Appendix A
A Question of Identity

The thought given to this appendix is to try to illuminate some aspect of the inner Franco Modigliani even though the literal truth is that economics was his life. When it came to research activities, he was relentless, incredibly focus-driven, passionate and able to sustain extraordinary intensity. In contrast to the way Oscar Wilde describes great artists as dull in *The Picture of Dorian Grey* because they are totally absorbed in their work, Modigliani was anything but dull. Moreover, anyone who came into contact with him was taken by his infectious enthusiasm.

It was Franco Modigliani's good friend, the MIT's 1969 Nobel laureate in medicine, Salvador E.Luria, who noted that a biographer of scientists should not only explore the scholar's scientific endeavors but also capture "the more controversial, more intimate aspects of the subject's personality." As an example he mentions that "to examine Pasteur without his roots in French provincial bourgeois life or Einstein without his relation to Judaism is to diminish them."[1]

Our interest in Modigliani's identity the purpose of which is to supplement his intellectual portrait was whetted by his autobiography. The early chapters charting events prior to his arrival to the United States are punctuated with references indicating his Italian Sephardic roots. It is of interest to note that during World War II his mother found refuge in Palestine. Modigliani, however, referred to it as Israel even though the state was founded only in 1948.

As the narrative unfolds, the latter chapters are devoid of any mention of his roots or of Israel where he lectured. Moreover, he appears to exalt in his wife, Serena's and his decision not to provide any Jewish education to their children. However, in my interview with Leah Modigliani, the granddaughter, she mentioned that in her youth she was a member of Hashomer Hatzair, a Zionist leftist group.

Since most scientists tend to distrust, in the words of Jacob Bronowski, the "not-formalizable," they shy away from abstract thought.[2] This overly rational mindset guiding scientists might explain why Modigliani avoids expressing abstract emotions and feelings, such as passion, anguish or doubt toward his religion and heritage. There are many academics who have attained their success only through years of organizing their lives into chapters of almost entirely dispassionate, rational, coherent events. Janna Malamud, a Boston psychoanalyst, daughter of the famous writer, Bernard Malamud writes, "My father was frequently uncomfortable with the messy, fleshy reality of life. He rather preferred himself as a book – at least sometimes."

Janna Malamud remembers, "My father disliked the label Jewish Writer." Once when identified by a taxi driver as Jewish, "he answered stiffly, 'I'm an American Professor.'"[3] Bernard Malamud's composed demeanor and dislike for discussing his personal and religious past is plausible given his troubled childhood and his utter shame over his immigrant past. Towards the end of his life, the irreligious Malamud, who asked that his body be cremated, regretted not having a Jewish spouse and urged his daughter to marry a Jew. Modigliani, in contrast, apart from his father's untimely death, recounts his childhood as happy and uneventful, not counting, of course, his frequent boisterous tantrums. Unlike Malamud, Modigliani shows neither embarrassment nor disdain for any parts of his past, Italian and Jewish. Assuming Modigliani considered all of his past equally important – the progression and outcome of his life, why then, does he show no recognition of his Jewish heritage?

Jewish intellectuals usually make it a point to discuss in detail their Jewish identity, be it with pride or disdain, along with their religious convictions or lack thereof and all of its related consequences, such as the formation of a Jewish state and the Holocaust. At a Jerusalem symposium, Hannah Arendt, for example, openly lamented her fate of having been born a Jew. She spoke of "the misery and misfortune of my life – having been born a Jewess – this I should on no account now wish to have missed." Henry Roth, the famous author of *Call It Sleep*, who for 40 years experienced a writer's block, astonishingly suggested that Jews in America might add to the gifts they had already conferred to humanity: "the last and greatest one: of orienting themselves toward ceasing to be Jews." Aharon Applefeld, an Israeli novelist pointedly asked: "How could [one] bear to waste [one's] cultural legacy?"[4]

Nathan Sharansky, the celebrated Russian dissident refutes in his biography those who claim that Jews are focused too much on Jewish issues despite the evidence to the contrary. He tells of his Russian Jewish friends "who insisted that what was important was not saving Soviet Jewry but saving the world. Paradoxically those who tried to save the world by taking up Communism ended up creating a slave state." Sharansky cites Cynthia Ozick's story on the shofar. The shofar has a broad opening and a narrow opening "If you blow into the broad end, you get nothing. If you blow into the narrow end, you get a sound everyone can hear."[5]

While most secular Jewish intellectuals take a stance or at least display some curiosity regarding their heritage, Modigliani showed not the slightest interest. At a lecture delivered by Gershon Levy at Oxford University in 1952, the eminent philosopher and self-proclaimed agnostic Jew, Isaiah Berlin, agreed with the speaker that "We Jews are both a religion and a people. When we were liberated from Egypt – the Exodus – we entered history as a people, and when we were given the Ten Commandments at Mount Sinai we entered history as a people." He added enigmatically "we are steeped in memory. We have longer memories than anybody. Hence, we are aware of continuity and heritage more than any other surviving community in the world."[6] Robert Pinsky, who served an unprecedented three terms as U.S. Poet Laureate, seconds the statements by stating that "Jews are nothing if not memory; we are made of memory."[7]

Modigliani however does not focus on or highlight any memorable or personal experiences of any Jewish holidays, religious activities or Jewish saga. Why? Although, he supplies no evidence to assume any anger or disdain toward Judaism, inference or supposition to the contrary may not be compelling enough to merit dismissal either. Modigliani, however, barely mentions his identity, let alone discusses his Jewish past, calling himself first and foremost an Economist. He enrolled his children in Quaker schools, proclaiming himself as "free thinking" and having no intention of "reconnecting" to religious bigotry, thus, effectively disconnecting from his Jewish heritage, albeit unintentional, perhaps. He writes: "We had always been free thinkers, convinced that morality must have its own roots in conscience, not in dogma."[8] Ironically, it was Hitler who blamed Jews for creating and burdening the world with conscience. [http://www.youtube.com/watch?v=yB7x_uuxKdM&mode=related&search=]

It is of interest to note that the 17th century philosopher, Baruch Spinoza was one of the first to question the "a priori truths of organized religion in favor of interpreting spiritual values within a personal context" thus, contributing to the distinction between Jewishness and

Judaism, a distinction between the secular and the religious. [9] It appears that Franco Modigliani in contrast to his namesake, the painter Amedeo Modigliani did not make this distinction.

When Modigliani is greeted by Professor Harold Burbank, department head of economics at Harvard, after receiving a formal invitation from the economics faculty to join, we find Modigliani admit to feeling "flustered" for the first time in his life and understandably so. He says, "…. I was received by the head of the economics department, whom I discovered on that occasion to be a well-known reactionary, backward-looking anti-Semite, and opposed to anything that had even a faintly European flavor."[10]

Yet, even at this peak of anger and frustration he did not focus on anti-Semitism solely. Instead he mentioned it along with the other characteristics he couldn't find in Burbank, such as being forward looking – open minded – free thinking not bound by religion. Modigliani blamed Burbank's rejection of him not on his "internal flaws" such as being Jewish. Rather, he ascribed this to Burbank's stupidity. He did not dwell on the issue, moved on and "never looked back."[11]

Appendix B
Selected Personal Vignettes

By William A. Barnett [1]

In spring of 1963, I was a senior, majoring in engineering, at MIT. I had heard about what Modigliani and Miller were doing in corporate finance, and I knew that Modigliani's graduate course was electric. Although it was unusual for an undergraduate at MIT to be permitted to take a graduate course, especially in another field, I asked for permission, and Franco agreed. His class was an astonishing show. What he and Miller were doing (Miller was at the University of Chicago then) ran against the grain of what was widely believed in mainstream corporate finance at the time. The class was large and the graduate students in the class were very aggressive with their questions. It would not have surprised me if some of the people in the room were junior MIT faculty, rather than students, but I did not know. Franco typically walked into the room without any notes. He would walk to the board, pick up chalk and start enthusiastically deriving equations, which soon would cover all of the blackboards. When students would ask confrontational questions, he would light up and start deriving more equations on the board. Clearly he loved to be challenged and was enormously impressive to everyone in the room.

