundations. The sole law they constantly refer to is that of the balancing of supply and demand, and as for their scientific rendering of the economic world, it does not go beyond emulating the simplest of Newton's laws in classical mechanics: the interaction between forces in the search for equilibrium.

The crucial role played by money is underestimated, and money itself is identified as a positive asset, a mistake the Classics understood and avoided, but which is symptomatic of the conceptual superficiality of mainstream economics.

It is also important to note here that mainstream economics has been influenced by the increasingly widespread pragmatism characteristic of the Anglo-Saxon approach to science after WW2. In that spirit, Keynes's most profound intuitions were interpreted according to the principles of general equilibrium analysis (GEA), and their originality was almost completely lost. Even Walras's concept of the *numéraire* was confined to the marginal role of a commodity-standard and not investigated further.

Attempts have been made to overcome this pragmatism and the dominance of mathematical modelling, and two of these must be mentioned: the post-Keynesians' and Bernard Schmitt's. The first comprises the works of many important authors, sometimes very different from each other both conceptually and methodologically, but with a common denominator, namely a deep dissatisfaction with GEA and the desire to overcome its microeconomic foundations by deploying Keynes's insights. The second is the work of the French economist to whose analysis this book is devoted.

If I do not identify Schmitt with post-Keynesian economists, it is not because he does not share their dissatisfaction with GEA or because he rejects Keynes' intuitions but because his analysis goes much further than theirs and encompasses Keynes's achievements while overcoming their flaws. As Keynes himself claims in the preface of his *General Theory*, the 'difficulty lies not in the new ideas, but in escaping from the old ones, which ramify, for those brought up as most of us have been, into every corner of our minds' (Keynes 1936/1946: viii). Unlike Keynes, Schmitt was not indoctrinated by the 'dominant ideas' of mainstream economics and so was able to grasp the revolutionary implications of Keynes's intuitions and build, on their basis, his own macroeconomic analysis.

It is only to the extent that Schmitt was inspired by Keynes's 'fundamental equations' that he could be considered a post-Keynesian economist. However, his analysis went much further than that of Keynes and clashed in places with the claims of the Cambridge economist. This is why it would be reductive and mistaken to assimilate Schmitt to the post-Keynesian school of thought.

Schmitt's contribution

This book is about Bernard Schmitt's quantum macroeconomic analysis. Its aim is to provide a thorough overview of the development of his approach, from his first investigation into the nature of money to his last inquiry into the nature of countries' sovereign debts.

The presentation of his analysis follows a chronological *and* conceptual order, with the latter prevailing over the former. The reader must be aware that the developments ascribed to a certain chronological period can often be traced back to previous periods and can also be observed again as constitutive parts of the analysis of later periods. When it became necessary to give a more articulated picture of a given argument, I did not hesitate to disclose in advance the results obtained by Schmitt in later writings.

Logical consistency is the predominant principle for Schmitt. His methodology is simply that of applying logic, both inductive and deductive, to economic reality in order to discern its principles and derive its concepts. Induction must be understood in its Aristotelian meaning, as a process leading to the discovery of what is not deducible from axioms and assumptions. Schmitt's use of logic is extremely rigorous and relentless but always connected to reality and never in the service of building models abstracted from it. For him, economics is not a branch of mathematics, and models represent a vain attempt to mirror a reality that exists only in the imaginary universe of mainstream economists.

Schmitt was passionate about logic, as any of his readers is bound to feel. His passion moved him to constantly search for the root causes of economic events. Sometimes the reader might get the impression that his analysis is too abstract and might find it difficult to link it to factual evidence. Yet, this is only a first impression; within Schmitt abstraction is never a goal but a necessary means to understand the actual economy.

The aim of scientific investigation is to explain the real world, and Schmitt's quantum macroeconomic analysis is no exception. Economic reality must be interpreted, and it can be done through an analytical lens. For the analysis to be rigorous, economists must not be afraid of abstraction, on the condition that the world always is the point of departure and of arrival. Schmitt develops his research along these lines with uncompromising rigour. His style is precise and often concise, which might be off-putting on the first impact. The difficulties experienced by the reader are inherent to the subject matter itself; Schmitt explicates them, but fully understanding them remains a hard task.

