Interview with Professor Christopher D. Carroll*

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Christopher D. Carroll is an economics professor at Johns Hopkins University Baltimore and research associate at NBER. He obtained his BA from Harvard University in 1986 and his PhD from MIT in 1990. He first worked as an economist at the Federal Reserve Board and later took a job at Johns Hopkins University. He was also a member of the Council of Economic Advisors in 1997-1998 and 2009-2010.

His research field is macroeconomics, in particular the consumption and saving decisions of households. He is particularly interested in how theoretical models can be reconciled with household and aggregate data. He has several publications in leading economic journals, and he is also editor of the entries of Encyclopedia Britannica on consumption. He received the TIAA-CREF/Samuelson award in 1998 for his work on the precautionary saving motive.

– Your work emphasises heterogeneity of household behaviour. What role do you think household heterogeneity will play in the future development of macroeconomics? What are the key questions in the research on household heterogeneity?

– My forecast, and we all know how good economists' forecasts are, would be that 10 or 15 years from now some substantial degree of heterogeneity among agents, both households and firms, will be standard for macroeconomic modelling. And a macroeconomic model that doesn't incorporate a reasonable degree of heterogeneity will be viewed as hopelessly out-of-date and not to be trusted as a guide, especially for policy-making purposes. The reason for this is that (as I said in my lecture) it has become much more feasible: we have steadily and substantially improving techniques and tools for doing it. Computer speed is faster, we have better data, and the models that incorporate some degree of heterogeneity produce much more believable answers to our important questions. The most compelling example, I think, is the question what effects you might expect from the different fiscal policy experiments.

The representative-agent DSGE models give completely implausible answers that nobody believes even in the community of people who work on DSGE models. They introduce patches, or they just disregard the predictions of their own model when a question like that comes up, because they don't believe the answer. If you have a framework that has reasonable amount of *ex ante* and *ex post* heterogeneity in it, you can at least have a straight face when you answer a question like what effects would a change in the permanent tax rate on labour income be. So, I think heterogeneity will be a central part of future models even at central banks. I hope that there's the same degree of effort on pushing models of this kind in the next 10 or 15 years as there has been on DSGE models in the last 10 or 15 years.

– Do you think the main models in central banks will also take into account more heterogeneity than they do now? I am asking this because there are many types of economic models. One model may answer the question what effect a stimulus measure has on the economy; there may be a forecast model of consumption; and there is a central bank model that may serve another purpose. Do you think central bank models are also able to take into account more heterogeneity?

– What I hope happens is that central banks will return to the past. I remember when I worked at the Fed in the early 1990s, one of the things that was surprising to me, but then I came to see the wisdom of it, was that the forecast that is the official

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staff forecast of the Fed, which was produced by a forecasting group that I was part of, that was a separate group from the modelling group. And we used the output of the model as only one of many different kinds of input. We had a whole set of topic-specific kinds of models that the experts in each of their fields used. And the individual experts would make their forecasts for the individual components which had fit together as a result of the national accounting identities. The forecast of the formal model was just one input into that process, but it wasn't a very important input frankly.

I think that was a better way of doing things than to say 'OK, here is our modelling section in our central bank and they produce a model and we tweak it a little bit here and there.' Because our modelling capabilities are so far from providing a plausible and useful picture of especially short-term economic dynamics, that I feel a little bit that it's almost like the situation described in the Vietnam war: where some soldier defended actions in his group in a particular village by saying 'we had to destroy the village in order to save it.' I think we might be better off destroying the DSGE models in order to rebuild them. Or not even necessarily have one model that everything has to be shoehorned into. The one thing that everything has to be shoehorned into is the national accounting identities. One of the surprising insights that I think really struck me in the process of helping to make the Fed's forecast was how useful the national accounting identities are as a forecasting tool. I am not sure that the structure provided by DSGE models aside from the fact that they close the national accounting identities really deserves to be taken very seriously. I believe imposing the national accounting identity is the critical thing.

– Macroeconomics has been heavily criticised for not being able to predict the crisis. Do you think this criticism is justified? What do you think were the main problems with pre-crisis macro?

