

FABIO MILANI - Research Statement

Economists have long recognized that expectations play a large role in the economy. Households need to form expectations about future income, wealth, and interest rates, when deciding how much to save and consume, and firms need to form expectations about future demand conditions, prices, marginal costs, interest rates, among other things, when setting their current prices or deciding how much to invest. As a result, and at a higher level of aggregation, macroeconomic variables as output and inflation also depend in large part on expectations about the future. It is, therefore, important to have a good model of how these expectations are formed.

A central tenet of macroeconomic theory is the assumption of rational expectations. Rational expectations imply that agents form expectations about future economic variables that correspond to the mathematical conditional expectations for the variables conditioned on all the available information and on knowing the correct model of the economy.

The models that are used to study the behavior of macroeconomic variables at business cycle frequencies and to characterize the interaction between macroeconomic variables and monetary policy decisions embrace the same assumption. Therefore, conclusions on the type of shocks that matter for fluctuations, the length of the economy's adjustment to the shocks, and the effects of stabilization policies, are typically reached in models that assume rational expectations.

The rational expectations hypothesis clearly endows agents with a strong degree of information. The subjects in the models know the 'true' model solution, the parameters of the model, the distribution of the shocks, other agents' tastes and beliefs, and so forth. If one is interested in understanding the behavior of macroeconomic variables over the business cycle and the likely effects of policies, it may be worth looking at the empirical evidence from a different lens, which at least allows for small deviations from perfect knowledge and rationality.

The main focus of my research is to consider models that relax this strong informational assumption and allow instead economic subjects to learn about the economy over time. My research then shows that learning is empirically important and helps models explain the behavior of macroeconomic variables. Most of my research uses models rooted on theory, but it is mainly empirical in focus, as it usually involves the estimation of structural theory-based models.

1. 'Learning' in Macroeconomics

The main part of my research shows that deviations from fully-rational expectations and learning by economic agents are empirically important and allow models based on optimizing agents to match several features of macroeconomic data that may be, instead, harder to match under rational expectations.

In the paper "**EXPECTATIONS, LEARNING AND MACROECONOMIC PERSISTENCE**" (*Journal of Monetary Economics*, 2007), I show that learning is an important driver of **persistence** in the macroeconomy. Monetary models under rational expectations face a difficulty in matching the persistence of aggregate macroeconomic variables, such as output and inflation. Therefore, researchers typically extend their models to introduce a number of frictions, or one could say "mechanical" sources of persistence, such as habit formation in consumption or indexation to past inflation in price-setting (other choices include rule-of-thumb decisions and various adjustment costs), to match the observed inertia. These extensions improve the models' ability to fit the data by adding lags of the endogenous variables in the model equations.

The paper shows that, when rational expectations are relaxed in favor of learning, the model no longer needs those mechanical sources of persistence. The general equilibrium model that nests learning and mechanical sources of persistence is estimated using Bayesian methods. The estimation reveals that the degrees of habit formation and indexation required to match the data are substantial under the rational expectation assumption, while they fall to values close to zero under learning. Moreover, the posterior model probabilities indicate that the specification with learning fits the data better than does the model with rational expectations, even if the rational expectations model is extended to include those additional sources of persistence. The paper's findings show that learning can be an important source of persistence in the economy. In principle, learning may even represent a single mechanism capable of creating persistence, replacing the several additional features needed in various sides of the conventional rational expectations model. Importantly, some of the features that can be omitted under learning, such as indexation, are also known to be at odds with micro-level evidence on firms' price setting. This paper was the first example of an estimation of a DSGE model with near-rational expectations and adaptive learning by economic agents in the literature.

Related papers are "**ADAPTIVE LEARNING AND INFLATION PERSISTENCE**", which was a precursor of the previous paper, focused only on inflation dynamics, and "**A BAYESIAN DSGE MODEL WITH INFINITE-HORIZON LEARNING: DO "MECHANICAL" SOURCES OF PERSISTENCE BECOME SUPERFLUOUS?**" (*International Journal of Central Banking*, 2006). The latter paper follows the so-called infinite-horizon approach to introduce learning. Under this approach, agents' forecasts into the indefinite future matter for current economic decisions (while the previous papers assumed the so-called Euler equation learning, in which only short-term forecasts matter for current economic dynamics). The paper shows that mechanical sources of persistence are superfluous under infinite-horizon learning. The paper "**ADAPTIVE LEARNING AND MACROECONOMIC INERTIA IN THE EURO AREA**" (*Journal of Common Market Studies*, 2009) shows that inertia is, instead, more structural in the Euro area than it was found for the U.S., and it has only slowly changed over time. Learning can still account for most of the inertia, but the results point to slightly larger degrees of intrinsic inflation inertia, which are not entirely driven by expectations.

