

# Great Expectations:

## The Role of Beliefs in Economics and Monetary Policy

Based on a speech given by President Santomero at the Penn Humanities Forum,  
University of Pennsylvania, Philadelphia, PA, November 5, 2003

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hether one looks at consumers or businesses, expectations — people's beliefs — are driving forces of every economy. The economic outcomes one can expect from public policy are affected by the way beliefs are formed and how they vary over time. In this message, President Santomero gives his perspective on the important role beliefs play in economic decisions and policymaking. He also offers some observations on the important role the policymaker's credibility plays in determining the outcome of any monetary policy action.

Beliefs play an important role in economic decisions and economic policymaking. The beliefs held by both consumers and businesses lead to physical results in terms of the amount a nation produces, the opportunity for employment, and the formation of both personal and national wealth. The connection is the effect that beliefs have on people's demand for goods and services and on businesses' willingness to invest in new equipment and the construction of new facilities.

Beliefs are important to the decisions people make. Whether one looks at consumers or businesses, expectations — people's beliefs — are driving forces of every economy. The economic outcomes one can expect from public policy are affected by the way beliefs are formed and how they

vary over time. It matters whether people form their beliefs by looking at the past or by looking forward, by either trusting economic policymakers' promises or forecasting economic conditions.

Beliefs also play a central role in one current debate within monetary policy circles: the importance of the credibility of the policymaker in determining the outcome of any monetary policy action.

### BELIEFS IN AN ECONOMIC CONTEXT — ECONOMIC EXPECTATIONS

You will not see the word "beliefs" very much in the field of economics. Rather, you will find the phrase "economic expectations." This is because economists generally talk

about people's "beliefs" in the context of their expectations about the future. Yet, these expectations are at the heart of virtually every economic decision people make today.

For example, when consumers make decisions to spend or save, expectations play an important role. When making these decisions, people base their actions on both their current income and future prospects. This implies that actions today are predicated upon people's belief in the future and their future expected earnings. This plays out on college campuses every day. Even during their graduate school days, MBA, law, and medical school students generally spend more than doctoral students. Unfortunately, the life of a scholar tends to be less remunerative than a career in business, law, or medicine. Since students know this, their spending habits begin



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to emerge early, and these patterns develop not because of current stipends but because of earnings expected well into the future. Likewise, as each of us saves for retirement, we base our decisions on how long we expect to be employed, our expected future annual income, and what we expect to obtain from our accumulated wealth over the intervening years until retirement. Again, expectations about the future matter in an important way, as our beliefs dictate the steps we take today and the plans we make for tomorrow, aimed at achieving our economic and personal goals.

Business decisions are similarly affected by managers' view of the future. In fact, their behavior is perhaps even more dependent on an assessment of the years ahead. Businesses routinely try to project future gains that can be derived from current investments. When making a decision to invest in a specific project today, businesses compare the project's expected future flow of revenues to its current cost. This is fundamental to capital budgeting. These cash flows are only expectations because they are not contracted, nor are they guaranteed. They are derived from management's belief in the firm's value proposition, the marketing studies that support the project, and the firm's assessment of its own capability.

Expectations even affect economic decisions about foreign activity. Decisions about whether to import or export or whether to make a foreign direct investment or a foreign financial investment are all tied to the future relative value of the currencies involved. Moreover, these exchange rates are driven by the expectations surrounding countries' economies and their political future.

So expectations matter and expectations pervade virtually every economic decision.

## EXPECTATIONS AND PUBLIC POLICY

Public policymakers are not oblivious to this fact. They recognize that expectations influence people's behavior and that policymakers' actions will change the private sector's view of future economic conditions.

Policymakers take this interaction into account when policy is made — or to put it more directly, their decisions are influenced by this awareness. This can be illustrated quite easily with reference to the debate surrounding the latest federal tax cuts.