– My criticism would be not so much that macro models were not able to predict the crisis. I think the nature of financial crises in particular is such that they in principle ought to be hard to predict. What disturbs me more is that the kinds of DSGE models that prior to the crisis the profession, especially the central bank community, seemed to be using more and more was a set of models in which any crisis that of the kind that we had, was *impossible*. If you looked, for example at a model like the famous Smets and Wouters model and you tried to calculate what is the probability that events like the ones that we actually saw could ever happen in a model that's calibrated using the pre-2007 data. The answer is not in the history of the universe can anything like that ever happen.

When *Friedrich Hayek* won the Nobel-prize he gave kind of a sceptical lecture, his Nobel-prize acceptance speech, about the pretence of knowledge among economists, macroeconomists in particular. He talked about the dominant Keynesian modellers, who had their complicated, hundred-equation macroeconomic models that were based on loose econometric estimations and some loose Keynesian theory. He was interpreted as being unhappy about the Keynesian nature of the models. But I don't think that was really the heart of his point. His point was that a very complex structure that nobody clearly understands has been constructed and the basis on which we had confidence in the ultimate rightness of the implications of those models is very slim. He turned out to be prophetic in that those models blew up right at the time he was talking and in the subsequent ten years.

I think the DSGE modelling literature has got to a very similar point. The resemblance between the current state of DSGE models and the state of Keynesian models in the early 1970s is really remarkable. Hugely complicated models based on very flimsy evidence basis. Whenever anything happens that is not very well represented in the past data on which the model has been calibrated, the model has no useful interpretation. I think we have committed the same sins for which Hayek was criticising us and which ultimately destroyed the whole Keynesian enterprise in the 1970s.

My guess is that DSGE modelling will be viewed with the same degree of suspicion in 10 years and for the same set of reasons. We just got way ahead of ourselves. A set of simple, understandable models that looks at individual components of how the economy is working and makes a credible claim to actually being right (because the model matches micro data as well as macro data, it matches regional developments or it matches things that are going on in a number of different countries); a set of models of individual topics that have some reasonable degree of credibility, combined by a central bank staff that knows about national accounting identities I think is a much more appropriate way to carry out the tasks that central banks need to carry out: making plausible predictions of what's going to happen in the future. One that's plausible enough that policymakers ought to take it seriously.

– I'm wondering if this doesn't run counter to advocating heterogeneity. One attractiveness of the original RBC framework and the smaller scale DSGE models is that they are tractable, so you understand what is going on. When you have

heterogeneity, it becomes too complicated to see what happens. I mean, there is a trade-off between simplicity and introducing heterogeneity? What do you think?

– I think that once you really plunge into models with heterogeneity the extent to which they are hard to use and hard to understand is not nearly as great as it seems from the outside. It's true that at the moment it may take a year or two of investment in human capital to learn how to solve these kinds of models, but once you have done that, it's not that hard to understand what's going on inside the models. It's true that you can't prove theorems in these models, but you can't prove theorems in DSGE models these days either.

What I do agree with is that a process in which one takes some existing DSGE model that has all the bells and whistles and has habit formation and four kinds of financial frictions and all that sort of stuff, and then you try to add microeconomic heterogeneity and calibrate and have the data on top of all that, that would be hopeless. What I would advocate would be not doing that, but instead going back to fundamentals with a set of more precisely targeted, well micro-founded models, one for the consumption analyst who needs to say something about the dynamics of aggregate consumption. The financial sector model can be much simpler. And then there might be more: a nicely micro-founded model of firm behaviour to forecast aggregate investment and there might be four, five, six of these models that are constructed by different people responsible for the different sectors of the economy. And then those people get together in a room and battle it out, if their forecasts conflict: the national accounting identities have to be imposed and the arguments have to be settled without fist fights. I think that's a healthier vision for how the process should work.

One reason I think this is a healthier vision, is that there is at least some hope, if this had been the way forecasting was conducted in the period before the crisis, then a lot more people might have noticed, and it might have been taken a lot more seriously, that there were a lot of people out there with mortgages that there wasn't any reasonable chance that they might actually repay. That's part of the job of a micro-oriented consumption forecaster to track the distribution of wealth, and debt and distribution of house values in order to figure out what's going on with consumption. That person would be in the right place to raise flags that were not raised… Well, interestingly actually, they were raised by some: *Ned Gramlich* was a Governor at the Fed and in 2004 he tried to alert the Fed to the subprime crisis and all of the problems that were happening there. But of course, there was no one else on a regular basis whose job it was to pay attention to the issues that we can all now see quite clearly because we have the microdata to look at and we say 'Oh my God, how could it be that nobody knew what was going on?' They *could* have known what was going on, but just no one was paying attention to the microeconomic data, and the evolution of the microeconomic data.