While these papers are positive in focus, the results also have normative implications. If persistence in the economy is driven by intrinsic and structural features as habits and price indexation, optimal monetary policy would look substantially different from the optimal monetary policy in an economy in which persistence is, instead, driven by sluggish expectations and learning. Moreover, under learning, persistence is directly influenced by policy and its credibility: inflation persistence is high if the central bank is not perceived to be aggressive toward inflation and low if policy is aggressive and credible.

The paper "**LEARNING AND TIME-VARYING VOLATILITY**" shows that, in addition to generating persistence in the economy, learning activity by economic agents is also responsible in inducing greater and **time-varying volatility**. Several studies have documented large changes in the volatility of macroeconomic fluctuations in the U.S. Output growth volatility substantially fell in the post-1984 sample compared with the previous two decades: this shift in volatility is commonly referred to as "The Great Moderation". Time-varying volatility can now be considered an empirical regularity in the economy. It remains common, however, to assume that the volatility of shocks has remained constant over the studied samples or, in the opposite case, that the volatility has changed for exogenous reasons (i.e., good versus bad 'luck'). This paper, instead, presents and estimates a model in which stochastic volatility arises endogenously as a result of agents' learning. Learning generates a pattern of volatility, which roughly matches that in the data, i.e., increasing in the 1970s and falling after 1984.

Some of the common wisdom about historical U.S. monetary policy may change when models explicitly allow for learning, rather than conventional rational expectations. Several studies argue, for example, that monetary policy by the Federal Reserve went from 'passive' (that is, one that did not respond aggressively enough to rising inflation) and destabilizing in the 1960s and 1970s to 'active' and

stabilizing in the following decades. These results are usually obtained using simple models under rational expectations. Interestingly, less restrictive atheoretical vector autoregressive (VAR) models mostly reach different conclusions, finding not much evidence that monetary policy has changed over time, and concluding, instead, that most of the changes were in “luck” (expressed as the volatility of shocks hitting the economy). The paper “**LEARNING, MONETARY POLICY RULES, AND MACROECONOMIC STABILITY**” (*Journal of Economic Dynamics and Control*, 2008) estimates a monetary general equilibrium model, which departs from much of the previous literature by allowing the central bank to learn about the structure of the economy over time. The paper finds no evidence that the Federal Reserve was explicitly implementing a passive monetary policy even before 1979. Fed’s policy, therefore, while less aggressive than post-1980 policy, is not responsible in triggering macroeconomic stability. This paper reconciles the evidence on a regime switch in monetary policy from general equilibrium models with the available evidence from VARs.

Results that point in a similar direction are obtained in the paper “**LEARNING AND THE EVOLUTION OF THE FED’S INFLATION TARGET**” (Revise & Resubmit at *Macroeconomic Dynamics*). The paper’s main focus is in trying to infer the evolution of the Federal Reserve’s (unobserved) inflation target over the post-war sample. The paper shows that if the central bank forms monetary policy in a model in which the policymaker and market participants are assumed to have rational expectations, the resulting estimated inflation target varies a lot over time (from 2% in the early 1960s, to 8% in the 1970s, and back to 4% and 2% in the 1980s and 1990s). This result is consistent with other estimates in the literature. When the estimation is repeated, allowing the central bank to learn about the economy, the inferred inflation target series becomes, instead, remarkably stable over time: it maintains values between 2 and 3% over the sample. There’s no evidence that the Fed was explicitly targeting a higher target. Policymakers may have behaved *as if* they had a higher target, since they were taking policy decisions based on an outdated model of the economy. When evolving beliefs and learning are taken into account, the post-war evolution of U.S. inflation, output, and monetary policy decisions can be, therefore, explained without the need to require large exogenous changes in the inflation target.