As an undergraduate in engineering, most of my other classes had been in engineering, science, and mathematics. Those classes at MIT were intense and certainly not unimpressive. After graduating, I went to work for Rocketdyne in Los Angeles. Rocketdyne produced the rocket engines for the Apollo project, and I worked on the development of the F-1 rocket engine, which was the booster engine that got the vehicle off the ground. My colleagues were formidable high-tech engineers. But despite all of the outstanding engineers and scientists under whom I had studied and with whom I worked, the memory of Franco's course stood out in my mind, along with his statement to me at the end of the last day of class that I should write to him in the future. I wrote to him from Rocketdyne a few years later, and that was the beginning of my drift away from engineering into statistics and economics. In short, it was the inspiration of Franco's electric course to which I am indebted for the direction of my subsequent graduate study and then my career as an economist and econometrician. Few other economists or scientists have ever impressed me in the same way that Franco did in his amazing class in 1963.

I was on the staff of the Federal Reserve Board in Washington, DC. from July 1973 to September 1981. Twice a year, there was a big show in the Board Room. The Governors met with the "Academic Advisors" to hear what they had to say and to ask them questions. They were eminent economists who were invited by the Board. Certain of them clearly stood out in my mind, including two about whom I had heard but never saw at one of those meetings.

Milton Friedman had, a long time ago, been among them. But we were told that during one of the those meetings he stood up, said it was a waste of his time since he was not being listened to, and walked out, never returning to one of those meetings. This happened before I arrived, so I never did see him at an Academic Advisors' meeting. Another was Karl Brunner, whom I also never saw in one of those meetings. I asked my colleagues why. They told me that the Board was so angry at some of the things Karl had said that they had given instructions to the guards at the entrance to the building to never again permit him into the building. When I asked Karl about that at a conference, he said that the ban had done wonders for his career.

Of those whom I did periodically see at those meetings, three were clearly particularly influential. One was Ben Friedman from Harvard. Another was a somewhat puzzling person. We had never seen any of his publications, he was not at a university, and he worked for a consulting firm that had an econometric model that was not taken seriously by the Board's staff. Nevertheless, at the Advisors' meetings, he appeared to be surprisingly knowledgeable. His name was Alan Greenspan.

But it was clear who was the most respected of the Academic Advisors. It was the person who had played the primary role in the creation of the Board's own quarterly econometric model, called the FRB-MIT-PENN model. It was Franco Modigliani.

As editor of the Cambridge University Press journal, *Macroeconomic Dynamics*, I publish occasional interviews with famous economists.

I do not conduct the interviews myself. A collection of many of those interviews will be reprinted in 2006 by Blackwell in the book, William A. Barnett and Paul A. Samuelson (eds.), *Inside the Economist's Mind: The History of Economic Thought, as Explained by Those Who Produced It*. The interview with Modigliani was to be by his friend, Robert Solow. But there were problems with the transcript of Solow's interview with Modigliani. As a result, the usable parts of the interview would only be about half the length of a normal interview in *Macroeconomic Dynamics*. Because of the role that Franco had had in the direction that I followed in my career, I felt a special obligation to see to it that his interview was completed. Because of his advanced age at the time, I decided to complete conducting the interview myself without delay.

I flew to Boston from my office at Washington University in St. Louis and spent two days conducting the interview in Franco's condominium apartment near Harvard Square. The interview was completed November 5–6, 1999. The Franco with whom I conversed during that interview was not the vibrant young man who had so excited the room in the class I took from him in 1963. His health clearly was declining, and he walked with a cane. But, indeed, below the changed exterior, it was the one and only Franco Modigliani.

His phone rang repeatedly with calls from Congressmen and their staffs in Washington, DC, some of whom he dismissed out of hand. When he drove me to lunch, I was astonished to find that such an old man was driving a high-powered European car, which he proudly explained was consistent with his life-long preference for "sporty" cars. While in his apartment, food was served by his dynamic and charming wife, Serena. But not the coffee. Franco took great pride in the high-end espresso machine that had been given to him by a former student, and Franco took me over to that machine to watch, each time he made a cup of espresso. Clearly this was more important to him than some of the Congressmen who periodically called him.

During the interview, Franco stated in the clearest possible terms that the stock market was on a bubble and would surely drop 25 per cent soon, when the bubble burst. That statement is contained in his interview that I published in *Macroeconomic Dynamics* in 2000. Of course, he was right. Robert Shiller, whose book predicting that bubble's bursting is more widely known than Franco's prediction, has said of Franco, "He is my hero." Shiller was one of Modigliani's students at MIT. Indeed there was only one Franco Modigliani.

By Alan S. Blinder[2]

I was a young kid when I showed up at MIT in the fall of 1969 and wound up taking Monetary Economics from the great Franco Modigliani. Modigliani's intellectual achievements were, of course, legendary. And we students all held him in a bit of awe. Locally, his infectious enthusiasm for the subject – an enthusiasm that clearly infected Franco himself – was also legendary.

Franco's lectures routinely ran over their allotted time. I don't think he even heard the buzzer announcing the end of class, so enraptured was he in the intricacies of, say, money demand. So we students grew accustomed to arriving at our next class, or wherever we were going, 5–10 minutes late. But one day, the 5 or 10 minutes stretched … and stretched … and stretched. One by one, students rose from their seats and walked out of the room, heading (very late) to their next destination. Franco gave no sign of noticing the gradual exodus.

So there I was, at the tender age of 24, needing to leave the room but thinking that it was borderline sacrilegious to walk out on the great Modigliani. I therefore stuck it out – until only two students remained. At that point, my fear of being the last person to exit, thereby leaving Franco talking to an empty room, began to overwhelm my sense of politeness. So I seized an opportune moment in which Franco turned toward the blackboard, and quietly slipped away – leaving him lecturing to a single person as if he was addressing a full room. In my mind, I imagined, and imagined still, that Franco continued lecturing to an empty room after the last holdout finally departed.

Subsequently, some of the older graduate students told me that this was an annual event at MIT.

By Dwight Jaffee[3]

During my Ph.D. student days at MIT, 1964 to 1968, I was considered among the "Franco Boys." This was a group of students and MIT visitors working together on what was called the Federal Reserve Econometric Model project. The visitors group included Albert Ando, who had been Franco's student at Carnegie and then went on to a long career at the University of Pennsylvania; Harold Shapiro, who later became President at both Michigan and Princeton; and Robert Rasche, who has been at the St. Louis Fed for many years.

Each of us would meet with Franco every week or two to discuss the progress on our project/thesis. You would wait outside his office until he called you in. As you walked in, you could see him rapidly scanning the paper that you had given him earlier – he clearly had not looked at it until that moment. After maybe one minute, he would look up and say something like: "This all looks fine, but here on page 21, something does not look right … ."

Invariably, he picked on the weakest link of the paper's argument. As I was leaving MIT, I finally asked him for the secret. The answer, of course, was "experience." In that same parting chat, I asked him how he could write as many papers as he did. His answer was, "Dwight, as you, too, will learn, the problem becomes how NOT to write them." My own experience has confirmed both these insights.

Things Italian were of course always evident with Franco. He used to drive this tiny Fiat Spyder convertible to/from MIT – we worried in a car crash there would be nothing left. There was always a rotating group of visiting Italian students, a number of whom have gone on to the highest levels in the Italian government and the Central Bank. Franco's favorite hotel in Rome, ironically, was the Hotel Boston, and he always seemed unhappy with Italian politics. Personally, it also turned out that my wife (of Italian background) grew up on Clark Street in Belmont across from the Modiglianis.