Economists know the effect of a tax cut will differ depending on whether consumers believe a personal

example, another part of the administration's enacted tax program included federal tax incentives that were clearly labeled as a temporary tax break for businesses to encourage investment in new equipment. These incentives are set to expire at the end of this year. Assuming businesses believe Congress will not extend this temporary benefit or make it permanent, this tax benefit should encourage a short-run increase in business spending. Accordingly, most economists expect some business spending to be pulled forward to 2004 to take advantage of the tax incentive.

Let me illustrate why expectations matter to the Federal Reserve in its conduct of national monetary policy. The Federal Reserve's goal is

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income tax cut is temporary or permanent. If people expect the tax cut to be a one-time-only event, they are likely to spend less than if they believe the tax cut is a permanent policy change. To see this, consider your own likely behavior. In all likelihood, a one-time boost in your take home pay will have a smaller effect on your spending than a program that permanently increases your net income well into the future. Therefore, to trigger a desired result of a large boost in economic activity, a tax cut perceived as permanent will assist a slowing economy more than a transitory cut will. This was one of the rationales for the permanent tax-rate changes proposed by the current administration.

But transitory tax changes can also have a place in tax policy aimed at short-term response. For

to create financial conditions that foster maximum sustainable economic growth. The Fed makes two important contributions in this regard. First, it provides essential price stability — meaning little or no inflation. Second, it tries to offset shifts in demand that deter the economy's ability to reach its potential.

To a central banker, long-run price stability is of utmost importance because, for the market economy to achieve sustainable growth, it must generate efficient resource allocations, including appropriate savings and investment decisions. This requires not only a stable price level in the near term but also the expectation of stable prices over the long term. This implies that optimal monetary policy is not simply a matter of establishing a stable price level today, but of ensuring a

stable price level — and expectations of price stability — into the future. Only then can consumers and investors be confident in the environment in which they must make decisions that have implications far into the future. For this reason, central bankers often talk about the need to establish credibility and about the public's confidence in our long-run commitment to price stability.

For the past two decades, the Fed has focused on the goal of price stability and has been quite successful in achieving it. But we have not always been successful. Recall the 1970s. Early in the decade, inflation began to rise, and the Federal Reserve failed to establish itself as a champion of price stability. The public's inflation expectations became unstable. Inflation and inflation expectations spiraled upward. Economic performance deteriorated. The Fed, concerned about the potential impact on employment and economic activity, initially avoided undertaking the strong policy actions necessary to break this destructive cycle. It was not until Federal Reserve Chairman Paul Volcker led the economy into disinflation in 1979-82 that the Fed began to regain credibility. Unfortunately, regaining credibility was costly. We suffered two recessions during those years.

Nonetheless, since that time, the Federal Reserve has achieved what is essentially price stability and has also stabilized inflation expectations. This can be seen in at least two different ways.

First, the level of interest rates has moved lower over the period and has remained low. This is important because the level of nominal interest rates tends to move with expected inflation. This idea has a long history in economics, but it was best articulated by Irving Fisher in 1930. He pointed out that investors in finan-

cial assets would demand compensation for the loss in purchasing power associated with nominal investments when the price level rises. In other words, if an investor believes inflation will remain at 5 percent per year over the next several years, she will demand a yield of at least 5 percent. Otherwise, she risks a loss of purchasing power at

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the time the investment is redeemed. Therefore, the downward trend in market interest rates is associated with our success in reducing inflation expectations.

But we also have some survey data in support of this view. The Federal Reserve Bank of Philadelphia, among others, has been tracking the views of professional economists on various economic indicators for many years. Our Survey of Professional Forecasters, or SPF, asks for quarterly forecasts for a variety of economic data. As part of this process, we ask for expected consumer price inflation over the next 10 years. The most recent SPF reported that the expected inflation rate over the next 10 years was 2.5 percent per year. This level has remained essentially unchanged over the past three years, even as many disturbances buffeted the economy and the Federal Reserve aggressively reacted to offset their macroeconomic effects.