A puzzle that has recently drawn attention in the literature is why increases in **oil prices** no longer have the calamitous effects on the economy that they used to have. Oil price shocks in the 1970s are widely believed to have been a major source of stagflation in that decade. Oil price shocks of comparable magnitude in the late 1990s and after 2000, instead, had only mild effects on real activity and on the core inflation rate. The decline of the share of oil in the economy by itself does little to explain the attenuation of the effects. The paper “**EXPECTATIONS, LEARNING, AND THE CHANGING RELATIONSHIP BETWEEN OIL PRICES AND THE MACROECONOMY**” (*Energy Economics*, 2009) proposes a learning model that can successfully account for the observed changing relation between the oil price and the macroeconomy. In the 1970s, the effect of oil price shocks on output and inflation is magnified, since oil shocks lead to large adjustments in expectations. Expectations become to some extent self-fulfilling. In the 1990s and 2000s, with a more credible monetary policy, the effect of oil price shocks on expectations is minor. Expectations about future inflation are well-anchored. The overall effect on the economy, therefore, is considerably attenuated. I have plans to extend this line of work to more accurately consider the psychology involved in oil price changes and the role it can play in explaining their varying effects on the economy.

In my more recent research, I turn to the larger issue of identifying the main driving forces of **business cycles**. While there is no agreement in the literature, most researchers would agree that a combination of technology, demand (preference, government spending, etc.), and policy shocks are responsible for the business cycle. Past influential economists, however, emphasized less conventional explanations for fluctuations. They believed that psychological forces played an important role in causing and amplifying business cycles: Keynes (1936) famously attributed cycles to the action of “animal spirits”, while Pigou (1927) focused the attention on the effects of “errors of undue optimism or undue pessimism”. Non-

academic discussions also often mention market psychology and sentiment as major elements in booms and busts. These explanations, however, are rarely at the center of the current generation of macroeconomic models.

The paper “**EXPECTATION SHOCKS AND LEARNING AS DRIVERS OF THE BUSINESS CYCLE**” (*Economic Journal*, forthcoming) provides an attempt to introduce these sort of psychological or non-fundamental expectational forces in a popular macroeconomic model and to empirically evaluate their role. Economic agents form expectations from a near-rational expectations model and learn over time. Their expectations, however, are allowed to depart from the numeric forecasts implied by the near-rational learning model. Private sector agents may be, in some periods, overly optimistic – by forecasting, for example, a higher future output than implied by their learning model – or overly pessimistic. These waves of over-optimism and over-pessimism define the expectation shocks in the model. The paper exploits observed data on expectations from surveys in the estimation. This is a novelty of the paper and it permits to identify both the agents’ learning process over the sample that best fits time series data and the exogenous expectation shocks. The results uncover a major role for these novel expectations shocks as driving forces of the business cycle. These “optimism” and “pessimism” shocks, in particular regarding future real activity, are found to be the main source of economic fluctuations, as they account for roughly half of business cycle fluctuations.

2. Other empirical issues in monetary economics

Some of the following papers also employ learning, but it does not usually represent the main focus of the research. Others use rational expectations or allow for uncertainty in the expectation formation, by comparing the results under the two approaches.

2.1 News Shocks

In a paper coauthored with John Treadwell (Ph.D. student at UC Irvine) titled “**THE EFFECTS OF MONETARY POLICY “NEWS” AND “SURPRISES”**” (Revise & Resubmit at the *Journal of Money, Credit, and Banking*), we study the role of news shocks about future monetary policy in an estimated New Keynesian model. There is large agreement in the literature on the effects of exogenous monetary policy shocks. But most of the literature focuses on unanticipated policy shocks, which surprise the private sector. This paper incorporates news about future policy decisions to disentangle the impact of anticipated versus unanticipated shocks. The results show that anticipated ‘news’ shocks play a substantially larger role on fluctuations than unanticipated ‘surprise’ shocks. The latter lead to a much smaller and more immediate adjustment of macroeconomic variables, once the anticipated component is taken into account, than usually found in the literature.

I will consider the issue of news shocks more deeply in future research. For example, I’m working to incorporate data on expectations to better and more convincingly extract news about a variety of shocks in a monetary general equilibrium model.

2.2 Political Business Cycles

An extensive literature at the intersection between political economy and macroeconomics has developed models that are able to rationalize economic fluctuations driven by political cycles and it has tried to find evidence of their implications empirically.

The paper “**POLITICAL BUSINESS CYCLES IN THE NEW KEYNESIAN MODEL**” (*Economic Inquiry*, 2010) estimates a general equilibrium New Keynesian model, which incorporates the action of political opportunistic and partisan cycles. The monetary and fiscal policy, as well as few other, coefficients are allowed to depend on “political regimes” (i.e., Democrat versus Republican regime, pre-election quarters versus post-election regime, and so forth).