I cannot end without recalling the great fondness all the students and visitors had for Serena as well. Franco always had strong opinions on US politics (as well as Italian), but he always noted that what he could or could not say in public had to be approved by Serena.

By Larry Meyer[4]

I left MIT in the summer of 1969 to take a position as Assistant Professor at Washington University in St. Louis. Franco had been very active in promoting me for this position. When I left I had completed two chapters for my dissertation and was starting on the third. The economics department at Washington University let me know that I was expected to complete my dissertation within a year to remain in good standing. After immersing myself in writing lectures, I found myself half-way into the second semester without having made any further progress on my dissertation. I called Franco and told him I had an idea for a change in the title for my dissertation. I was thinking of calling it "*Two* Essays on Monetary Policy" He said that was fine with him and so I was done!

The next adventure was my dissertation defense. First, I called the third person on the Committee and he said (without reading the final draft) it was OK with him if it was OK with number 2 and Franco. I called number 2 and he said it was OK with him (also without reading it) if was OK with Franco. Everyone deferred to Franco. So I was off to see Franco.

My "dissertation defense" began at about 9 am in the morning. I was nervous but ready to defend. We met in Franco's office. He got up, went to the blackboard, and asked if I would mind if we started by talking about a problem he was having with a paper he was writing. About three hours later, he said we should take a break for lunch.

After lunch, I was really ready to defend. But Franco said there was actually a second paper he was working on that perhaps deserved some discussion. About an hour later, I told Franco that this was the last day to complete my dissertation and I still had to write an abstract, get a cover at the bookstore, etc. At that point, he extended his hand to congratulate me and said, "Well, in that case you're done! Congratulations."

And that's how I got to be a Ph.D. in economics.

Appendix C
Overview on Modigliani's Works

Economic contributions

Keynesian Model
Stabilization Policies
Savings and Consumption Hypothesis
M & M Hypothesis
The FRB-MIT-Penn-SSRC Model, 1969–1995
Division of Work
Conclusion

Modigliani pondered economic theory and policies for more than 50 years. His intellectual horizon spanned macroeconomics, money and banking, econometrics, industrial organization, and finance during that timeframe. His best-known contributions are extensions of the Keynesian research program in the areas of liquidity preference and the life-cycle consumption function, to such an extent that the concepts have become identified with him. He evolved the Modigliani-Miller (M&M) hypothesis in finance that took its initial spur from the Keynesian investment concerns.

He was the progenitor of the NAIRU (Non Accelerating Inflation Rate of Unemployment) concept in economics that currently pervades intermediate macroeconomics textbooks. Modigliani was also a precursor to the modern rational expectation hypothesis. For his "pioneering studies of saving and of financial markets" he was awarded the Nobel Prize for Economics in 1985. The approach we take in this overview is first to discuss his methodological contribution, and afterwards, to discuss his significant theories and postulates.

Modigliani follows a positive view in predicting and explaining economic reality.[1] His works have one foot in theory and the other in applications. Frequently, his empirical works show up in the form of regression analysis. But he also appeals to realism, as when he disavowed Robert Barro's theory on the ground that people do not generally think that they and their children are one, and, therefore, reason that they must save for their children's future.

At an early stage in his career, Modigliani joined with Grunberg (1954) to set a positive methodology for research on expectations. Their purpose was to investigate the claim that "In reacting to the *published prediction* of a future event, individuals influence the course of events and thereby falsify the prediction."[2] Modigliani observed that some predictions are *not published*, i.e., they are not *divulged*. Those possible predictions he called "private" predictions. Such possible private predictions can be stated logically: $O(t).L\supset.O'(t)$, where O represents observations on the variables of the system, L represents laws that we use to transform observation statements O to a new set of observation statements O'. The transformation process occurs over time, t.

One major point made about the implications of Modigliani's methodology for economic prediction is that it is "internally consistent." The model is consistent when its true values are ascertained. The implicative symbolic, $\supset$, is true when both O and O' are "true,", both are false, or when O is false and O' is true. What is novel about Modigliani's contribution to the expectations hypothesis is not that something "happens because you expect it,"[3] but that "prediction itself becomes a variable of the system."[4] To explain, a statement may be added to O, augmenting it to say O^*. The new statement will be governed by certain laws that would also augment L to L*. Because the model is "internally consistent," O' will also be augmented to O'^*. This is realized in economic applications by saying that future prices depend on future demand. But future demand is dependent on expected prices. We, therefore, need to explain expected prices. For Modigliani, expected prices depend on current prices and public predictions. Private forecasters can augment their forecasts by adapting to published information.

Modigliani was also involved in clarifying the role of anticipatory data on economic behavior. This effort falls in the genre of "the role of expectations and plans in economic activities."[5] The study followed a planning paradigm, exploring the way businesses use anticipated supply, demand, and production conditions to make decisions. The model Modigliani built is based on the Hicksian paradigm[6] in which everything is dated in order to move from static to dynamic changes, and businesses follow best alternatives.[7] Modigliani found that businesses do not follow their best course of action over their planned horizon. He advocated that under certainty, a "single-value" rather than a "strategic" expectation model is preferable. This implies that "plans had almost no binding effects on future operations."[8] He realized that "single-value expectations are not entirely reliable … more reliable information about the future can be acquired only at the cost of devoting scarce resources to this task."[9] However, where subjective uncertainty prevails, "some anticipations may have to be represented by subjective (joint) probability distributions, or analogous devices; and some plans may have to be represented by strategies, or schedules, expressing future actions as functions of later information."[10]

Modigliani used a simple Keynesian model where income is disaggregated into consumption and investment to illustrate prediction using anticipatory data. The model assumes that a consumption function can be fitted to non-anticipatory data. The investment function, however, may be determined from anticipatory data, i.e., information on investment plans.[11] Modigliani's position is that anticipatory data provides a bridge for our lack of present knowledge to make quantitative forecasts.[12]

Economic contributions

Keynesian model

Modigliani's early contribution was to put the Keynesian model on a classical foundation. Hicks, Kaldor, and others preceded him in starting that effort. Hicks' work set out "a classical theory in form similar to that in which Mr. Keynes set out his own theory,"[13] which became the IS-LM framework for Keynesian macroeconomic analysis. Kaldor was able to convince "Pigou that he was wrong to believe that a cut in money wages could increase the level of unemployment independently of a fall in the rate of interest."[14] Modigliani wanted "to examine to what extent the novel results of the *General Theory*, including its explanation of 'equilibrium' unemployment, could be traced to the unorthodox assumption of wage rigidity."[15] While he found that the model of Keynes rested mainly on the wage rigidity assumption, he came to realize a major role for the liquidity trap concept. Modigliani expounded his Keynesian ideas mainly with the Hicksian IS-LM apparatus.

Modigliani embraced Keynesian economics in his PhD dissertation on "Liquidity Preference and the Theory of Interest and Money" at the New School for Social Research in 1944. He did a major updating of this model in 1963, "The Monetary Mechanism and its Interaction with Real Phenomena,"[16] as well as in his last published work while alive, "The Keynesian Gospel According to Modigliani."[17]

In his Keynesian model, he sorted out the roles of liquidity preference and rigid wages. The model has equations on the real side of the economy that determine real output, and equations on the monetary side that determine the money value of output, and one equation that brings the two sides together. Modigliani's brand of liquidity preference does not require the concept of rigid wages to explain unemployment. Underlining the idea is that the price of money is anything that can be exchanged for it, therefore, the future price of money is the discount rate $R_t = \frac{1}{1 + r_t}$. Operationally, the rate of interest, r, increases in tight money situations as people hold more cash by liquidating assets. The consequences are to lower investment and saving, which in turn lower income and employment. The demand for money will then decrease to equal its supply. Tight monetary policy, therefore, implies a "rate of interest" to "output" adjustment, which contrasts with the classical view that implies a "rate of interest" to "price of all goods" adjustment. In the process, policy makers would supply an adequate quantity of money or fix the appropriate interest rate.