Schmitt's search for the best scientific explanation is constant, always accompanied by the need to dig deeper. As a result, even his clearest texts

are rich in intellectual challenges for the reader. Schmitt's capacity for hard work was prodigious; when focused on a specific topic, he kept at it almost day and night, writing down the results of his investigations on an ongoing basis. He then would move to another topic to do the same, though that would not stop him from revisiting the crucial steps of his analysis to test them further.

The choice of texts

His published and unpublished texts run in the hundreds. Extremely clear and didactic texts distributed to his students at the University of Fribourg, Switzerland, and the University of Dijon, France, alternate with very dense and arduous ones. From the beginning of his research until the end of the 1980s, most of his books were published by French and Swiss presses. A radical change occurred in the late 1980s: from then to his death in 2014, he no longer published one single book. Only some of his papers were published, mostly as contributions to collective volumes and a few in peer-reviewed journals. Partly the reason is that he lost interest in academic publishing, but mainly it was that he became too absorbed in his research and wanted to devote most of his time to it. The numerous manuscripts of this period include full-length books that could easily be revised and published. Most of his texts were distributed solely to his students or to a handful of people interested in pursuing his approach.

For this volume I have made detailed use of only *some* of Schmitt's published and unpublished manuscripts. The choice has not always been easy, and I have reluctantly resisted the impulse to quote other texts. My aim has been to provide an exegesis as faithful and complete as possible of Schmitt's analysis. Some of the unpublished manuscripts in my possession are untitled and undated. I have tried to order them chronologically to the best of my knowledge and given them indicative titles. Most manuscripts are in French, and I have provided my own translation of relevant excerpts from them. (Note that 'm.t.' after these quotations means 'my translation'.)

The volume follows the evolution of Schmitt's analysis, emphasizing its most relevant passages and presenting Schmitt's main arguments in support of his results. A critique levelled at Schmitt and his collaborators is that they exacerbate the need to prove everything and to provide many versions of proofs, sometimes only slightly differing from one another. It is true that the constant search for new logical proofs makes it arduous to summarize Schmitt's contribution and might sometimes discourage the reader. Yet, it is also certain that any new analysis must provide more than a single proof of its truth if it aims to supersede the orthodox vision of mainstream economics. The abundance of proofs provided by Schmitt, and reproduced in this volume, must be seen as a valuable intellectual patrimony that, hopefully, will be the object of investigation for future generations of researchers.

About Schmitt's terminology

A few remarks concerning Schmitt's terminology are in order. The first and most general remark is that none of his definitions is purely nominal and that none has the status of an axiom. In Schmitt's analysis, and this must be true of any scientific analysis, the definition of a concept is never given *a priori* but is always the result of a logical investigation. This explains why Schmitt's understanding of widely used concepts such as money, profit, interest, capital, inflation, and external debt differs from that taken for granted by mainstream economists.

Even though the terms used by Schmitt and by traditional economists are often the same, their meaning is sometimes quite different. This might create some additional difficulties for the reader accustomed to the old definitions. The best way of dealing with these problems is to avoid considering any economic concept as a given but to start from a clean slate and let the mind follow logic free from preconceptions.

Attention should be paid to the use of the word '*real*'. In everyday language, 'real' is used as a synonym of 'existent', 'actual', 'genuine', 'true' and is opposed to 'unreal', 'imaginary', 'false'. In economics, authors use 'real' in relation to money and income to distinguish what can effectively be purchased by a particular income or by national income in general, from the numerical or nominal expression of these incomes. Schmitt does the same and applies it also to goods. Thus, the expression 'real goods', which might sound redundant, indicates physical goods as opposed to goods conceived in their monetary or nominal form. 'Real goods' are not merely goods that really exist, but the physical goods that result from the process of production and define the 'content' of money-income, the object of the purchasing power of money. Likewise, 'real capital' is capital in its physical form, and so are 'real interest', 'real profits', and so on: they are the physical goods constituting the content of their monetary form.

