

CHANGES IN FINANCIAL EDUCATION OVER THE LAST 50 YEARS

An interview with János Száz on the occasion of his 70th birthday

Ágnes Vidovics-Dancs¹



Á. V-D.: The interview published in the last issue of *Public Finance Quarterly* mentioned the International Training Centre for Bankers, the Budapest Stock Exchange, and the National Bank of Hungary, but relatively little was said about the university, specifically about the University of Economics, where you have been climbing the stairs every day for 52 years, since 1971. What has been the biggest change at the university over this period?

¹ *Ágnes Vidovics-Dancs* associate professor, Corvinus University of Budapest, director of the Economic and Financial Mathematical Analysis (undivided master-degree) Program. E-mail: agnes.dancs@uni-corvinus.hu.

J. Sz.: I really prefer climbing the stairs to using the lifts. I am planning to continue teaching my subjects as a professor emeritus in the *Numerical Finance* subject series. There were no similar subjects at the University of Economics in the 1970s, either in Hungary or other countries. But, of course, this is far from the biggest change. It is probably more important that *short Power Point-type notes have replaced textbooks*, and the role of the library has largely been taken over by the *Internet*.

I think the problem with this is that, despite the fact that pieces of information have become quickly and easily available, carrying out research on the Internet does not replace the slow and tedious work that allows you to see the structure as a whole and delve into the details at the same time. In spite of being able to find the meaning of certain combinations of letters and desirable threshold values in my lab results on the Internet within minutes, I have not become a qualified doctor who can see the relationships. There is no royal road to mathematics either.

Another significant change is that more and more *spoilt* generations sit in the classrooms (the reasons for this have deep roots, and it is not sure that this trend makes life easier for today's children). - On the contrary, it is good if they sit in the classroom at all and do not work somewhere for 6-8 hours a day, already from the first year. This working lifestyle is often against in-depth, focused learning. The world has opened up for students, there are plenty of opportunities. I think this is clearly positive, but it does not make the life of today's young people easier either.

A few years ago, I met one of my students at breakfast in a hotel's restaurant in Brussels. She told me that she interpreted every Tuesday in Brussels. Punctually at 9:40 a.m. the next day, she was sitting in my seminar. Just like on Wednesdays of the following weeks. With the difference that I did not have to fly to Brussels every Tuesday.

The world has expanded. I taught with some of my colleagues in Mexico a few years ago. One morning, I read an email request sent from New Zealand by one of my students. A few weeks later, we were both sitting in computer laboratory No. 250 in Fővám Square. It seems that professors and their students can occasionally have quite a long distance between each other.

Á. V-D.: In 1971, you became a national economic planning analysis major, specialising in calculus for business and economics, which was the successor of the former mathematics for planning course at the time. Later, you yourself became one of the main organizers of financial education, introducing topics and founding workshops. How did it all start? Why education and finance?

J. Sz.: Both my parents and my sister graduated from the University of Economics as teachers of accounting. However, it was not enough for me to consider apply-

ing to the University of Economics. The decisive incentive was when I obtained professor *Denkinger's* textbook entitled *Probability Theory* when I was an eighth grader, and I really liked it. Moreover, I wondered what it would be like teaching maths at the University of Economics. As a result, I already applied to an academic grammar school with mathematics specialization, even though the subject called arithmetic had not attracted me at all previously.

When I was a university student, I taught programming at the Department of Information Technology from 1974. Imre Kiss, who had a very good sense of humour, was the head of that department. One of his famous sayings, which I sometimes crack as a joke, was the following: “*I was born 10 minutes later, and I have not been able to make up for it since then...*”. Another saying of his often comes to mind, as well: “*If there is a huge mess in the yard of the ironworks in Csepel, it may be easier and faster to manufacture an iron pipe again than finding it.*” I have rewritten quite a few programmes, because I was not able to find the previous version... The first student I discovered was *Juli Király*, who was still a freshman at the time. She also gave a great short lecture on the block diagrams of Leibniz. But that happened about 50 years ago.

Finance was not my own choice. *István Hagelmayer* invited me to the Department of Finance, therefore I ended up teaching financial mathematical models with *Márti Sulyok Pap*. It was the idea of *Kálmán Szabó*, who was the rector of the university in the mid-1960s), that the departments should also employ students who graduated as mathematics for planning majors to promote the integration of mathematical applications into several branches of education. That was how Márti got to the Department of Finance - and I joined her as an apprentice a few years later.