Stabilization policies

Using his brand of the Keynesian model, Modigliani was concerned with the big question as to whether the economy can be controlled by simple rules, as the monetarists advocated, or through discretionary policy, as he advocated. He thought that the growth in the M1 money supply, the most liquid form of money, destabilizes income through the wide swings in the velocity of money. Discretionary policies appeared more suitable to him because by the 1980s the United States Federal Reserve was able to use intermediate targets to achieve its goal of a final nominal income, even though velocity was varying.[18]

Stabilization issues also focused on the appropriate discretionary policy for shocks to the economy such as the OPEC oil crisis in the 1970s. At issue is how to find an optimal path that unemployment must take in order to bring inflation to its long-run target level. Modigliani evolved several ideas to characterize this process. One idea was the NIRU,[19] the non-inflationary rate of unemployment, where the inflation rate is expected to fall as long as the actual unemployment rate does not fall below a critical level. We may imagine that a level to which inflation can fall will be stable. When that level of prices is reached, a level of output and employment will be attained. In other writings, Modigliani referred to that level of output as NIRO,[20] meaning a non-inflationary rate of output. NIRU and NIRO have dynamic implications for optimal policy measures. Calculating the expected rate of inflation on some weighted average of past prices is one way to achieve the optimality. Its simplest form is that the expected price, p^* is equal to the price in the last period, p_{t-1}. The difference between actual price and expected price, $p-p_{t-1}$, will be some function of the unemployment rate, and NIRU will be a solution to that function.[21] In the NIRU model, it is possible to find turnpike-like solutions. An efficient turnpike path would be for the economy to move straight down on a vertical line anchored on the long-run rate of unemployment for an inflation rate above its critical level. Another turnpike path would be for the economy to veer off to where the short run Phillips Curve (PC) cuts the long run PC curve, before the inflation rate achieves its critical level. The NIRU and NIRO concepts manifest themselves in the standard macroeconomic textbooks as NAIRU, the non-accelerating inflation rate of unemployment.

Savings and consumption hypothesis

After WWII much emphasis was placed on the reconciliation of the observation that the average propensity to consume exceeded the marginal propensity to consume. Many attempts were made to reconcile these two propensities. Modigliani set out to revise the Keynesian consumption function that depended only on absolute income by introducing a peak level income variable in the past to explain savings behavior.[22] Given a trend in the saving-income ratio, the difference between actual and previous peak income would explain cyclical variations around that trend. When actual income is low relative to peak income, savings are depressed. During boom periods, savings would rise until the previous peak level is achieved, then consumption would leap upwards, reconciling the marginal and average propensities.

Modigliani later added a classical foundation to this theory that led up to his life-cycle hypothesis (LCH). The LCH of savings holds that people smooth out their consumption over a lifespan. Borrowing more by younger age cohorts, saving more by prime working age cohorts, and drawing down savings by retirement age cohorts, does this. In terms of the neoclassical paradigm, the individual maximizes lifetime utility, constrained by lifetime income and wealth. As Modigliani stated, consumers can expect a lifetime income based on their labor income, assets, or bequests. In other words, consumers receive income, Y, up to the end of their working life, N. They accumulate savings during their working years, and consume, C, uniformly during their lifetime, $L>N$. Since lifetime consumption must equal lifetime income, assuming no bequests, we can express $CL = NY$, or $C = (N/L)Y$, in which case the terms in parentheses represent the marginal propensity to consume. Fitting the LCH to labor income and net assets, A, the equation $C = .766Y + .073A$ reconciled some anomalies during the post- WWII period. Also, "The fact that wealth enters importantly in the short-run consumption function means that monetary policy can affect aggregate demand not only through the traditional channel of investment but also through the market value of assets and consumption."[23]

The LCH was extended to many other areas of applications, of which two stand out – the burden of national debt and managing social security. In considering the national debt issues, the question has arisen as to whether life-time is finite or infinite. Modigliani thought that the model was practical only from a finite point of view, whereas Robert Barro advocated an infinite horizon.[24] To fathom the logic, assume a game between government and individual taxpayers. The government incurs a debt. Taxpayers may react by saving more now because they or their heirs will be taxed in the future to pay off the debt. The increase in saving will give them the wherewithal to pay off the debt, or in case they die, for their heirs to pay off the debt through bequests. Modigliani questioned whether the infinite horizon assumption is credible, and whether the people do save for bequests. He examined the government deficits and argued that the evidence for Barro's argument was lacking.

Modigliani extended the LCH to Social Security problems from the point of view of treating Social Security as private savings. As a saving, Social Security Taxes (SST) will add to the wealth variable in the LCH model. Modigliani wanted to treat Social Security savings as a mandatory or compulsory activity, somewhat like the forced savings concept. The approach broadens the definition of wealth, and changes some of its consequences. On the one hand, it may reduce the saving-income ratio, as people count on their SS as savings for the future. On the other hand, it may encourage early retirement. Modigliani thought that the two consequences might cancel each other out.[25]

M&M hypothesis

The Modigliani and Miller hypothesis (M&M) also evolved from Modigliani's thinking on Keynesian economics. For Keynesians, the rate of interest is the cost of investment funds. The idea of cost of investment funds can easily be analyzed in terms of a mix of debt and equity. The invariance principle pertains to this idea since one method of financing can expand only at the expense of the other, leaving the value of the firm unaffected. This initial realization led to the now famous M&M hypothesis. Initially, the M&M was proposed without taxes, dividends, and bankruptcy. In later analyses these variables point out conditions under which the invariance condition would be upheld.

In practice, the value of an unleveraged firm, a firm with equity but no debt, could be estimated by dividing the firm's earnings before taxes and interest (EBIT) by a weighted average cost of capital, ρ. If EBIT is \$5,000 and ρ is 10 per cent, the value of the firm from the so-called net operating income (NOI) approach is \$50,000. Suppose that the firm wants to acquire some debt. It can sell some bonds (D) on which it will have to pay some interest (I), which is a tax-deductible expense. If we use the NOI approach, we would not account for this interest deduction, so the value will still be the same. But the corporate tax rate (t_c) will change the value of the firm. If the corporate tax rate is 50 per cent, a dollar of debt raises the firm's market value by 50 cents.

The FRB-MIT-Penn-SSRC model, 1969–1995

Several of Modigliani's theoretical thoughts went into the creation of an international econometric model, which was used by the Federal Reserve Board, until it was reformulated in 1995. The model rested on Modigliani's Keynesian contributions, modified by later research that facilitated better predictions. The model had a real sector that was influenced by fiscal policies, and a financial sector that mainly linked with the real sector through monetary policy. The financial sector is the largest through unborrowed reserve requirements, and the discount rate drives the short-term money rate of interest and the nominal money supply. The response from a change in unborrowed reserves to GNP works through lags and is subject to some delayed effects. As with other large scale models, the FRB-PENN-SSRC was respecified to accommodate new expectation elements in order to pick up conditions such as supply and demand shocks.