The results provide some evidence that political variables may matter. The best-fitting specification is one that allows the coefficients to vary according to a regime that depends on whether the economy is in the few quarters before a presidential election or not. The evidence suggests that monetary policy becomes considerably more inertial before elections and fiscal policy deviations from a simple rule are more common. Moreover, policies become somewhat more expansionary before elections, but this effect disappears for monetary policy in the post-1985 sample.

2.3 The Effect of Globalization on Macroeconomic Dynamics

With the increase in globalization in recent decades, arguments that it may have radically transformed the way economies work have become more and more common. One particular example that has drawn quite a lot of attention in the monetary policy literature is the so-called global slack hypothesis, which argues that, in a globalized economy, countries' inflation rates should become more a function of global, rather than domestic, measures of activity, rendering traditional New Keynesian Phillips curve models outdated.

The paper “**DOES GLOBAL SLACK MATTER MORE THAN DOMESTIC SLACK IN DETERMINING U.S. INFLATION?**” (*Economics Letters*, 2009) shows that global slack has indeed become a positive determinant of inflation in the U.S. by estimating a two-country model between the U.S. and the rest of the world under the assumption of rational expectations. A follow-up paper “**THE EFFECT OF GLOBAL OUTPUT ON U.S. INFLATION AND INFLATION EXPECTATIONS: A SEMI-STRUCTURAL ESTIMATION**”, however, argues that the evidence in the literature on the positive effect of global slack may be sensitive to the modeling of inflation expectations. When inflation persistence is captured by learning, which replaces rational expectations, the significance of global measures of output largely disappears. The paper “**GLOBAL SLACK AND DOMESTIC INFLATION RATES: A STRUCTURAL INVESTIGATION FOR G-7 COUNTRIES**” (*Journal of Macroeconomics*, 2010) extends the analysis by assessing the role of global slack on the sample of G-7 countries. The results indicate that national output series are affected by global developments, while national inflation rates (with few exceptions) can still be characterized by traditional New Keynesian Phillips curves, with global measures of output failing to constitute significant determinants of inflation.

The paper “**HAS GLOBALIZATION TRANSFORMED U.S. MACROECONOMIC DYNAMICS?**” (*Macroeconomic Dynamics*, forthcoming) examines to what extent the process of globalization has altered the functioning of the U.S. economy. Globalization is modeled as the changing degree of openness to trade over the sample. Several key coefficients in the model are allowed in the estimation to depend on the extent of globalization and thus they become time-varying. The paper shows that the impact of globalization on the dynamics of U.S. macroeconomic variables has been minor. Closed-economy models still provide a substantially better fit of U.S. data than do various open economy specifications with time-varying degrees of openness.

The conclusion that globalization did not have major effects on the dynamics of U.S. macroeconomic variables as inflation, output gap, and interest rates, seems now predominant in the literature.

While the previous papers focus on globalization, intended as the increase in openness to trade, recent years have also been characterized by a large increase in international financial integration. The stock of external assets and liabilities as a fraction of GDP has risen by a factor of seven over the 1970–2004 period in industrial countries. As a result, bilateral financial linkages may matter more than they did in the past and may have a growing influence on the economies' real side as well. Cross-border wealth effects from changes in international stock prices may have become increasingly important and may now matter for macroeconomic dynamics in open economies.

The paper “**THE IMPACT OF FOREIGN STOCK MARKETS ON MACROECONOMIC DYNAMICS IN OPEN ECONOMIES: A STRUCTURAL ESTIMATION**” (*Journal of International Money and Finance*, 2011) estimates a two-country model, which incorporates a cross-border wealth channel. The general equilibrium open economy model

is estimated for the following countries: Australia, Canada, New Zealand, Ireland, Austria, and the Netherlands, with the U.S., usually representing the foreign country in which the largest stock market is situated, although the U.K., Australia, and Germany are also considered in some cases. The empirical results show that the international wealth effect has a significant size for Ireland (from asset price fluctuations in the U.S. and U.K. stock markets) and Austria (from asset price fluctuations in the U.S. and German stock markets); the effect is largest in Ireland. Wealth effects are unimportant in the remaining economies. In all countries, however, fluctuations in foreign stock markets still matter as they affect the formation of expectations about future output gaps in the domestic open economies. This effect is likely motivated by the similarities in the Home and Foreign countries' business cycles.

2.4 Interdependence between Stock Market and Macroeconomy

The paper “**LEARNING ABOUT THE INTERDEPENDENCE BETWEEN THE MACROECONOMY AND THE STOCK MARKET**” investigates the strength of interactions between the stock market and macroeconomic variables. The paper provides an estimate of the magnitude of the wealth effect from a structural model, concluding that it is quite small. Non-fundamental stock market shocks, however, affect the economy through their effect on expectations, particularly about future output movements. The effect has become smaller over time.