Schmitt's analysis is essentially macroeconomic. It concerns the economic system as a whole and investigates the impact of economic events on the *set* of economic agents. The word '*set*' recurs regularly in Schmitt's texts; it must be understood in its mathematical meaning, namely as a collection of elements (agents, objects, numbers, and so on) considered as an entity in its own right, which cannot be reduced to the mere *sum* of its elements. First introduced in mathematics, the concept of set finds a significant application in economics, whereby macroeconomics is defined as the analysis of the economic transactions that, whether carried out by a single agent or by any number of agents, modifies the situation of the set of economic agents and, consequently, of the whole economy.

The present criterion of distinguishing microeconomics from macroeconomics based on the number of agents involved in each transaction is both superficial and wrong. *It is not the number of agents involved that matters, but the nature of their economic activity*. Hence, the production of a single worker is

macroeconomic because it increases the income available in the whole economy. The loan granted by income holders to consumers, on the other hand, defines a microeconomic event even if it is carried out by a great number of agents, because it merely re-distributes a given income without either increasing or decreasing it. The concept of set is also useful when the analysis concerns all the elements of a given class taken as a whole as, for example, the set of workers, of households, of firms, of banks, and so on. In particular, it finds a fruitful application in international economics, where a country considered as a whole is identified with the set of its residents.

Quantum macroeconomics

Other terms and phrases proper to Schmitt's terminology are worth noting: 'quantum macroeconomics' and the use of terms such as 'emission', 'corpuscular', 'wave-like' and 'quantum time'. Although they are taken from physics, these concepts find a new field of application in economics, where their meaning is specific to this discipline. An emission of money, for example, is an instantaneous creation-destruction of an immaterial flow and not of a particle or a wave as in quantum physics. Another example is the concept of quantum. In physics it refers to an indivisible discrete amount or 'chunk' of energy like Einstein's photon, or to a charge in a spread-out field as in quantum field theory; in Schmitt's macroeconomics it relates to time.

It is important to emphasize that Schmitt's quantum macroeconomic approach to economics is not a transposition of quantum mechanics principles into the field of economics. Schmitt's analysis developed independently from physics, and the fact that economics and physics seem to converge on a new perception of reality must be seen as a sign of the natural evolution of science and not as an attempt to construe economics by borrowing from physics.

Specific to Schmitt's research is the use of a modern form of logic that goes beyond the traditional binary form. The main difference between his and the binary form of logic is that the former rejects the generalized application of the principle of the *excluded middle* (*tertium non datur*). Already found wanting by some philosophers and mathematicians, binary logic is also ill-suited to explain the complexity of economic phenomena such as production, profit, amortization, stagflation, etc.

Distinct from the fundamental principle of non-contradiction, the law of the excluded middle restricts the analysis so much that it can no longer account, for example, for amortization being at the same time a reproduction and a new production, or prices being simultaneously identical to and greater than values. Schmitt succeeds in accounting for these conundrums without falling into contradiction thanks to the use of a logic that may soon replace the old binary form in every scientific field.

The structure of the volume

The book is subdivided into three parts, each corresponding to a period of Schmitt's activity characterized by its main contributions to specific areas of investigation. The chronological distinction is somehow arbitrary and far from clear-cut since Schmitt's research extends over a period of more than sixty years without interruption, and the main topics of his investigation were always at the centre of his interest. It is nonetheless possible to pinpoint three main phases in the conceptual development of his analysis, which I designate as his greatest intuitions, his further in-depth discoveries, and his final years of ground-breaking analysis.

The last sections of 13 out of the 14 chapters of Part I and Part II are devoted to a critical comparison of Schmitt's analysis with that of other economists, both orthodox and heterodox. This comparison will help contextualize Schmitt's intellectual achievements and show what unites and what separates his analysis from that of other prominent economists, in general, and of Keynesian and post-Keynesian economists, in particular.

Part I

Part I deals with Schmitt's first discoveries in the field of national economics and international economics and spans the period from 1959 to 1987. During these years of intense research, Schmitt investigates all the main topics of macroeconomics, writing and then publishing some of his masterpieces. This first part is made up of nine chapters, six concerned with national economics and three with international economics.

Chapter 1

Chapter 1 deals with the central element of Schmitt's analysis: bank money. By referring to several of his publications and unpublished manuscript, it is shown that Schmitt elaborates his notion of bank money far more rigorously than the great majority of his fellow economists. The starting point of his analysis is double-entry bookkeeping and the crucial role played by the number zero. The simultaneous entering of positive and negative numbers into banks' balance sheets demonstrates that money as such cannot be issued either as a net asset or as a net liability. Far from surprisingly, this means that banks cannot create a positive asset in isolation from the rest of the economy.