Why is this important? Stated simply, the more people believe in the

existence of price stability, the more effective monetary policy will be as it tries to offset shifts in demand that deter the economy's ability to reach its potential. If people are relatively confident that a downturn will be short-lived, and monetary policy action will be effective in returning the economy to sustainable growth, they will be more willing to spend into a downturn, taking advantage of temporarily low prices and low interest rates.

In this respect, the fact that consumers did indeed spend their way through the recent economic downturn is a testament to the credibility of monetary policy and consumer expectations that we would soon return to a more acceptable rate of economic growth. The Fed's aggressive countercyclical monetary policy over the most recent business cycle has given consumers the opportunity to borrow at relatively low interest rates. Seizing this opportunity, households have increased their purchases of homes and durable goods at record rates, dampening the breadth and depth of the past recession. They are also sustaining that growth, giving business investment time to recover and businesses a reason to invest in a better future.

This situation contrasts with the recent Japanese experience, where interest rates at or close to zero elicited little response. The difference is confidence in the future. Of course, confidence is born of many factors, not just the effectiveness of monetary policy. Nonetheless, I think confidence in the Federal Reserve's effectiveness is part of the mix. In short, expectations about the central bank's performance figure into the public's behavior. Likewise, maintaining public confidence in both the stability of prices and economic growth helps the Federal Reserve achieve its mission.

In Japan's case, interest rates had been at or close to zero for a long

time, without eliciting a substantial response in terms of increased consumer or business spending. Only recently has the situation begun to change. For a number of years, people in Japan did not expect an immediate turnaround in their economy. Accordingly, they have had little incentive to rush to take advantage of current low rates.

The other aspect of Japan's recent experience that has attracted some attention is its persistent price deflation. Ordinarily, when businesses cut prices, ensuing increases in demand help to generate an economic turnaround. Once the turnaround begins, prices stabilize and return to normal. Indeed, the expectation of future price increases is what encourages consumers to buy now, inducing a positive response to the price cuts. But if people believe the initial price declines are a harbinger of continued weakness and additional price declines, demand slackens, leading to even less economic activity and a continuing downward spiral. Again, expectations are at the heart of these economic decisions and the impact of these price changes.

In sum, these examples illustrate the important role beliefs play in economic decisions. Physical results in terms of actual consumer and business behavior are influenced by consumer and business expectations — that is, their beliefs.

## HOW BELIEFS ARE FORMED MATTERS

Given the importance of expectations, it should not be surprising that considerable effort has been expended on studies of expectations. Economists have been interested in a number of aspects of expectations, including how they are formed, how expectations change, and their speed of adjustment. Indeed, failure to investigate these issues fully could lead to flawed empirical and analytical

research and then flawed economic policy as well.

For these reasons, researchers have long investigated what people believe will occur in the future and how their views vary over time. Researchers interested in studying consumer spending want information about what consumers believe and how that affects their short-term spending behavior. Similarly, economists studying firms'

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behavior track firms' views about the outlook for their businesses or industry and how this is related to their own business spending on new facilities or equipment.

But beliefs are difficult to observe. One way to obtain data is to simply ask people what they believe. Some organizations conduct regular surveys of general consumer issues. For example, the Conference Board publishes a survey of consumer confidence, and the University of Michigan publishes a survey of consumer sentiment. Both surveys generate an index intended to summarize overall consumer attitudes. The Michigan survey in particular asks pointed questions: whether buying a car is a good idea now or in the future, whether jobs are plentiful now or are likely to be in the future, and what the respondent expects the consumer price inflation rate to be over the next five to 10 years.

Such information is relevant and quite helpful. However, it does not fully solve our problem because behavior is only loosely related to such surveys. It is well known that consumer spending is more closely related to direct economic factors such as income

than to these consumer sentiment numbers. Such numbers are helpful in explaining behavior, most often during times of shocks such as wars, but they are not perfect. Consumers have too often said one thing and done another for economists to totally trust confidence survey numbers.