The paper “**THE IMPACT OF FOREIGN STOCK MARKETS...**”, discussed above, also fits in this line of research.

2.5 Earlier work

In the papers “**PARAMETER INSTABILITY, MODEL UNCERTAINTY AND THE CHOICE OF MONETARY POLICY**” (*B.E. Journal of Macroeconomics – Topics*, 2005), coauthored with Carlo Favero (Bocconi University), and “**MONETARY POLICY WITH A WIDER INFORMATION SET: A BAYESIAN MODEL AVERAGING APPROACH**” (*Scottish Journal of Political Economy*, 2006), I investigate the evidence, considered puzzling in the literature, that central banks' decisions are characterized by sizeable degrees of interest-rate smoothing (that is, the habit that central banks move interest rates at small increments in the same direction for several years, with very uncommon policy reversals, rather than adjusting them in full in one step). This gradualist behavior is hard to reconcile with optimizing behavior, unless an extreme dislike for interest rate movements is assumed in the central bank's loss function. The first paper suggests that both parameter and model uncertainty about the dynamic structure of the economy may help explain the observed gradualism of interest rate decisions, while the second shows that incorporating a large and more realistic information set, with model uncertainty managed through the use of Bayesian model averaging, also goes a long way in solving the puzzle.

In the paper “**STRUCTURAL FACTOR-AUGMENTED VARs (SFAVARs) AND THE EFFECTS OF MONETARY POLICY**” (*B.E. Journal of Macroeconomics – Topics*, 2006), coauthored with Francesco Belviso (a Ph.D. classmate at Princeton University), we estimate a factor-augmented VAR, which allows us to incorporate a large amount of information, thus improving over standard VARs. While the extracted factors usually lack economic meaning in the literature, the paper proposes a way to attribute a structural interpretation to the factors. The framework is then used to study the effects of monetary policy and non-policy shocks on hundreds of economic variables.

2.6 Miscellaneous

The paper “**PUBLIC OPTION AND PRIVATE PROFITS: WHAT DO MARKETS EXPECT?**” (*Applied Health Economics and Health Policy*, 2010) doesn't belong to the previous research areas. This paper was motivated by the debate in 2009 about the inclusion of the so-called “Public Option” in the proposal for health care reform. The paper was written during the period in which the public option was actively discussed. Proponents highlighted the several beneficial effects that would arise from increased competition in the health insurance market, whereas opponents contended that a public plan would drive insurers out of the market

and possibly lead to the “collapse” of the private health insurance industry. The paper aimed to contribute to the debate by inferring, using financial markets’ information, the effect that the public option was likely to have on the private health insurance market. In particular, it exploited data from a prediction market in which investors were allowed to trade a security with a payoff tied to the event that the “public option” would have been approved by the end of 2009 or not. The price of the security can be interpreted as the probability of public option approval (under some conditions).

The results reveal the market expectation that the public option would reduce health insurers’ profits by roughly 13%. The estimated negative effect, however, indicates that financial markets did not believe in the calamitous scenarios that were evoked by trade organizations and opponents of the public option.

Future

In the immediate future, my research will focus more on the role that psychological forces and non-fully-rational shifts in expectations play over the business cycle, thus extending and improving the work started in the “Expectation Shocks and Learning” paper, and continuing to exploit the large amount of rarely used information available from survey expectations.

In a follow-up paper, I am extending the analysis to a more comprehensive DSGE model. This allows me to study more realistically the role of other shocks as neutral and investment-specific technology shocks, as well as labor market shocks, and to evaluate the impact of expectational shocks on variables as investment. One aim of the paper is to provide a way to formalize and assess empirically the action of animal spirits on economic fluctuations.

Given the role of news shocks, I will also test my proposed sentiment shock versus news shocks, which have become increasingly popular in the literature. Both potentially lead to expectation-driven business cycles. But news refer to information about future shocks (most of the times, future technology shock, but also government spending or other shocks), while sentiment shocks are meant to capture psychological factors that are unrelated to current and past economic conditions, and are not directly related to future exogenous shocks.

In joint work with Gabriela Best (Ph.D. student at UC Irvine, now starting at Missouri State), we are exploiting evidence from survey expectations to estimate model with non-fully rational expectations, which allows us to track the evolution of the degrees of monetary policy transparency and credibility over time. We can infer private-sector perceptions about how monetary policy is conducted and, with that information, proceed to study the quantitative benefits of improved transparency and credibility on macroeconomic outcomes.