Chapter 1 shows that money is issued by banks as an *asset-liability*, which is a *mere numerical form*, and explains how this purely numerical 'container' can acquire positive purchasing power. Already investigated by the Classics, the transition from nominal money (a valueless, numerical form) to 'real' money (endowed with a positive value or purchasing power) requires the intervention of production. It is through the remuneration of the factors of production that money and output are so closely 'associated' that they define the two aspects

of one and the same reality. Schmitt's analysis confirms the Classics' idea that it is through human labour that money acquires positive purchasing power, as well as Walras's intuition that economic value is not a dimension but rather a mere numerical relationship.

Chapter 2

The formation of money's purchasing power is investigated further in Chapter 2, with arguments mainly derived from Schmitt's second published volume: *Monnaie, salaires et profit* (1966). It is in his 1966 book that Schmitt claims that, from a macroeconomic viewpoint, the factors of production must always be traced back to a single one, namely human labour, and therefore wages are the only macroeconomic cost of production. Definitively demonstrated in 1984, this claim rests on the fact that the payment of wages is the only transaction by which an output can become the object of a bank deposit. Yet, if wages are the only macroeconomic income formed by production, how can we explain the existence of other incomes, in particular profit? Schmitt's answer is in line with Keynes's *General Theory*, that is, with the inclusion of profit into national income: profit is derived from wages and so are interest, dividends, and rents.

Chapter 2 refers to Schmitt's effort to provide the building blocks of a theory of national money and production, and an explanation of how profit is part of wages. A highly controversial topic in economics, the theory of profit becomes a cornerstone of Schmitt's early analysis of capitalism. Starting from the role played by bank money and the way money is associated with produced output, Schmitt is able to show that the formation of profit is perfectly consistent with the identity of national income and nominal wages. His 1966 analysis is placed in a historical frame, shown as the first step towards a quantum theory of profit, subsequently presented in his 1984 book on inflation, unemployment, and capital malformations.

While developing his own theory, Schmitt analyzed in depth the theories advocated by his predecessors and his contemporaries, highlighting both their positive contributions and their shortcomings. His critical assessment of Keynesian and Marxian economics was mostly elaborated in the first three decades of his research, whereas his critical investigation of general equilibrium analysis lasted almost until his death.

Chapter 3

Chapter 3 deals with Schmitt's critical appraisal of Walras's general equilibrium analysis, Keynes's income analysis, Marx's theory of value and surplus-value, and Sraffa's attempt at determining relative prices through the methods of production.

In this chapter, I consider Schmitt's first attempts to show that neither Walras nor Patinkin or the quantity theorists succeed in integrating money

into the theoretical framework of GEA. The dichotomy between real world and monetary world, on which GEA rests, does not allow for the transformation of relative into monetary prices.

Walras's failure to integrate money into his system of equations is not corrected by the advocates of the quantity theory of money: it remains trapped in the logical impossibility to transform an identity, Fisher's equation of exchange in its various forms, into a condition of equilibrium. Patinkin's real-balance effect does not succeed in overcoming Walras's impasse either, because the adjustment of the supply of, and demand for, real goods through which individuals equilibrate their real balances cannot determine at the same time the value of money, i.e. its purchasing power, and the prices of goods. Patinkin's mistake is the same as that of the quantity theorists: it consists in deriving the purchasing power of money from the general price level, whereas it should be clear that the adjustment determining the price of goods leaves the value of money unaltered.

In order to discover the reasons underlying the logical indeterminacy of relative prices, Schmitt follows Walras in his initial analysis of the direct exchange between two goods, stresses the crucial importance of what is known as Walras's law, and questions its logical status. His answer is that Walras's law is nothing more than a tautology without explanatory power.

Contrary to what Walras and his followers believe, the law supposed to equalize the number of variables and of GEA's independent equations is an identity only when exchanges occur. Before exchange, in the phase of adjustment that is supposed to lead to the determination of relative prices, Walras's law does not apply, which means that the number of independent equations cannot be reduced. The ensuing over-determinacy of Walras's system of equations has an unavoidable, distressing consequence: the logical indeterminacy of Walras's relative prices.