At that time, nobody mentioned *bond pricing* or *option pricing* (because Black and Scholes's significant article, which laid the foundation for this topic and has become world famous, was only then accepted for publication with great difficulty by an American journal. And the journal accepted it only due to the intervention of a Nobel laureate. Even in America, it was only a decade later that they began to realize the importance of the topic.) In the beginning, Márti and I taught *profit maximization* models and, among other things, the *Balance of Cash-Flow Relations* (BCR) created by *Mária Augusztinovics*. This was a financial application of Leontyev's *input-output analysis*: summarising the essence of the *credit money system* in a multi-sector model. Mathematically, it was a standard model - and in those decades, every student at the University of Economics had to study 4 semesters of mathematics: analysis, probability theory, linear algebra and operations research (linear programming). Therefore, it was a basic task of the university exam to calculate how much gross output each sector had to produce for a given

amount of net output, taking into account the consumption of each sector (input-output analysis). The BCR's financial interpretation was even bolder at that time. The Soviets and the Bulgarians were still taught, following *Marx*, that money was gold, and banknotes were only its substitutes. At the Department of Finance headed by *Miklós Riesz*, there was no question that the forint was *credit money* – i.e. it was generated by granting loans (or buying foreign currency) by banks and ended with the repayment of the loan. In the middle of the socialist era, claiming that socialist money is created out of nothing (with an accounting operation) and has no gold cover behind it...

Well, it was one of the things in which Hungary was far ahead of the other countries of the socialist block. At the university (then known as the Karl Marx University of Economics - MKKE), subjects like

- (the deeply undervalued) *political economy*,
- a subject called the *History of Economic Theories* taught by professor *Antal Mátyás*, where in essence, we learned about the essential basic concepts and connections of modern economics, in addition to *Smith*, *Ricardo*, *Keynes* and *Friedman*,
- and *Finance*, which was absolutely modern in terms of macrofinance, coexisted peacefully.

Due to his pragmatism, finance was highly respected within the university. Primarily thanks to István Hagelmayer, Miklós Riesz, *Tamás Bácskai*, *Tamás Bánfi*, but perhaps also to the nature of the topic. There were three significant financial workshops in Hungary at the time: the *National Bank of Hungary*, the *Financial Research Plc.* led by Hagelmayer, and the *Department of Finance*. The prestige of the National Bank of Hungary abroad was also significant compared to the size of the country. After the Soviets' adventure in Afghanistan, only the National Bank of Hungary was able to obtain foreign loans in the Eastern bloc.

I will never forget that when the arbitration department led by *Imre Boros* received a brand new dealing room, from which they managed the centralised foreign exchange transactions of the National Bank of Hungary (and thus those of the entire country), the National Bank of Hungary's currency trading partners came to the handover ceremony from London, Zurich, Frankfurt, and by a special charter flight from New York, *János Fekete*, the Vice President of the National Bank of Hungary, concluded his toast on the eve of 7 November with the following sentence: "*Let us toast to the anniversary of the victory of the Great October Socialist Revolution!*" The initial shock was replaced by general grin, and the bankers who came here drank heavily. Budapest was a special place on this occasion. These international bankers rarely visited places where 7 November was

celebrated, and where they went, it would have been considered the worst joke to drink to that event.

Well, that is where we started.

Later, “*the planning office was replaced by the stock exchange*”. In university mathematics education, this would have meant that the emphasis would be shifted from matrix calculus to probability theory and stochastic processes. At least this should have happened, if mathematics and statistics education had not shrunk to a third or a quarter due to the pressure of the college lobby (and to the Western „best practice” business school models) during the transition to the Bologna system. Not only did mathematics and statistics education have a long tradition at the University of Economics, but the legal predecessor of the MKKE had a pioneering role at the European level, as well.²

The static, multi-sector equilibrium calculations of socialist planning were replaced by the need for dynamic stochastic analysis – if only for the purpose of the simplest stock price analysis. The foundations of this disappeared from domestic higher economics education during the transition to the Bologna system. Clicking on the icons of today’s trendy data analysis software (Big data, machine learning) does not replace this method at all. There would be an even greater need for a more thorough understanding right now.