Post-Keynesian views

Modigliani communicated with other post-Keynesians, who were determined to see Keynes from other than a neoclassical point of view. He co-authored two articles with the preeminent leader of the neoclassical school, Paul Samuelson, that has generated much research in the area of long-term rates of return. One of the co-authored articles critiques the Pasinetti theorem, which states: "The equilibrium rate of profit is determined by the natural rate of growth divided by the capitalists' propensity to save."[26] This conclusion is derived from a basic differential equation that expresses changes in the profit-income ratio as a difference between the saving-income and investment-income ratios. Samuelson and Modigliani's dual Pasinetti theorem makes the inverse of the naïve accelerator, i.e, income-capital ratio, equal to the growth in population divided by the workers propensity to save. The confluence of the primal and dual methodologies has elevated the analysis to a high level of generality in the determination of the distribution of wages and profits in the economy.

Division of this work

We can divide a cake fairly if one person cuts and the other accepts or rejects. We start by giving the master the knife. Modigliani cut six collected volumes of his articles in professional journals. In Volume I, he started with an article published in 1976, only because it summarized his thinking on macroeconomics at that time. He aimed for a topical discussion of his works covering his interest in Keynesian economics, its applications, and policy issues. In his 2001 *Adventures*, he divided the cake spatio-temporally, ordering his contributions geographically–America, Italy, and Europe. But he also enlisted the help of methodology.

Modigliani's writings can be arranged by topic or publication date. Furthermore, we can rank the topics by order of importance. In 1986, one appraiser provided the following: the life cycle hypothesis, the Modigliani-Miller theorem, the basic Keynesian macroeconomic model, and production concerns in managerial economics.[27] This hierarchical ranking of topics has merits and demerits. It considers Modigliani's important works to be those that earned him the Nobel Prize. Modigliani, however, thought that his contributions had a "unifying thread: a propensity to swim against the current by challenging the self-evident orthodoxies of the moment."[28] Therefore, our preference is to focus on a time and topic presentation of his works.

Chapter 1 Modigliani's Early Life and Influences

Before we focus on the topics from the general introductory point of view, leaving the more scientific aspects for the individual chapters, we review Modigliani's formative years, ascendance of Mussolini to power in Italy and the settlement of Modigliani and his wife in the United States.

Chapter 2 Modigliani and Keynesian Economics

Many people approach Keynesian economics for a quick fix for economic crises. Ordinarily, the economy will take care of itself in the long run through market forces, according to the classical economists. But when things go awry with the macroeconomic machine, policy makers need to replace a cog, or give the engine a push, or a helping hand, Keynesian economics provides that kind of intervention. Modigliani invested a lifetime of research into the Keynesian apparatus. He created a Keynesian model that was turned into a large-scale econometric model of the Federal Reserve Bank. His life-long teachings steadfastly upheld the Keynesian view that was challenged by Keynes' teachers, and is now challenged by their disciples.

The materials for Modigliani's Keynesian framework started with his PhD dissertation in 1944 at the New School for Social Research, titled "Liquidity Preference and the Theory of Interest and Money." That dissertation established Modigliani as a model builder in the realm of interpreting Keynesian economics, delineating the proper role of wage rigidity and liquidity preference in the Keynesian model, and elevating monetary policy to a pedestal for controlling the economy. The model was upgraded and expanded during his lifetime to accommodate anomalies and new ways of thinking.

Chapter 3 The Gospel of Keynesian Reality: Development and Application of Modigliani's Model, 1944–2003, The Realm of Stabilization Policies

Volume I of Modigliani's *Collected Papers* starts with a debate in the 1970s between Milton Friedman, the monetarist, and himself, the Keynesian. Friedman exclaimed: "We are all Keynesians now!" Modigliani reciprocated, "We are all monetarists now!"[29] We can only imagine that some spectators also exclaimed, "Not in our backyard!" for this sort of agreement can only occur under a new school of thought. Anyway, the debate did take place, and the place was a new grassy knoll, one where the grass can be cut by both blades of the scissors – demand side and supply side. The name of the new game was stabilization policies.

Some related materials for stabilization policies are found in Volumes III, IV, and V of his *Collected Papers*. Part II, Volume III is called "Stabilization Policies," and Part III covers International Monetary Systems, focusing on Special Drawing Rights (SDRs). To stabilize the SDR, Modigliani had proposed to use price indexes for globally traded commodities. The title of Volume IV of his *Collected Papers* is "Monetary Theory and Stabilization Policies." Part I of Volume V addresses "the effectiveness of simple minded rules versus discretion to stabilize the economy."[30] This brand of Keynesian economics was developed interactively with theory, applications, amendments, and extensions occurring at different times.

Essentially, Modigliani's concerns with stabilization were derived from his primary interest in liquidity preference and wage rigidity. Liquidity preference is usually discussed in the context of the money market, and wage rigidity in the labor market. In the money market, a change in the interest rate will lead to a change in demand for money. Equilibrium will be reestablished if wages are flexible. This chapter is built around financial markets, investment, and prices, where Modigliani is best seen as an inventor and as a model builder.

Chapter 4 The Life Cycle Hypothesis (LCH)

Keynes was the first to initiate research into the way people spend their money. He expounded his doctrine first in his *General Theory*. It took the form of a great "psychological law" that revealed great insight into how the mass of people save when they act in groups, or as members of a nation. The Keynesian consumption function was chock-full of research materials, forming the basis for the award of two Nobel Prizes, one to Milton Friedman, and the other to Modigliani.

Modigliani's original works on consumption and savings comprise Volume II of his *Collected Papers*. As with his first volume, the second volume opens with a summary essay of his reflections some 20 years after he first advanced the hypothesis. Essentially, his concerns with LCH are based on microeconomic foundations. Its foundations are "the classical postulates of utility maximization applied to decision horizon consisting of the household's life cycle."[31] The purpose is to explain some puzzling behavior of saving.

The core outline of this chapter includes Keynes' law of saving, depicting savings as an increasing proportion of income; Milton Friedman's paradigm of saving, indicating short-run cycles and long-run stability of saving to income ratio, concerns reconciling short and long-run discrepancies in consumption behavior; and Modigliani's contribution to the overall puzzle.

Modigliani explained that his gateway for finance was his concern over the Keynesian investment function.[32] Because Keynes' system is considered short-run, and change in capital stock, which is investment, is the definition of the long-run, Keynes' ideas about investments were swept under the rug. Some use his remark: "in the long run we are all dead" to supersede his thoughts on investment. But later analysis found important nuggets in his views on the instability of the marginal efficiency of capital, and the influence of interest rates as the cost of capital. While Harrod-Domar originated a growth model incorporating the accelerator theory of investment with the tax multiplier, it was

Modigliani who first conceived the idea about the relationship between the cost of finance and the way debt or equity in a firm finances its investment.

Chapter 5 Modigliani and Miller's (M&M) Hypothesis

In this chapter, exploring the Modigliani-Miller (M&M) theorem that revolutionized thinking in corporate finance, we see the formation of a new historic approach to the finance narrative in the literature. Its outline starts with how Modigliani came to this theorem, continues with the collaboration with Miller, and then their parting over the subject. Modigliani revisited the subject later and had expressed the desire just before he died to further pursue work on this theorem.

Chapter 6 Forecasting: The MPS Model

Modigliani was also an accomplished econometrician in every sense of the word. Funded by the Board of Governors of the Federal Reserve Banks (FRB) and the Social Science Research Council (SSRC), Modigliani was the leader in founding of the MIT-Penn-SSRC (MPS) econometric model in the late 1960s. The MPS was one of the early large-scale econometric models in the U.S. It was modified and substantially enlarged frequently to meet the needs of economic challenges such as supply and demand shocks during the 1970s. One of its abiding features is its Keynesian outlook, but from its inception it also integrated new tools into the equation.

At the time the MPS was born, the adaptive expectation hypothesis was in vogue. Modigliani had also pioneered early versions of the rational expectation hypothesis, which was not amenable to applications until much later. Meanwhile, other changes such as competition in the global economy demanded improved specifications for better forecasting results. The MPS was, therefore, replaced with the FRB/US model in 1996.