The second part of Chapter 3 is devoted to part of Schmitt's critical appraisal of Keynesian economics, in particular of some of the main macroeconomic topics analyzed by Keynesian economists: the attempt to determine national income starting from a system of equations derived from Keynes's identities, as well as the world-famous theory of the income multiplier and its relationship with the principle of effective demand.

The multiplier theory is probably the one that most contributed to Keynes's renown, though not one of his original contributions, and despite its metaphysical flavour. It is taught by Keynesian economists (new-Keynesians and post-Keynesians included) to this day and came under attack by Schmitt in his 1971 volume on the macroeconomic analysis of income.

As shown in Chapter 3, the kernel of his critical analysis lies in the role played by saving and hoarding, respectively. The nature of bank deposits and the necessary compliance with the principles of double-entry bookkeeping establish beyond doubt that hoarding is always, and necessarily, equal to zero. Consequently, if indeed, as the multiplier theory assumes, consumption reproduces income, the process of multiplication that follows an exogeneous increase

in income will go on endlessly. Schmitt's proposed alternative is clear: instead of being at the origin of new income, consumption, i.e. the final purchase of produced output, leads to the destruction of the income spent by consumers.

The third part is concerned with Schmitt's critique and synthesis of Marx's economic thought, with reference to his theory of value and surplus-value.

Even though Schmitt's favourite classical author was undoubtedly Ricardo, his interest in Marx was not secondary, as testified by his deep knowledge of *Das Kapital*. Schmitt's published and unpublished texts on Marxian economics deserve our attention, not only because they throw new light on the logical shortcomings of Marx's analysis but also because they contribute to a better understanding of Schmitt's own theory. In two volumes published by Castella, the founding blocks of Marx' theory of capital are critically analyzed with the twofold intent of emphasizing the positive aspects of Marx's analysis of value, while pointing out its weaknesses.

Already present in the works of Smith and Ricardo, the labour theory of value is a pivotal element of classical political economy, which finds in Marx its most accomplished version. Even though quantum macroeconomics confirms the claim that labour is alone at the origin of economic value, the classical attempt to measure value in terms of working time is doomed to failure. The very heterogeneity of labour does not allow the use of labour time as a standard of value.

What is new in Schmitt's analysis is the explanation of why it is logically impossible to measure economic value, time included, with a dimensional rod. By extension, Marx's theory of surplus-value is then dismissed on logical grounds, because *no fundamental distinction can be drawn between labour and labour power*. Marx's attempt to explain profit in terms of surplus-value fails for this very reason and because it cannot explain the monetary realization of surplus-value.

The last part of Chapter 3 is devoted to Schmitt's critique of Sraffa's attempt to provide a successful alternative to Walras's system of relative price determination. Sraffa seeks to determine the ratio of exchange between real goods through a system of equations relating to their methods of production. Starting from the idea that commodities are produced by means of commodities, he assumes that production takes place through consumption in a scheme that he describes as a self-replacing state. He also distinguishes the case in which production occurs without a surplus from that in which a surplus is formed and distributed in proportion to the capital invested in each industry.

Schmitt considers the two cases and shows that the prices Sraffa believes to be determined by his equations are the very definition of his assumptions. The ratio of exchange between the commodities produced in the two industries Sraffa refers to is implicit in the choice of the self-replacing state and of the absence of a surplus or of its distribution in proportion to the advances of each industry.

Schmitt also shows that, in the case of a positive surplus, Sraffa's equations are inconsistent with the assumption that a surplus is formed in each industry,

unless the commodities produced by them, iron and wheat, are considered interchangeable, as if iron were merely a kind of wheat and vice versa.

The physical heterogeneity of real goods should have prevented Sraffa from writing his equations, whereas he adds up iron and wheat as if they were different quantities of one and the same object.

Like Walras's, Sraffa's failure to determine relative prices through exchange is due to the lack of the common numerical standard necessary to transform physically heterogeneous objects into economic products. Exchange being a bipolar transaction, none of the goods exchanged can be defined as the standard of the other without at the same time defining the latter as the standard of the former. Heterogeneous before exchange, Sraffa's commodities are bound to remain distinct and heterogeneous even during or after their exchange, which is further proof of the logical impossibility of determining relative prices in his theoretical framework.