So economists have had to look more closely at the underlying economic data to determine expecta-

tions. Researchers obtain estimates of expectations about future economic data in several ways. These methods essentially try to model how people form their expectations, or beliefs, about the future.

For instance, economists have tried to generate proxy data for expectations by simply extrapolating from the past, which amounts to saying that people believe nothing is really changing. Others have employed a more forward-looking approach, relying on a model of the economy that is calibrated to the past but permits more to change in the future. If people form their expectations or beliefs in a more forward-looking manner, they may behave differently than if they form their beliefs by looking only at the past. This difference is most evident in economists' discussions of the impact of announced changes in economic policy.

Suppose inflation were 8 percent and the central bank announced a policy to lower inflation in the future from 8 percent to 2 percent. If consumers and businesses absolutely believed the policy announcement, they would be willing to accept lower

10-year interest rates immediately. As a result, interest rates would adjust sharply downward. The policy and ensuing drop in interest rates would essentially prove a self-fulfilling prophecy based on the strength of people's beliefs.

In contrast, if consumers and businesses adjusted their expectations about future inflation only *after* actual inflation started to fall, they would *not* be willing to accept a sharp reduction in 10-year interest rates. This constitutes a kind of “seeing-is-believing” skepticism in the populace.

In general, economic research has shown that the economy makes faster adjustments to announced policy changes when people form their beliefs in a forward-looking manner, rather than forming their beliefs based on the recent past behavior of economic data, and when policymakers have credibility.

Economists' understanding of how expectations are formed has evolved substantially over the past 30 years. In the early days of macroeconomic modeling, we modeled people's expectations as simple extrapolations of their recent experience. Then, in the 1970s, the so-called “rational expectations” revolution changed our whole approach. We began to model expectations about the future as an accurate forecast of the future economic environment.

We continue this research effort even now. Currently, we are modeling expectations as the outcome of an intelligent and well-informed, but occasionally mistaken, learning process. The marketplace eventually weeds out expectations based on poor information and erroneous thinking, but this can take a considerable amount of time. This has led many people to argue that policymakers can assist the market in its attempt to predict the future by greater transparency

and more public disclosure. Let me turn to this topic and its implication for monetary policy.

### TRANSPARENCY, DISCLOSURE, AND EXPECTATIONS

Because the Fed can avoid sharp changes in public expectations about monetary policy and the Fed's credibility by being as transparent as possible in its own decision-making, information about the Fed's policy goals, its assessment of the current economic situation, and its strategic direction are increasingly a part of the public record. The statements now

**The Fed recognizes that transparency plays an important role in achieving its policy objectives and goals.**

released after every Federal Open Market Committee meeting are important in this regard. They not only report our decisions concerning immediate action but also our sense of the key factors driving near-term economic developments and the strategic tilt to our actions going forward.

The Fed recognizes that transparency plays an important role in achieving its policy objectives and goals. Any policy action can have very different effects, depending on what the private sector infers about the information that induced policymakers to act, about policymakers' objectives, and about their likely future actions.

Over the last few decades, there has been enormous progress in improving the clarity of the Fed's objectives and its discipline in pursuing those objectives. There has also

been great progress in providing more accurate and timely information about Fed policy actions. This progress has greatly enhanced policymakers' credibility. Providing more certainty about the central bank's objectives and plans through greater transparency and disclosure will help avoid large swings in public expectations about future changes in monetary policy. This can help stabilize the economy over the long run.

When you come right down to it, the Fed directly influences just one market interest rate — the rate on overnight unsecured loans among banks, commonly known as the fed funds rate. Therefore, for the Fed's policy actions to affect economic activity, they must ripple out to other short-term interest rates. How and to what extent are primarily a matter of expectations.

When the Federal Reserve changes its fed funds target, financial markets make an assessment as to how persistent that change will be, what it signals about the future path of fed funds rate targets, and the economy's reaction to the Federal Reserve's change in policy.