So I hope that not only will we produce conceptually satisfying models when we start paying attention to microeconomic heterogeneity, we also might be in a better position to see problems developing that are impossible to see if only looking at National Accounts data.

– I have a related question about these modelling strategies. In the DSGE approach, there is no heterogeneity, that's one thing, but then also it's a linear framework and you have these normally distributed shocks that never get big. I was wondering how you would weigh these three things. Could we have aggregate models, but with nonlinearity and big shocks? How far the mileage would go without heterogeneity? Which one is the most crucial?

– I don't think you get very far toward a deeper understanding of what's going on just by saying that the shocks are not normal. The reason the shocks look non-normal is that the model is wrong. I don't think the ways in which the model is wrong can be properly captured by changing the assumptions about the kurtosis, or the skewness or other aspects of the shocks. I think you have to go through the ways in which the model is wrong.

The biggest and hardest, one has to admit, issue outside of the kinds of heterogeneity of consumers and firms that I have talked about in my lecture, the largest problem that macroeconomists have had to deal with is complexities of finance. But, given the events of the past 3 years in which, arguably, blow-ups in the financial sector have caused huge destruction in the real economy. I think the urgency of having better things to say about finance is hard to deny. And any good finance model is a model in which the system is susceptible to panics. If it's not susceptible to panics, it's a bad model of finance. It's those kinds of panic situations that, I think, if you have a model that doesn't have any meaningful treatment of finance in it, produce outcomes that look like they are not coming from a normal distribution. But it's not that you've used the wrong distribution generator. It's you've left out the economics of finance. I don't have the right model of finance in mind, but I will point out that finance is essentially about one set of agents lending money to another set of agents. By definition that's not something that can be dealt with in a model where there is only one agent. In the US the finance sector accounted for something like 40% of aggregate profits in 2007 and it accounted for 7 per cent of employment. So, the proposition that finance is sort of a transparent veil that doesn't really accomplish anything, is very hard to sustain. Especially now, of course, given that blow-ups in the financial sector nearly pushed us into a second Great Depression.

But the first step to having sensible models of finance is having the heterogeneity across different agents that leads to the motivation to have some group lending money to another group. So, there is a connection between the absence of heterogeneity and the absence of finance in DSGE models.

– In September 2008, writing about economists' reactions to the bail-out plan you referred to Alan Blinder's observation that "Economists have the least influence on policy where they know the most and are most agreed; they have the most influence on policy where they know the least and disagree most vehemently." Having worked at the Council of Economic Advisers for two different periods (1997-98 and 2009-10), what were your personal experiences about how the economics profession can influence policy?

– Economists have a lot of influence in some spheres, in particular in those spheres where the politics are not of overriding importance. Unfortunately the politics are of overriding importance in too many things.

The problem, in my experience, in the Obama and Clinton administrations is not so much with the President or the policy-makers not understanding the point that economists are trying to make. The problem isn't even necessarily with policy-makers disagreeing with the point on substantive terms. The problem is that often the thing that everybody knows needs to be done is politically difficult or impossible to get done. Because when I say everybody knows that it needs to be done, by that I mean internally, 'in the halls of government,' or whatever.

One problem that we have in the US political discourse right now, and maybe this is true in other countries as well, is that journalists have kind of abdicated any responsibility for making judgements about whether the things that politicians are saying are true or not. *Brad DeLong* puts this nicely on this section on his webpage,[1] it's entitled: *"Views differ on shape of the Earth"*, in which he castigates journalists who present completely factually incorrect political assertions, as equally plausible to the ones that are true. It's hard to know what could be done to fix that problem. If your journalists are not willing to say to politicians: 'What you just said is completely out to lunch and there is no evidence for it at all,' then politicians will continue to exploit the unwillingness of journalists to take a stand. Maybe it's changing a little bit in the USA. The nomination speech by vice presidential candidate *Paul Ryan* last week has attracted a lot of criticism for exactly these kinds of mumbo-jumbo, pseudo, 'they-sound-plausible-but-they-are-not-really-true' statements. I hope that the willingness of the journalists to say, 'Look, you said X, but, in fact, according to the Congressional Budget Office, what you just said is not true,' is a signal of a change in attitudes.