Chapter 3 ends with a short note on Schmitt's critique of Pasinetti's input–output analysis and his pure labour theory of value.

Chapter 4

Chapter 4 deals with the all-important question of the relationship between production and time. In his 1984 volume on *Inflation, Unemployment and Capital Malformations* Schmitt advocates a new notion of time and shows that production is not a function of continuous or discontinuous time, but an *instantaneous event* that defines a positive and indivisible portion of time: a quantum of time. His quantum macroeconomic analysis marks a crucial point in the history of economic thought.

Conceived as an instantaneous event quantizing time, production becomes the object of economics as a *sui generis* scientific inquiry. Schmitt is thus able to transform economics into a scientific practice rather than aping it or distorting it – which is what happens when one views scientific description and explanation as synonymous with mathematical representation – and to specify the logical laws on which it rests. The analysis of production remains central, because it is through production that *money is transformed into income* and output becomes its object. As an economic event, production coincides with a payment that gives a numerical form to physical output.

Since Einstein we have become aware that time – still a mysterious concept – is a component of a new dimension, space-time, and that its measure requires light as a constant. However, the experientially important 'arrow of time' remains unexplained, since physical laws are timeless; or so it has seemed till recently. Schmitt's view of time is not at odds with how we ordinarily experience it. It provides a complementary vision of time. Quantum time derives directly from the specific nature of economic production and its relationship with the period of transformation of matter or energy required to obtain any physical output.

Economic production is instantaneous, because it is nothing other than the 'moment' at which physical output is given a numerical form through the

payment of wages. The result of economic production is the transformation of physical output into a sum of money. This does not mean that the process of production is irrelevant or that physical output does not matter. Indeed, the payment of wages refers necessarily *to a finite time period*, corresponding to that of the physical transformation of matter or energy, which is precisely the definition of quantum time: *the result of the (instantaneous) emission of a finite period of time*.

The originality of Schmitt's thought and his efforts to free economics from its subservience to mathematics and physics derive from his intuition that Keynes's equation between global supply, Y, and global demand, $C + I$, is an identity. To maintain that production and consumption are the two opposite phases of a sole emission, and that each production creates the income necessary and sufficient for the final purchase of its output, one must show that investment, too, defines a final transformation of income. Indeed, it is through investment that income is transformed into fixed capital.

Chapter 5

Chapter 5 is devoted to the analysis of the way fixed capital is formed. At least since the works of Ricardo, it has been understood that *capital is closely related to time*. What still remained unclear was the passage from capital-time – as Schmitt calls it – to fixed capital. Following Keynes's claim that capital is what enables us to build a bridge between present and future, Schmitt shows that capital could not exist in the absence of banks and their financial intermediation. It thus appears that capital is formed through the investment of savings.

The distinction between capital-time and fixed capital is due to the fact that the former belongs to a reversible process through which saved-up income is transformed into capital, whereas the latter derives from the irreversible or definitive transformation of income into capital. In both cases, saved-up income is invested, but in the first case saving can be recovered and spent for the final purchase of the output stocked by firms, while in the second case saving is forever fixed in the instrumental goods, whose production it finances.

The study of fixed capital formation in capitalist economies is crucial for the understanding of the pathologies that affect them. Schmitt develops it along two lines of thought, one in his 1984 volume and the other in an unpublished manuscript of 1998. Consistent with the chronological order I follow in this scientific biography, only the first of these two analyses is presented in Chapter 5.

Chapter 6

Chapter 6 completes the investigation of the main elements of a capitalist economy of production. The use of fixed capital makes it necessary to account for its maintenance and its replacement. Amortization grants the maintenance and replacement of fixed capital and, as such, it coincides with the production

of amortization-goods. Hence a question arises: is amortization a reproduction, or does it define a new production comparable to that of new investment-goods? Schmitt's quantum macroeconomic analysis shows that amortization is both a reproduction and a new production.

Far from being self-contradictory, Schmitt's analysis is an example of the fact that the logic of economics goes beyond the principle of the excluded middle. Schmitt is thus able to show that, in the present capitalist system, the production of amortization-goods adds to the production of consumption- and investment-goods.