This chapter includes the less known development of post-Keynesian economics that led to the "The Dual Pasinetti Theorem" advanced by Modigliani and Samuelson. At the heart of this discussion is Modigliani's preoccupation of how to integrate or extend traditional economic analysis to the theory of value and distribution. This brand of economics proceeds with two strides. The short stride version follows the economics of Keynes. The longer stride goes to the heart of the definitions of terms such as capital and profits that could be considered unsettled questions in a growth environment. For this Modigliani integrated neoclassical economics into his Keynesian thought.

Conclusion

Modigliani extended and polished his works over his career. The Keynesian apparatuses he evolved were tailored to several foreign countries, mainly European. Collaborating with his past students, who occupied major positions in central banks and other financial institutions, he evaluated the performances of the international economies against his models. In one of his last published papers, he used data for the European countries to illustrate the Keynesian framework.

The works we present of Modigliani are both deep and broad. His penetrating mind poured onto economic matters starting with his PhD dissertation that set what Samuelson called the Model-T version of Keynesian economics research. As his model degenerated over time, he turned them back into progressive research with new thoughts and specifications. He was able to go to the heart of many subjects related to consumption, investment, and monetary aspects to find some novel ideas. The fruits of his research have helped to make the Keynesian paradigm practical.

Notes

Preface

1. D. J. Wolpe, *Floating Takes Faith* (Springfield, NJ: Behrman House, 2005), p. 116.
2. For an insightful look at the role played by the wives of scientists, see I. I. Mitroff, T. Jacob, and E. T. Moore's article, "On the Shoulders of Spouses of Scientists" in *Social Studies of Science* 7 (1977), pp. 303–327.
3. Ibid., p. 106.
4. H. Gardner, *Creating Minds: An Anatomy of Creativity Seen through the Lives of Freud, Einstein, Picasso, Stravinsky, Eliot, Graham and Gandhi* (New York: Basic Books, 1992), pp. 44–46.
5. Observers of the scientific enterprise note that joint authorship is increasing. J. M. McDowell and M. Melvin, "The Determinants of Co-Authorship: An Analysis of Economics Literature," *The Review of Economics and Statistics* 65, no.1 (1983) pp. 155–160. Also, A.H. Barnett, R. W. Ault, and D. L. Kaserman, "The Rising Incidence of Co-authorship in Economics: Further Evidence," *Review of Economics and Statistics*, 70 no.3 (1988) 539–593. Edmund Burke insightfully remarked: "In my course I have known, and, according to my measure, have co-operated with great men; and I have never yet seen any plan which has not been mended by the observations of those who were much inferior in understanding to the person who took the lead in the business" in *Reflections on the Revolution in France* (London: Penguin, 1986), p. 83. This is what I had to say about collaboration at a seminar held at the Centre Detudes Interdisciplinaires Walras-Pareto, University of Lausanne: "There is a tendency to overglamorize the lone wolf scientists working with limited resources and arriving at astounding results. There are those who argue that eminent scholars are so individualistic that they are by temperament, wholly unsuited for work in any research group." Einstein used to say, "I am a horse for a single harness." R. S. Root-Bernstein, *Discovering* (Cambridge, MA: Harvard University Press, 1989), pp. 382–397. The author, a biochemist and a recipient of the prestigious MacArthur Prize Fellowship (1981–1986), attempts to unearth the blueprint for scientific discovery. He cites approvingly what several other scientists consider to be the "truths" of scientific progress. It is that the most important breakthroughs come in ill-equipped laboratories with limited funds and simple techniques. As an example he tells of Otto Hahn who, in 1938, used "apparatus that fit on a desktop" to split the atom. M. Szenberg, "Editing the Life Philosophies Series of the 1930's Generation of Eminent Economists" in *Editing Economics and Economists as Editors*, P. Bridel, ed. (Geneve and Paris: Droz, 1992), pp. 320–322.
6. M. Szenberg, ed. *Passion and Craft, Economists at Work*, with a Foreword by Paul A. Samuelson (Ann Arbor, MI: University of Michigan Press, 1999), p. 140.

7. F. Modigliani, "Ruminations on My Professional Life," in W. Breit and R.W. Spencer, eds. *Lives of the Laureates* (Cambridge, MA: The MIT Press, 1995), p. 139.

Chapter 1 Modigliani's Early Life and Influences

1. F. Modigliani, 2001.
2. Ibid., blurbs on the cover.
3. http://nobelprize.org/economics/laureates/1985/index.html.
4. W. Breit and R. W. Spencer, 1995, pp. 139–163.
5. Aristotle, 1961, p. 54.
6. F. Modigliani, 1988, pp. 145–158.
7. F. Modigliani and S. L. Cao, 2004, pp. 145–170.
8. P. A. Samuelson, 1999, p. XI.
9. J. Hadamard, 1945, p. 47.
10. W. A. Barnett and R. M. Solow, 2000, p. 223.
11. H. Neisser and F. Modigliani, 1953.
12. W. A. Barnett and R. Solow, 2000, p. 239.
13. F. Modigliani, 1986, p. 215.
14. E. R Tannenbaum, 1972, p. 9.
15. T. H. Geer, 1968. p. 519.
16. B. Mussolini., 1923, p. 5.
17. Ibid., p. 16.
18. Ibid., p. 39.
19. R. Ulich, 1961, p. 188.
20. J. M. Keynes, 1979, p. 80.
21. T. H Geer, op. cit., 1968, p. 521.
22. Mussolini, op. cit., p. xi.
23. T. H. Geer, 1968, p. 523.
24. Ibid., p. 527.
25. F. Modigliani, 2001, p. 13.
26. F. Modigliani,1986a, p. 215.
27. This attitude is reminiscent of Janusz Korczak, a dedicated Jewish doctor to destitute children, who managed both a Catholic as well as a Jewish orphanage in Warsaw before the Second World War. Korczak defended children's rights in courts, as well as in his famous books. He chose to die together with the two hundred Jewish orphans in the death camp Treblinka, rather than save himself. www.korczak.com/Biography/kap-1who.htm. Also, http://en/wikipedia.org/wiki/Janusz_Korczak.
28. F. Modigliani, 2001, p. 2.
29. S. Freud, 1964, p. 34.
30. F. Modigliani, 2001, p. 2.
31. Ibid., 2001, p. 9.
32. P. Neville, 2004, pp. 125–135.
33. Ibid., 2004, p. 151.
34. Ibid., 2004, p. 116.
35. R. J. B. Bosworth, 2002, p. 342.

36. F. Modigliani, 1995, p. 141.
37. R. J. B. Bosworth, 2002, p. 288.
38. F. Modigliani, 1995, p. 141.
39. F. Modigliani, 1986a, p. 217.
40. W. A. Barnett and R. M. Solow, op. cit., p. 223.
41. F. Modigliani, op. cit., 1995, p. 142.
42. In the matter of marriage, Modigliani provides the best prescription for a happy marriage: "Our love was kindled by long talks about what we thought of life … our ideas and values matched perfectly." F. Modigliani, op. cit, 2001. Also, their families knew each other intimately starting with their great grandmothers. An ancient Talmudical text says it all, "Like should marry like."
43. Ibid., p. 143.
44. F. Modigliani, op. cit, 1986a, p. 219.
45. F. Modigliani, op. cit., 2001, pp. 67–68.
46. It is instructive to note that the same fate befell Paul A. Samuelson despite winning the David A. Wells Prize for his *Foundations of Economic Analysis* (Harvard Economic Studies, Vol. 80, 1947). In both cases Burbank's anti-Semitism played a role in denying them a faculty position at Harvard. It is no wonder that Samuelson describes Burbank as standing for "everything in scholarly life for which I had utter contempt and abhorrence." See M. Szenberg, A. Gottesman and L. Ramrattan *Paul Samuelson On Being an Economist*, with a Foreword by J. Stiglitz. (New York: Jorge Pinto Books, 2005), 23–24. In the index to his *Adventures*, Modigliani refers to him as Professor Burbank, without spelling his first name. Also, he is the only person referred to as "professor" which indicates Modigliani's similar feelings of contempt for him.
47. F. Modigliani, op. cit., 2001, p. 53.
48. P. A. Samuelson, 1987, p. 30.
49. R. D. Parke, 2004, pp. 1–24.
50. "Lay" analysis is the title of one of Freud's works.
51. P. A. Samuelson, op. cit., p. 30.
52. W. A. Barnett and R. M. Solow, op. cit., covered all these disagreements.
53. Personal correspondence 2006.
54. P. A. Samuelson, op. cit., p. 29.
55. Personal correspondence 2006.
56. Personal correspondence 2006.
57. Personal telephone conversation 2006.