One other point to make on that subject is that I think a lot of the most ultimately useful and influential work that economists do is initially rejected by the political system for a variety of reasons. But eventually, if the responsible people keep working in the background and produce good plans for tax-reform, or for entitlement reform, or whatever, politicians attention to these issues is very episodic, and they will, you know, suddenly decide on Tuesday that they need a tax reform plan on Wednesday and whatever plans have been developed will be taken off the shelf. And, so I think an awful lot of good work can be done behind the scenes and dust it off when the political time is right. And if we don't, as a profession, produce those kinds of good analyses when nobody is watching us, then the plans that are on the shelf when the politician needs them, will be just half-baked, bad plans and we will have bad policies. So quietly we need behind the scenes to get things right and then just wait for the right opportunity is another response to the next urgent disaster.

– You mentioned truths that many people in government agree with, but think it's impossible to do politically. When they refer to these truths in newspapers, they are often related to entitlement reform, pensions or health care policy. Do you have a strong opinion on what the US should do in the next 10 years; whether entitlement reform should be on the table or not?

[1] http://delong.typepad.com/.

– I think there are a variety of good plans and ideas, many of them produced by staffs of various, different commissions that then get ignored. I will make a distinction between the pension system (the social security system) and the health care system.

The social security system, in truth, could be made permanently solvent without too much effort. A few tweaks here and there, tying the retirement age gradually to life expectancy, recalibrating the formula for how benefits are adjusted, to make that formula responsive to wage growth. Maybe increasing contributions to the system a little bit. A collection of ideas, all of which have been thoroughly explored, and which would not require substantively large changes to the program, would I think bring it into balance. I hope that when those reforms are carried out, that they are of a type that causes the system to be inherently self-adjusting. We all learn in the first year of graduate school that a pay-as-you-go type of social security system can pay benefits that match roughly the combination of wage-growth and population growth. So you need to have a system that inherently, intrinsically indexes benefits. Behind the scenes, so it doesn't have to become every 20 or 30 years a giant political battle. But I think there is a reasonable prospect of solving that problem, because the size of the problem is not really all that large, unlike in some European countries where something big is going to have to happen.

The other big entitlement problem for the budget, of course, is the medical insurance system: Medicare for the elderly and Medicaid for low income people. That is much more difficult to project, partly because we have just had this big reform, Obamacare as the Republicans like to call it. That was a very far-reaching change in the system. So any projections of what the cost of the new system (presuming that it stays largely intact, as I suspect it will: Republicans like to complain about Obamacare but they have not yet proposed any plausible alternative for what they would do if they were elected; I suspect they wouldn't change it very much if they were elected), so projections about the cost of that system are even more uncertain than usual, given that the whole structure is changing right now. Nonetheless, there is no question that something will need to be done to adjust the system for the aging population and the exploding cost of it. Something ought to be done: intergenerational justice requires that we not have a system that sucks too much of a blood out of the younger generation in order to pay unreasonable expenses for the older generation.

I think the nature and shape of the appropriate adjustments, though, is very hard to take a clear stand on it, at this point until how the new system works really becomes more clear. There is some reason to hope that some of the reforms instituted and some of the experiments that the reforms are funding will make it clear what the options are. One thing that I think is underappreciated about the Obamacare program is the extent to which there is a lot of research and development and experimentation that is an intrinsic part of what the system ought to work like to move forward. So, I hope that that underappreciated and not really ever discussed part of the reforms will help to guide the way for the necessary cuts, and outline the cuts that are most effective and least painful.

– Do you follow closely the current Euro crisis? Any thoughts you could share with us on this topic?

– I am glued to my TV screen! I am glad I am not in charge of preventing the Euro crisis from spiralling out of control. It's a very difficult problem. As we all know, all economists know, the countries that are currently member of the Euro zone are not anything close to an ideal optimal currency zone. And whether such countries can get together, well, it's a nice experiment for testing economic theory of optimal currency zones. I am not very optimistic that it's going to produce a pleasant outcome, but I will continue to be glued to my computer monitor.