Á. V-D.: For nearly 5 decades, the university, and within that teaching finance, has been the axis of your professional activity without interruption. But there were also longer and shorter detours: National Bank of Hungary, International Training Centre for Bankers, Training Centre for Brokers, the stock exchange, a six-month IMF course in Washington, and an honorary professorship at the University of Cluj Napoca. In addition, you are the author/co-author of several textbooks and professional books. Was there any connection between your writings and your roles outside the university?

J. Sz.: Yes, there definitely was. But this was mostly realised later, with a long delay.

I wrote my thesis on *stochastic processes* under the supervision Margit Ziermann in 1976. It did not include an iota of finance. The fact that I got into the Department of Finance made it seem like an unnecessary dead end. Then, nearly a decade and

² Károly Jordán started teaching probability theory at the legal predecessor of our university in 1920. It was unique as an independent subject in economic education, all over Europe at the time. “There was no country other than Hungary in continental Europe, where there was systematic teaching of probability and statistics as early as 1920.” In: https://link.springer.com/chapter/10.1007%2F978-1-4613-0179-0_63 (encyclopediaofmath.org.)

a half later, I started dealing with options and the analysis of the value change of stock portfolios - an activity that required exactly this kind of math. Later, when analysing extremely large price changes, I found the stochastic process (Poisson process) on which I wrote my thesis. Until 1975, I did computer simulations, not on stock market data, but on the breakdown and repair data of the blue buses in Budapest. *Gábor Kepecs*, with whom we examined the statistical data of buses, attended the same course two years below me. Gábor and I sat together on the stock exchange board 15 years later, and then he was the Eastern European executive of *Aegon* for a long time. The insurance profession is also about stochastic processes, and the Poisson process is a good entry into this field, as well.

Looking back, the biggest benefit of the six-month IMF course for me was that it was a *project-based course*: We had to create a financial program for Kenya in groups of 12 people, based on the same data and perspectives the IMF delegation was working on in Nairobi. The participants of our course were various central bank and finance ministry officials from 36 countries - it was a real-life project. Today, the management of the university expects this kind of innovative courses, which I had a taste of 35 years ago, from the university lecturers (as opposed to simple lectures).

Á. V-D.: Together with Tamás Bánfi and Márta Sulyok Pap, you were the authors of the book entitled „The bond” in 1986, which was the first book written by Hungarian authors about securities and the stock market after a break of nearly 40 years.

J. Sz.: Yes, today this book is considered to be a literary rarity in this respect.

After a course on the London stock exchange (LIFFE) in 1982 and based on my subsequent readings in this field, it was relatively easy for me to write chapters on the *securities arithmetic*. The difficulty was caused by the calculation of bond yields. Today, calculating the internal rate of return from the exchange rate and the bond's cash flow requires only entering the three letters *IRR()* in EXCEL. At the time when the book was written, EXCEL did not exist, and still printed tables were used for market bond trading, even in America. In Hungary, everyone tried to calculate something, but even the professional weekly at the time published exchange rates and yields based on the wrong algorithm. For want of a better computer, a Commodore 64 computer (brought from Western tourist trips) was needed for the calculation, which in principle had a memory of 64 K, of which 38 KB was available for the programmer.³ However, in order to use it, you had to be

³ Today, a single phone photo requires approx. a hundred times more storage space if it is only 3-4 MB in size.

able to program and know some numerical approximation method (e.g. Newton's method of tangent), which, if you applied it, you were one of the very few who could calculate bond yields. There were no electronic databases, everything had to be typed on paper into the C64, once you found the data source...

Our knowledge in this field proved to be a good source of income for a while: we constituted the *Portfolio Specialist Team*, within the small cooperative called *Economix*, which operated within the university. We were the first financial consulting company in Hungary. If we had continued our activities in this direction, we could have made a nice fortune. But we had more exciting challenges. Márta, Tamás Bánfi and me as a trio have done several things together since then. Among other things, new subjects, specializations and majors have been created due to our cooperation over the years. The first really far-reaching project was the organization of the International Training Centre for Bankers. *Erzsébet Könczöl*, who also taught at the university, but with a significant corporate background behind her, joined us, as well.

Á. V-D.: You were the first professional director and later the president of the International Training Centre for Bankers for many years. Are you still teaching here?

J. Sz.: The International Training Centre for Bankers was established in 1988, in the framework of a World Bank project, from the cooperation of nearly 3 dozen banks (including 6 large banks). It was the first such institution in Central and Eastern Europe. This project belonged to *Judit Tóth* at the National Bank of Hungary.