Chapter 2 Modigliani and Keynesian Economics

1. J. M Keynes, 1936, p. 372.
2. J. M. Keynes, 1987, p. 24.
3. R. K. Vedder and L. E. Gallaway, 1997, p. 1.
4. A. Kramer, 1984, p. 116.
5. J. M. Keynes, 1987, pp. 296–297.
6. J. M. Keynes, 1987, p. 299.
7. P. Samuelson, 1987, p. 29.
8. F. Modigliani and L. Papademos, 1980, p. viii.
9. F. Modigliani, Vol. 1, 1980, pp. 23–68.

10. Ibid., pp. 69–97.
11. Ibid., pp. 3–22.
12. Ibid., p. 20.
13. F. Modigliani, 2005.
14. W. A. Barnett and R. M. Solow, 2000, p. 227.
15. J. M. Keynes, 1936, p. 246.
16. A. O'Sullivan, 2003, p.132.
17. J. M. Keynes, 1936, p. 249.
18. Keynes, 1936, p. 135.
19. Ibid., p. 248.
20. Ibid., p. 248.
21. Ibid., p. 249.
22. J. M. Keynes, 1987, p. 1.
23. Ibid., p. 3.
24. Ibid., p. 18.
25. Ibid., p. 15.
26. Ibid., p. 27.
27. Ibid., p. 16.
28. A. C. Pigou, 1952, p. v.
29. Ibid., p. 9.
30. J. M. Keynes, 1936, p. 6.
31. J. M. Keynes, 1987, p. 54.
32. Ibid., p. 54.
33. J. R. Hicks, 1984, p. 186.
34. J. M. Keynes, 1936, p. 5.
35. R. K. Vedder and L. E. Gallaway, 1997, p. 1.
36. J. R. Hicks, 1937, p. 186.
37. P. A. Samuelson, 1941, p. 545.
38. R. Harrod, 1934, p. 129.
39. T. K. Rymes, 1989, p. 177.
40. J. R. Hicks,1936, pp. 238–253.
41. Ibid., p. 238.
42. Ibid., p. 239.
43. Ibid., p. 243.
44. J. M. Keynes, 1987, p. 72.
45. Ibid., p. 26.
46. J. R. Hicks, 1936, p. 245.
47. Ibid., p. 246.
48. Ibid., p. 187.
49. J. R. Hicks, 1939, pp. 62–77.
50. J. R. Hicks, 1984, pp. 218–219.
51. J. M. Keynes, 1987, p. 79.
52. A. Lowe, 1965, p. 229.
53. J. M. Keynes,1987, p. 83.
54. Ibid., p. 83.
55. Ibid., p. 71.
56. Ibid., p. 73.
57. Ibid., p. 80.
58. F. Modigliani, Vol. 1, 1980, p. 26.

59. F. Hahn,1985, p. 56.
60. J. M Keynes, 1936, p. 3.
61. A. Lowe, 1965, p. 227.
62. F. Modigliani, Vol. 1, 1986, p. 73.
63. J. M. Henderson and R. E. Quandt, 1971, p. 24.
64. D. Gale, 1982, pp. 8–9.
65. J. M. Keynes, 1936, p. 41.
66. F. Modigliani, 1944, p. 47.
67. D. Patinkin, 1949, p. 1.
68. H. G. Johnson, 1970, pp. 18–19.
69. D. Patinkin, 1948, pp. 135–154.
70. W. J. Baumol, 1972, p. 370.
71. F. Hahn, 1985, p. 61.
72. F. Modigliani, Vol. 1, 1986, p. 83.
73. D. Patinkin, 1961, p. 107.
74. F. Modigliani, Vol. 1, 1986, p. 89.
75. Ibid.
76. F. Modigliani, 1944, p. 69.
77. D. Patinkin, 1948, p. 153.
78. F. Hahn, 1985, p. 60.
79. G. Rubin, 2004, p. 191.
80. Ibid., p. 194.
81. Ibid., p. 210.
82. Ibid., p. 211.
83. F. Modigliani, Vol. 1, 1980, p. 46.
84. M. Morishima, 1977, p. 154.
85. A. C. Pigou, 1952, p. 61.
86. F. Modigliani, 2005, p. 343.
87. J. R Hicks, 1937, p. 191.
88. F. Modigliani, Vol. 1, 1980, pp. 53–54.
89. J. M. Keynes, 1936, p. 214.
90. P. A. Samuelson, 1941, p. 548.
91. P. A. Samuelson, 1969, p. 175.
92. F. Modigliani, Vol. 1, 1980, p. 26.
93. Ibid., p. 28.
94. Ibid., p. 27.
95. Ibid., p. 32.
96. Ibid., p. 37.
97. Ibid., p. 38.
98. Ibid., p. 40.
99. Ibid., pp. 41–42.
100. F. Modigliani, Vol. 1, 1990, p. 43.
101. F. Modigliani, 1980, pp. 69–107.
102. S. Fischer, 1987, p. 230.
103. Ibid., p. 235.
104. A. Leijonhufvud, 1982, p. 100.
105. G. Rubin, 2004, p. 206.
106. A. Leijonhufvud, 1982, p. 327.
107. M. Morishima, 1977, p. 154.

108. A. Leijonhufvud,1982, p. 335.
109. P. A. Samuelson, 1986, p. 277.

Chapter 3 The Gospel of Keynesian Reality, Development and Application of Modigliani's Model, 1944–2003, The Realm of Stabilization Policies

1. J. M. Keynes, 1963, p. 187.
2. H. Hoover, 1952, p. 19. It is worth noting that Irving Fisher used his knowledge of economics, finance, and mathematics to invest in the stock market. He shared his techniques with his fellow Yale faculty members who accumulated a fortune. However, with the stock market crash he not only lost 10 million dollars in 1930, but also his home. Fisher's Yale colleagues who followed his investment strategies became impoverished as well.
3. Ibid., p. 20.
4. J. M. Keynes, 1963, pp. 142–143.
5. Ibid., p. 154.
6. Ibid., p. 161.
7. Ibid., p. 169.
8. Ibid., p. 177.
9. J. Tobin, 1987, p. 6.
10. Ibid., pp. 9–11.
11. L. Papademos and F. Modigliani, 1990, p. 412.
12. Ibid., p. 413.
13. J. Tobin, 1987, pp. 52–53.
14. P. Samuelson, Vol. 5, 1986, p. 276.
15. A. Lowe, 1965, p. 277.
16. P. Samuelson, 1986, p. 286.
17. Ibid., p. 287.
18. J. E. Stiglitz and B. Greenwald, 2003, p. 188.
19. J. Tobin, 1987, p. 443.
20. P. A. Samuelson and R. M. Solow, 1960, p. 177.
21. F. Modigliani, 1986a, p. 6.
22. F. Hahn and R. Solow, 1995, p. 2.
23. J. B. Taylor, 1993, pp. 4–5.
24. R. Dornbusch, et. al, 2004, p. 193.
25. F. Modigliani, 1944, p. 52
26. Ibid., pp. 53–54.
27. F. Modigliani, Vol. 1, 1980a, p. 91.
28. Ibid., p. 93.
29. Ibid., p. 95.
30. Ibid., pp. 96–97.
31. Ibid., p. 4.
32. F. Modigliani, Vol. 4, 1989a, p. x.
33. F. Modigliani, 1986a.
34. F. Modigliani, Vol. 1, 1980, p. 143.