The analysis developed in Chapter 6 concerns the genesis and nature of inflation and unemployment.

Too often identified with a generalized rise in prices and quantified through the use of a consumption price index, inflation is in reality a pathology leading to a decrease in the purchasing power of money. It is an anomaly affecting the relationship between money and output in such a way that a given output becomes the real content of an increased number of monetary units.

To explain inflation is to show that a numerical difference can exist between global demand, D, and global supply, Y, without contradicting the fact that D and Y are the terms of an identity. Schmitt shows that what might seem an impossible claim is, on the contrary, the only possible way to arrive at a correct understanding of how money units can lose part of their purchasing power in a context where production is the only macroeconomic source of income.

As for unemployment, what Schmitt investigates is *pathological* unemployment – Keynes's involuntary unemployment. Once again, what is under scrutiny is the macroeconomic working of our capitalist economies and its compliance with the principles governing money, income, capital, and their interrelations.

The search for the cause of unemployment is arduous, and Chapter 6 analyzes how Schmitt deals with the problem in his 1984 volume on capital. There he shows that pathological unemployment is the unavoidable consequence of a process of capital accumulation, whose by-product is the increasing fall in what Wicksell called the *natural rate of interest*, the ratio between total profit and accumulated capital. When this rate drops below the market rate of interest, the production of new fixed capital-goods must be reduced. Indeed, at this point the system reaches a critical level of accumulated capital and is forced to reduce its rate of growth. This is so because capital must be remunerated and, when the natural rate of interest falls below the market rate, the profits firms can make are no longer sufficient to guarantee the payment of interest.

The second section of Part I is concerned with Schmitt's contributions to the field of international economics during his first intense period of research activity.

As a matter of fact, Schmitt's interest in international economics goes back even further, to the late sixties, and is the consistent generalization of his intuitions concerning the nature of bank money. From that time on, he worked

painstakingly on both national and international economics, developing a unified theory of money.

The second section of Part I of Schmitt's scientific biography is devoted to his main achievements in the field of international payments and rests on his published and unpublished manuscripts dated between 1960 and 1988.

Chapter 7

Chapter 7 shows how Schmitt's conception of money can be applied to international transactions and how he managed to work out a common theoretical framework encompassing both national and international economics.

International economics differs from national economics in that the former is not directly at the origin of any production. Yet, this has no impact on the way money is issued by banks and relies on the logically incoherent view of treating money as a positive asset. In an international framework, it is particularly clear that no national currency can be considered as if it was real good. Issued by banks as a spontaneous acknowledgement of debt, outside its national border, a national currency defines an IOU of the whole banking system. It is plain, therefore, that national currencies not only have no redeeming power, but they cannot be themselves the object of any international payment.

Chapter 7 is based mainly on one of Schmitt's most successful books: *Théorie unitaire de la monnaie, nationale et internationale* (1975). Translated into German, Portuguese and Italian, this book marks the start of a period of renewed interest in the old theory of the circuit as well as in its modern formulation. A number of heterodox economists were to follow Schmitt's example and contribute to the diffusion of circuit theory. Yet, their analyses differ substantially from that of Schmitt regarding the logical distinction between money and income. Furthermore, none of them saw the relevance of applying circuit theory to the field of international economics.

Chapter 7 also shows that today's international transactions are a cause of inflation. Schmitt explains why this is so in *Les pays au régime du FMI*, published in 1984 by Castella. He tackles the case in which a country's imports are balanced by its exports as well as the case in which a country's exports are net and shows that the pathology derives in both cases from the fact that, contrary to its nature, money is considered a real good.

In the first case, this leads to the monetization of the foreign currencies paid by foreign importers. It is this additional creation of domestic money that pathologically increases the number of domestic money units initially associated with current output.

In the second case, inflation is due to a process of duplication, whereby the net importing country pays for its net imports by transferring to the creditor countries a mere IOU. Since the totality of foreign currency remains deposited with foreign banks, creditors are paid in what Rueff calls a duplicate, a simulacrum that pathologically increases the financial capital available in the net exporting country.