Currently, the International Training Centre for Bankers operates not only as an educational institution, but also as a consulting company. Degree programmes, such as CEFA, are still in demand today. CEFA is a *European investment analysis degree*: with independent modules such as *bonds, equity analysis, options, securities law, monetary policy, accounting analysis, corporate finance*, etc. This degree is the European rival of the American *CFA*, but not only in Europe, but also in Japan, China, and South America, more and more potential employees of the investment and risk management market are obtaining it.

It is a great pleasure for me to meet a new class again this year, and together we will be able to unravel the mysteries of stochastic dynamics, without which there is no financial risk management.

The C64, on the other hand, keeps its price well: for the price you can buy it today (but it is a rarity), you can buy a brand new 5 GB computer with a 500 GB hard drive!

Á. V-D.: 49 years in education. A very long period. What has been the most beautiful moment, if you can highlight one at all? Have you ever thought about quitting?

J. Sz.: I do not consider it to be long, actually. Even recently, I have regarded myself a beginner in many ways. It is enough to mention the weeks when we suddenly had to cope with online education due to Covid a few years ago. We had no idea on Wednesday that we would be teaching outside the classroom for a long time. We did not have much time to acquire the secrets of *Teams*. The biggest challenge was the organisation of fair and meaningful exams under the new conditions.

I did not think that I would exchange the university chair for anything. I received very appealing offers, but I said no even to the position of vice-president of the National Bank of Hungary light-heartedly.

Only once has it happened to me that after an hour and a half I realised that “Jesus Christ, I have to teach for another 2 hours...” It was a very bad feeling. Thank God, I always have the opposite feeling: the class is over and I have not gotten to the end of the material yet... But what should I do when finance is so colourful and diverse? And now, not only one of my classes, but also my career as a full-time professor is over, but the situation is the same: I do not feel like I have reached the end. My last book could have been written better, with different highlights, in a different structure...

There are always interested, smart and enthusiastic students. You just have to find them in time and help them by creating certain „fast tracks”. Such fast tracks are colleges for advanced studies, but also the *SPM program*, for example, which is an abbreviation of the name *Special Finance Mathematics*, and otherwise, the monogram of Márty Sulyok Pap, who died early, and with whom financial mathematics education began at the University of Economics. However, the *GPME* (a 5-year program in economic and financial analysis, also known as undivided training) offers unique opportunities for ambitious students. In today’s conditions, this corresponds to the once-legendary planning mathematics major.

Á. V-D.: Many students like you, but lately, there seem to be more people who think your lectures are too rhapsodic.

J. Sz.: It is partly true. Well, those who prefer linear trains of thought, where we get from A to B step-by-step, should read my textbooks instead of listening to my lectures. In the classroom, I assume that they have already learnt certain things from previous subjects and read the textbook. In class, our task is to connect things that seem far apart but are actually close or identical. For example, the T-product in finance, is a homogeneous diff. equation in differential equations. But for this, you need to know what the T-product is and what the homogeneous and

inhomogeneous diff. equations are. If you do not have the pieces of the puzzle, you cannot put together the picture.

The other thing is that taking notes has gone out of fashion. Based on our own notes, we followed e.g. the trains of thought a one and a half hour lecture by *Iván Berend T.* Power Point notes which are handed out make this unnecessary. Recently, I taught a group of French students, and none of the 20 students had a pen or pencil to sign the attendance register.) But, the most important is **what the brain of each generation is hooked on**. Let me quote *Tamás Vekerdy*:

“By the time 3,5-year-old children are taken to kindergarten, many of them can no longer listen to fairy tales.

They simply cannot pay attention to them, they are not interested - because until that age, they had only been watching fairy tales. Or video clips. Or commercials. These tickle the surface of the brain quickly, in a vibrating way, therefore, the children could not even get to know the experience of lowering themselves into the world under the crust (like in a well) or into the world of images of the right hemisphere, where the flow of successive images evoked by the story they listened to causes pleasure. We have moved the experience out of the regions below the cortex to the surface of the cortex, that is, it no longer means presence and immersion that mobilizes emotions, but only the visual, intellectual monitoring of constantly changing stimuli. At this level, only brief impressions can be grasped, and if these do not change with sufficient speed, they become uninteresting because there is no empathy in the experience. And if children get used to this constant scratching on the surface of the brain, then this is what they need all the time. Then they are no longer able to listen to a story attentively, they constantly demand only fast flashing video clips, because they long for this intense stimulation. If they do not get it, they will get bored. However, those three-, four-, or five-year-old children who are not spoiled in this respect can play the same infinitely simple game with pleasure for an impressively long time: for example, they climb up a sandy hillside and slide down. They climb up, they slide down. When I, the adult, - perhaps incorrectly - tell them: “You have already slipped five times, it is enough. Your clothes will be dirty! What do you already look like?!” After all, this is the perfect pastime for a child!”⁴