35. Ibid., p.145.
36. F. Modigliani, 1986a, p. 8.
37. Ibid., p. 11.
38. Ibid., p. 18.
39. F. Modigliani, Vol. 4, 1989a, p. 44.
40. Ibid., p. 86.
41. Ibid., p.150.
42. Ibid., p. 145.
43. Ibid., p. 147.
44. Ibid., p. 197.
45. Ibid., p. 187. The propositions that we formulated to capture Modigliani's discussion on stabilization policies, were also covered in his Raffaele Mattioli Lectures published in 1986.
46. F. Modigliani, Vol. 4, 1989a, p. 192.
47. F. Modigliani, 1986a, p. 20.
48. F. Modigliani, Vol. 3, 1980c, p. 189.
49. Ibid., p. 222.
50. F. Modigliani, Vol. 4, 1989a, pp. 175–176.
51. F. Modigliani, 1986a, p. 21.
52. Ibid., p. 20.
53. F. Modigliani, Vol. 4, 1989a, p. 159.
54. F. Modigliani, Vol. 1, 1980a, p. 7.
55. B. T. McCallum, 1979, pp. 57–58.
56. W. A. Barnett and R. Solow, 2000, p. 235.
57. P. A. Samuelson, 1986, p. 839.
58. F. Modigliani, Vol. 3, 1980c, p. 472.
59. K. J. Arrow, 1986, p. S394.
60. F. Modigliani, Vol. 4, 1989a, p. 159.
61. F. Modigliani, Vol. 1, 1980a, p. 8.
62. Ibid., p. 6.
63. B. T. McCallum, 1979, p. 70.
64. S. M. Sheffrin, 1983, p. 55.
65. Ibid., pp. 56–57.
66. F. Modigliani, Vol. 2, 1980b, pp. 442–443.
67. Ibid., pp. 458–459.
68. Ibid., p. 51.
69. R. Dornbusch, et al., 2004, p. 339.
70. P. A. Samuelson, 1986, p. 280.
71. F. Modigliani, Vol. 2, 1980b, p. 459.
72. P. A. Samuelson, 1986, pp. 280–281.
73. F. S. Mishkin, 1996, p. 36.
74. F. Modigliani, Vol. 2, 1980b, p. 60.
75. Ibid., p. 460.
76. Ibid., p. 463.
77. Ibid., p. 416.
78. Ibid., p. 419.
79. Ibid., p. 423.
80. Ibid., p. 423.
81. F. Modigliani, 1989b, Vol. 5, p. 93.

82. Ibid., p. 94.
83. Ibid., p. 96.
84. R. Barro, 1974, pp. 1095–1117.
85. F. Modigliani, Vol. 5, 1989b, p. 118.
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77. B. McCallum, 1979, pp. 57–73.
78. A. Ando, 1974, pp. 541–571.
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82. A. Zellner, 2002, p. 11.
83. F. Brayton, et.al, 1997, p. 227.
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Appendix A A Question of Identity

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4. E. Goodheart, pp. 255–256. It is worthy of note that the anti-fascist, Arendt was a student and the lover of the Nazi philosopher, Martin Heidegger for 40 years, till his death in 1976. She was instrumental in his rehabilitation after WWII. [http://www.heartfield.pwp.blueyonder.co.uk/love.htm]. Also, of interest is the fact that Theodor Herzl, founder of political Zionism at the end of the 19th Century, wanted to propose to the Pope "Help us against the anti-semites and I will start a great movement for the free and honorable conversion of Jews to Christianity." M. H. Goldberg, p. 4.
5. D. J. Wolpe, 2005, p. 17.
6. Y. Avner, p. 21. When the celebrated Italian journalist Oriana Fallaci asked Golda Meir whether she was religious, she responded "Me religious? Never! Only my grandfather was religious, but those were the days when we lived in Russia. In America we observed the festivals, but went to the temple very seldom. I only went for the High Holy Days to accompany my mother. You see, to me being Jewish means being proud to be part of a People that has maintained its distinct identity for more than 2,000 years, with all the pain and torment inflicted on it." Y. Avner, August 10, 2007, p. 25.
7. R. Pinsky adds that his grandfather was "married to a Methodist woman, his third wife. He had a Christmas tree, did not go to school. But if you tried to tell him he was not Jewish he would punch you in the nose." E. Brawarsky, p. 34. The grandfather, despite being a bar-man, understood that there is a difference between identity, heritage, and belief.
8. F. Modigliani, 2001, p. 105.
9. M. Klein, p. 7. In a newly published book, R. Goldstein tells us that Spinoza "waited until both his parents had passed away before he revealed his heresy … " He continued to attend services in the synagogue everyday for a year reciting Kaddish mourning his parents. Spinoza's God was the one to which Einstein felt closest … God was the equivalent of nature, playing no role in the day to day affairs of mankind. S., Lipman, *The Jewish Week*, (June 23, 2006). In other words, besides acknowledging one's responsibility to mankind and "one's particular origins, [one] carries a special regard for and responsibility to one's parents and grandparents." R. Ben, p. 32.
10. F. Modigliani, 2001, p. 253.
11. It is important to note that in his autobiography, Modigliani is silent about his mother after her return to Rome in the 1940s, with the end of World War II. He doesn't even mention her death. When I probed this lacuna, the answer I received from a family member was "She was religious." I was also told that the children of Giorgio, his older brother, are prominent members of the Rome Synagogue.

Appendix B Selected Personal Vignettes

1. William A. Barnett is Oswald Distinguished Professor of Macroeconomics, University of Kansas, and editor of *Macroeconomic Dynamics*.
2. Alan S. Blinder is the Gordon S. Rentschler Memorial Professor of Economics at Princeton University and Co-Director of Princeton's Center for Economic Policy Studies, which he founded in 1990. He served as Vice Chairman of the Board of Governors of the Federal Reserve System from June 1994 until January 1996.
3. Dwight Jaffee is Willis Booth Professor of Banking and Finance, Haas School of Business, University of California, Berkeley.
4. Larry Meyer serves on the Board of the National Bureau of Economic Research, is a Senior Advisor to the G-7 Group, and a Fellow of the National Association of Business Economists. He also served as a member of the Board of Governors of the Federal Reserve from 1996 until 2002.

Appendix C Overview on Modigliani's Works

1 F. Modigliani and E. Grunberg, 1954, pp. 465–466.
2. Ibid., p. 465.
3. W. A. Barnett and R. M. Solow, 2000, p. 235.
4. F. Modigliani and E. Grunberg, 1954, p. 466.
5. F. Modigliani and K. J. Cohen, 1961, p. 3.
6. J. R. Hicks, 1946, p. 115.
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15. F. Modigliani, Vol. 1, 1980, pp. xi-xii.
16. Ibid., pp. 69–97.
17. F. Modigliani, Vol. 6, pp. 327–359.
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25. F. Modigliani, Vol. 5, 1989, pp. 3–34.
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27. P. J. K. Kouri, 1986, pp. 311–334.
28. M. Sarnat, 2004, pp. iv-vi.
29. F. Modigliani, 1980, p. 3.
30. F. Modigliani, 1980, p. x.
31. F. Modigliani, 1980, p. xiv.
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