– What is your view on the US policy response to the crisis? Do you think, in particular, that the bank bail-out, as implemented, ended up being good policy? Could the 2009 stimulus have had a better design? Is there a good policy solution for the foreclosure crisis in the US? How important is the housing market for the recovery?

– The response to the crisis reminded me of the characterisation of *FDR* in the New Deal in which he promised 'relentless experimentation'. Economics, macroeconomics is still not a science like physics where we all can agree on exactly the right thing to do. Especially given the magnitude of the crisis, trying all sorts of different things to see what works seems wise to me, rather than committing to one golden arrow, which maybe will turn out to puncture the balloon instead of to solve the problem. So, I think, even *ex post* it would be hard to get agreement on what would have been the best mix of policies to pursue. I think that pursuing a wide range of policies was actually the wisest approach that could reasonably be expected. I am in the *Krugman, DeLong,* etc., camp which says a larger stimulus package and one with a different mix would have been more effective, more appropriate, but there is a lot of reason to credit the view that it would have been impossible to get through the Congress anything bigger than what the administration actually did get. So whatever we might think was the ideal package: 'politics is the art of possible,' as the saying goes, and I think they went pretty far subject to the constraints that they were subject to.

To go back and say with hindsight something I think was a mistake, was the extent to which the shape of the package was changed to try to get a few votes from the opposition party in the Senate. The administration was extremely eager to have a few Republicans sign on to the package and they shifted the mix from spending to tax cuts fairly substantially in order to get those 3 Republicans. I think the old Keynesian argument, that spending is more stimulative than tax cuts because – especially in a crisis like this – people might save a substantial portion of the tax cut, has a lot of force to it. I think in hindsight even the people who had the view that it was going to have a big political payoff to have some Republicans participate and vote for the package, would agree that that had not turned out to be true. I think there is no sense, in the political universe, that the Republicans participated in the stimulus, even though there were 3 of them that voted for it. So, I think probably not having distorted the package in order to get those 3 votes would have been better judgement, but you know it's a fairly difficult in real time to know the answers to these kinds of political economy problems.

– How do you see the problems of the housing market and the issue of mortgage debtor rescue?

– Well, I think we have finally hit bottom and the housing market will recover gradually. An awful lot of the bubble lending that happened was just misguided and the people that got those mortgages had no realistic prospect of ever paying them off. There is a set of people on the margin for whom somewhat more could have been done: somewhat more people could have been kept in their houses with an adjustment to the size of their loan, or something quick. But for a lot of the people, a lot of the bad mortgages that were made, I think there is basically no hope, and trying to extend the period in which everything is left to the suspense and nobody knows what the outcome is going to be, might not have really achieved a much better outcome.

I do think that if we could leave aside the political economy, if it had been possible to find a way to have more principal reductions for a set of people that were close to the margin would have been a better policy than the one that ended up happening. Although, I participated a little bit, I wasn't one of the policymakers, but I sort of knew what was going on in the internal debates about the housing relief packages. The structure of the packages was designed to help out people who were kind of the, in some sense, the kinds of people who in some sense made defensible decisions that just, things turned out to be worse than expected and, you know, house prices changed. They were responsible people, they were keeping up with their mortgages, and the sorts of people were the ones that you really want to rescue. You ought to be fairly generous about defining who that set of people is. I think part of the miscalculation, or part of the surprise that the administration experienced was that there were just a lot fewer people in that marginal area than they had expected. There was kind of a sense among certain analysts, and I think this was believed by the people who designed the program in the Treasury, that there was this enormous number of people who were, you know, right on the margin, that it wasn't really the case that all of this lending had been irresponsible and crazy, only a modest part of it had been irresponsible and crazy.

The failure of the administration's programs to make very much difference, I think, was partly due to the fact that it was calibrated to help only the people, relatively near the margin of responsible behaviour. It turns out if you really wanted to do something that would have a big effect, you needed to rescue a bunch of people who had made decisions that were even at the time pretty hard to defend. And that gets into the political economy, because there is a big danger, I think of being perceived as spending a lot of public money to bail out people who had bought a house that was bigger than they could afford or had refinanced to buy a nicer car for themselves, or something, when they really should have kept the old car. And so, there was a pretty evident and visible political barrier there that prevented the rescuing of people, who, maybe there would have been a macroeconomic case to rescue the irresponsible, but I think, the politics of that would have been pretty toxic.