In the paper “Heterogeneous Public and Policymaker’s Expectations, Learning Dynamics, and Macroeconomic Fluctuations”, I study how large a role excesses of optimism and pessimism by the policymaker (the Federal Reserve in this case) play on the economy. The model allows for heterogeneous expectations between policymakers and the private sector (heterogeneous expectations lead to a novel range of implications for the stability of equilibrium).

While departures from rational expectations and the consideration of actual professional expectations from surveys are important for the U.S., they may be even more crucial for developing countries, in particular during periods of transition to a new policy regime. In the paper “Learning to Trust Institution in Emerging Market Economies: Brazil’s Inflation Targeting Experience”, I estimate a medium-scale small open economy model for Brazil, exploiting available forecasts regarding several macroeconomic variables, such as output, inflation, and exchange rates, over the sample period. During the period, the Brazilian central bank moved to an inflation targeting regime and revised the target downward a number of times. The estimation in the paper reveals the extent to which expectations converged to the target, how the effects of shocks on inflation and inflation expectations attenuated over the sample, and the impact of non-fundamental belief shocks on the Brazilian economy.

I have plans to incorporate heterogeneous expectations in a DSGE model (much more generally than done in the previously discussed paper, which included heterogeneity only between private-sector and central bank's expectations) and study the transmission of structural shocks, but this research idea remains at a very preliminary stage and, therefore, I do not discuss it here.

Finally, a future research project, with a more econometric focus, consists of studying the impact of assumptions about expectation formation on the econometric estimates for macroeconomic models.

Teaching

I have taught Ph.D. courses in *Monetary Economics*, *Advanced Macroeconomics*, *Time Series Econometrics*, and *International Macroeconomics*. The courses in Monetary Economics and Advanced Macroeconomics were new preparations that are part of new field sequences introduced in the department in the last few years and now routinely offered. International Macroeconomics was also a new course preparation, which was not offered at the time in the department. Time series econometrics was a new format for a course that was sometimes offered in the department. This new format has an increased focus on applications, with a particular emphasis on macroeconomic applications, and it presents both classical and Bayesian perspectives for a variety of topics.

At the undergraduate level, I have taught courses in *Econometrics*, *Intermediate Macroeconomics*, and a writing course in *Financial Markets and the Macroeconomy*. The course in Econometrics is the first of a sequence of econometrics courses for students in the honors program (particularly in the past) and students in the quantitative economics program (in more recent years). This course was already offered in the department, although I've somewhat changed its format, and changed the textbook. An innovation was the requirement that students had to write an empirical paper by the end of the course (in some years it was required, in some years optional, but still done by most students). This allowed them to get hands-on experience on what they were learning and it was usually well-received. Intermediate Economics (Macroeconomics) is the third portion of the required Intermediate Economics sequence. Three years ago, I have developed a new writing course titled Financial Markets and the Macroeconomy. Students write a proposal and several drafts of their paper over the quarter, responding to the feedback they receive, before turning in their final version by the end of the course. They present their paper idea in class and need to serve at least once as discussants for other students' presentations. A somewhat innovative component of this course is that the papers do not look as typical course term papers, since students are required to use econometrics to find the answers to their research questions and to support their conclusions. For most students, this is the first and only time they write a research paper during their academic career. This writing course is now offered every year.

In the Ph.D., I have advised a number of students. I served as main advisor for Gabriela Best, who finished her dissertation "Essays on Monetary Policy and Learning", and who is now an assistant professor at Missouri State University in Springfield, MO, and for John Treadwell, who is completing his dissertation and is working at Fannie Mae. I was a member of the dissertation committee for Nathan Fiala (now at the World Bank), Jibonayan Raychauduri (now Lecturer at the University of Essex), and Esther Lee (now at EViews).

Among the newer cohorts of Ph.D. students, I'm serving as main advisor for Sung Ho Park and Ashish Rajbhandari. I'm currently advising, although not as the main advisor, Ryan Baranowski, David Licata, Cathy Zhang, Arshad Mohammad, and Rui Liu.

At the undergraduate level, I was lucky to encounter some of the best UCI students in my econometrics and financial markets classes. Some of the students I've supported for graduate school have been accepted to Ph.D. and Master Programs in Economics, Statistics, Finance, and Accounting, at UCLA, Ohio State, USC, UCSB, and Claremont McKenna.