At university, they should be able to listen to stories about the characteristic function of normal distribution. They should imagine. Then play with it with pleasure.

My classes can provide students with quite a *retro* experience. Their mobile cannot even be on the desk, so that they will not be able to pick up the phone and go out to make calls during class... In fact, I do not ask more from them than any cinema

4 DR. TAMÁS VEKERDY (2017): Belső szabadság [Inner freedom]. Budapest: Kulcslyuk, http://bit.ly/belso_szabadsag.

or theatre asks. Students do not come to a class to wait for me until I have read and answered my e-mails during the lecture. My favourite computer laboratory has a glass bookcase in the background. Therefore, I can see all the screens. And the students know that I can. You can work in this way. (The university also has long computer labs with glass walls. Walking down the hall, I sometimes see as many different screenshots as there are students sitting inside. Only the poor teacher speaking in front of the class cannot see what anyone from the outside can.)

I really want to give my students the same experience that teacher *Peták's* math classes at Verseggy High School gave in Szolnok 50 years ago: how can we figure out step by step how to solve a specific construction task? By focusing on the given task. I have never seen Federer using his mobile while serving. But not even when they sit down for 1-2 minutes to have a rest. Even though they can play tennis with one hand...

In the case of geometrical construction tasks, it was important to realize that what we did was correct. Nowadays, how to *convince* someone of something (e.g., to buy this or that) plays a much bigger role in business education than how to *convince* them of the fact that our statement or argument (e.g., our geometrical construction) is correct. In the 1940s, my parents as would-be accountancy teachers, studied mathematics for 10 semesters. Two of these semesters were about geometry. Obviously, it was not decided on the basis of similar triangles whether an item to be accounted should go to the asset or liability side. However, the goal was to acquire the ability to express and prove things clearly. They studied from *Farkas Heller* for three semesters: *Economics, Finance, History of Economic Theories*. None of these is directly required for accounting tasks. But these subjects make the university a university. Proving is badly needed in today's business education.

At the end of the 1970s, the University of Economics had 40 students in finance: 20 of them majored in corporate finance, 20 in macrofinance. According to the current regulations, these numbers do not reach the minimum required to start the course. In view of such low numbers, 5 students entered Tamás Bánfi's Theory of Finance exam at 8 a.m. and they left at 12:30 p.m. Until that time, they had to argue for and against certain statements – and to listen to the others and react to them. Nowadays, there are very few oral exams. Lectures could only be given in a suit. Today, some instructors appear in shorts in the final exam. On the other hand, for the graduation ceremony, everyone dresses up in black ceremonial uniforms rented from clothes rental companies and takes pictures in square caps, much to the delight of the parents.

Á. V-D.: Who do you consider to be the most influential domestic financial economists from the past decades?

J. Sz.: More than 30 years ago, Hungary was the first country to have a two-level banking system, a stock exchange, an International Training Centre for Bankers and a Training Centre for Brokers. We were the first to become members of international professional organizations such as the *European Federation of Financial Analysts Societies (EFFAS)* or *CEMS* (association of business schools of European universities). Owing to the former, it is possible to obtain an international degree valid in 30 countries here, in Hungary, and through the latter, several thousands of our students have already had the opportunity to study for a semester at the most prestigious European business schools. All this did not happen overnight, as a kind of velvet revolution. István Hagelmayer already wrote about the need for a two-tier banking system at the end of the 1960s. The responsibility and influence of good teachers is enormous. We heard this in *Katalin Karikó's* heartfelt commemoration, in which she recalled the teachers who started her career. Another influential name that is hardly ever mentioned today is Miklós Riesz. What he taught determined the views of many economists who have made a brilliant career since then. Therefore his influence, if not directly referenced in footnotes, is still clearly perceptible to the initiated eye. Like a warming sunray filtered by the foliage of trees.