– This brings us to our last question: Do you think many people were irresponsible? Was there an unsustainable consumption boom in the US of the early 2000s, even the 1990s?

– I think unquestionably. I have a paper that tries to decompose movements in the US personal savings rate back to the 1960s into 3 explanatory variables. One of them is the availability of credit, one is unemployment expectations (trying to capture the precautionary motive: when people are worried of becoming unemployed, they save more), and third, classic wealth effect (when wealth goes up then people don't feel the need to save as much; when wealth collapses they need to save more). What that empirical investigation suggests is that the personal saving rate in the mid-2000s, 2003 through 2007 personal saving rate in that period was lower than it otherwise would have been, as a result of the ever expanding availability of credit. It was lower by about 2 percentage points. If we didn't add the sort of excess credit creation that we saw, we sort of had what looked like a more normal pace of credit creation, we would have had a saving rate that was a couple of percentage points higher. I think if we had had that more temperate pace of credit expansion, we wouldn't have had the crisis!

So I think that there was a sort of consumption boom that was not realistic in the sense of being a reasonable anticipation of anything that was going to happen to future income. It was, you know, a classic bubble. And the extent to which the economics profession was captured by the ideology that says, either there is no such thing as a bubbles, or you can never tell when a bubble is happening while you are in the middle of it, I think is one of the big failures of our profession. I think, actually that it is not as difficult to tell when a bubble is forming if you are someone who believes that it's possible to tell that a bubble is forming. If you are someone who believes that it's impossible, then you'll find reasons to deny the evidence of your senses.

I presented a paper at an academic consultancy meeting at the Fed in January of 2004 that was about housing wealth effects. My discussant was *Bob Shiller.* And he said a few nice things about my paper, but then did what everyone expected, which is to give his views of the state of the US economy. In January, 2004 Bob Shiller was saying we are at the early stages of inflating a housing bubble and thus the Federal Reserve should do something about this! *Ned Gramlich* was a governor of the Fed, and he was trying to convince his colleagues that subprime lending industry was sort of behaving increasingly irresponsibly. And the Board and the economics profession, basically, didn't pay attention to the, I think, pretty compelling evidence that was in front of us, because of a predisposition to believe that it was impossible that Bob Shiller could actually know that we were in the midst of a bubble. Even though, actually, Bob Shiller had testified before the Fed Board in a previous academic consultant's meeting in December 1996 saying that the stock market was in the midst of inflating a bubble. So he's got a pretty good record. I think, if you are more open-minded about whether or not it is possible to detect a bubble and you are willing to look at all sorts of different kinds of evidence, then it will be an easier task, than if you start off with the presumption that it is impossible and therefore you reach the conclusion that you can never tell. I think it's just a change of attitude that's needed and not really any development of radical new tools or methods or analyses.

I do think that part of the reason that Bob Schiller and Ned Gramlich were able to diagnose the early stages of the housing bubble is that they were willing to look at kinds of evidence other than, say, price-dividend ratios or a few aggregate statistics.

We all have read now the newspaper stories about the crazy mortgage-brokers who didn't have a high-school education and were earning 200-300-400,000 dollars a year pushing mortgages on people who couldn't add and multiply. If you are willing to keep your eyes open for those kinds of bubble-indicating phenomena, or even if you are willing to be constantly paying attention to good microeconomic data, then I think it's going to be easier to detect these kinds of things, than if you start off by saying the only tool for detecting a bubble is whether there is a price-to-earnings ratio that exceeds some historical value and since we have only a very limited amount of data on the price-to-earnings ratio, we can't tell whether there is a bubble or not. When you can tell that there is a bubble is when you have people without a high-school education, making 600.000 dollars a year, selling mortgages when their previous job was as a hair-dresser; when you have people who have no job, no income, and no assets, and they are able to buy a half-a-million dollar house. That's a bubble! And it's not that hard to tell that it's a bubble. But we need, I think as a profession, macroeconomists need to open their eyes to the existence of these kinds of evidence and not just focus on aggregate statistics.