Another topic analyzed in Chapter 7 is that of currency exchange rates. Most economists consider the rate of exchange as the relative price of currencies, because of the mistaken identification of money with an asset. Emulating what Walras did in the case of real goods and services, they think it is possible to determine the equilibrium rate of exchange between currencies by adjusting their supply and demand on the forex.

Dismissing this view of the exchange rate, Schmitt maintains that if the erratic fluctuation of exchange rates is indeed due to the speculative purchase and sale of currencies on the forex, the cause must be the erroneous treatment of money as a net asset. If currencies were considered for what they actually are, the present regime of relative exchange rates would be replaced by a new regime of *absolute exchange rates*, compatible with the use of money as a *means* rather than an object of exchange.

Chapter 8

Chapter 8 argues that a positive analysis must lead to a normative result and provides the principles that facilitate *the transition from disorder to order*. Schmitt's inquiry into the nature of international payments and of their systems (or non-systems) leads indeed to a plan for an international monetary reform. Chapter 8 deals with the reform he first put forward in 1973 and with the influence of Keynes's Plan for the Establishment of an International Clearing Union (ICU) presented at Bretton Woods in 1944.

Keynes's Plan contained two original proposals, none of which was correctly understood by the scientific community of the time:

1) The institution of a supranational bank (the ICU); and
2) The emission of an international currency, the bancor, distinct from any national money.

According to Keynes, the emission of the new currency should have been based on the principles of banking, that is to say, on the necessary equality between credit and debit. The bancor would have conveyed all the payments among countries, and a mechanism based on multilateral clearing would have guaranteed a perfect match between monetary and real payments. Unfortunately, Keynes's Plan was not sufficiently elaborated and clear-cut, so it was not implemented.

Schmitt's own plan supplies what is still missing in Keynes's and puts forward the logical principles and the practical arrangements that would make it possible to transform the present non-system of international payments into a truly orderly system. In his 1973 book *New Proposals for World Monetary Reform*, Schmitt sets out a regulatory framework for a reform, which he would develop further in his 1977 book *L'or, le dollar et la monnaie supranationale*, and to which he will return on several occasions during his long-lasting involvement with the problems of world monetary disorders and their solutions.

Chapter 9

As Chapter 9 points out, Schmitt published three volumes about the problem of European monetary unification between 1975 and 1988. The debate on the advantages and disadvantages of adopting a European currency was derailed by the confrontation between advocates and adversaries of an eminently political project that soon took over. Anyone who dared point out the existence of critical difficulties, likely to hamper the project, was accused of Euro-scepticism, a euphemism that really meant that any critique was seen as a stance against the EU.

Schmitt's texts attempt to keep the debate within a strictly economic context, to analyze the European project from a scientific and macroeconomic viewpoint rather than from a political one. More specifically, Schmitt seeks to understand which countries adopting the European money would suffer. His approach rests on the nature of money, income, and capital as well as on the role played by national monetary systems vis-à-vis the free movements of capital. Indeed, monetary sovereignty is a 'safety belt' against the loss of domestic capital. Even when invested abroad, domestic capitals remain deposited within the banking system of the country in which they originate. Apparently contrary to common sense, this state of affairs is imposed by double-entry bookkeeping, and understanding it is crucial for a correct evaluation of the pros and cons of monetary unification.

Does this mean that European countries were, and still are, confronted with two equally negative alternatives? Namely, either give up monetary sovereignty and accept the increase in economic divergences between them or to maintain their monetary sovereignty and accept the erratic fluctuation of exchange rates between their domestic currencies. No, it does not. As shown in Chapter 9, Schmitt developed the principles of a reform that would allow European countries to remain monetarily sovereign – at least until economic convergence is attained – and at the same time guarantee the automatic and costless stability of their national currencies.

Part II

Part II covers a period of roughly ten years of Schmitt's activity, 1987 to 1998, and is characterized by an increased effort towards a more in-depth analysis of national economics as well as criticism of general equilibrium analysis, GEA. Those were very prolific years in terms of manuscripts. As most of them have remained unpublished, Schmitt's substantial improvements to his analyses are much harder to show. A choice must be made if we want to preserve the specificity of Schmitt's message.

Chapter 10

Schmitt was always fascinated by the problem of international payments and their pathological implications, and he devoted a substantial part of his research