This alteration in market expectations, in turn, drives changes in other short-term interest rates. It is the markets' anticipation today of future Federal Reserve actions that extends the impact of a fed funds rate change to other short-term interest rates.

The effect of a monetary policy action by the Fed will also ripple out to long-term interest rates. Thus, the change in the overnight rate, a single Fed action, affects the entire pattern of interest rates, with long-term interest rates often moving in the same direction as short-term interest rates.

Research suggests that Federal Reserve near-term policy actions are pretty well anticipated by financial markets, though the precise timing



and magnitude of interest rate changes are not.

At times, however, long-term interest rates do not move in the same direction as short-term rates. For instance, this can occur when the Federal Reserve is reducing its fed funds rate target but investors believe this easier monetary policy will lead to higher inflation. Yet again, an economic outcome depends on what investors expect — their beliefs — about the future. The better markets can predict the future course of Fed actions and their results for the economy, the more effective monetary policy will be.

Unfortunately, expectations about the economy evolve in ways we cannot always predict. They are also subject to dramatic shifts that we cannot always anticipate. Consequently, they impart an inevitable element of instability to the economy.

## INFLATION TARGETING AS A NEXT STEP

It is partly for this reason that some economists have recently spoken in favor of explicit inflation targeting. Proponents argue that the Federal Reserve should set an explicit target for inflation to further improve central bank transparency.

I admit to being of this opinion. I believe the FOMC should seriously consider inflation targeting so as to consolidate the gains made in central bank credibility over the past two decades and to increase the efficacy of policy even further.

I believe we have reached a point where institutionalizing inflation targeting simply makes good sense from an economic perspective. In short, it is a reasonable next step in the

evolution of U.S. monetary policy, and it would help secure full and lasting benefits from our current stable price environment. Evolving to explicit inflation targeting from our current implicit target has significant potential benefits, and the costs may be minimal if we can implement it in a constructive manner.

## We have reached a point where institutionalizing inflation targeting simply makes good sense from an economic perspective.

Clearly, proper implementation of inflation targeting is crucial to its success. That, in turn, requires more research and analysis about how and when to introduce it. But while it requires more public debate and discussion, it may be an idea whose time is approaching.


Explicit information about the Fed's policy goals, along with its assessment of the current economic situation and its strategic direction, can only improve financial markets' expectations and move market interest rates into better alignment with appropriate Fed policy.

## CONCLUSION

Expectations are at the heart of virtually every economic decision people make. The public's expectations about factors affecting the economy have a powerful impact on the economy's overall performance. People's view of the future pervades virtually every decision made in our complex and vibrant economy. In some ways,

beliefs assume characteristics of a self-fulfilling prophecy. If people believe the economy is healthy and strong, that belief helps to make it so. Their confidence will induce spending and increase demand, which will, in turn, promote business investment spending, which creates jobs, and ultimately translates into economic growth.

People's beliefs extend not just to the economy's state and structure but also to policymakers' behavior in their attempts to control both monetary and fiscal policy. As for monetary policy, its effectiveness hinges on public confidence — people's belief — that the Federal Reserve has the commitment and the capacity to maintain stable prices and foster maximum sustainable economic growth.

Establishing this confidence is not easy, particularly in a world where shifts in public expectations can themselves create episodes of economic instability. But, ultimately, the key to creating stability lies in demonstrating stability: focusing on the ultimate policy objectives, pursuing those objectives persistently, and communicating them forthrightly. In this regard, I believe the Federal Reserve is on that path. 

# Should Cities Be Ready for Some Football?

## Assessing the Social Benefits of Hosting an NFL Team

BY GERALD A. CARLINO AND N. EDWARD COULSON

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re the large public expenditures on new stadiums a good investment for cities? Does hosting a major sports team have benefits?

Although public subsidies for professional sports teams are controversial, the answer to these questions may well be yes. In this article, Jerry Carlino and Ed Coulson report the results of their 2003 study: When quality-of-life benefits are included in the calculation, building new stadiums and hosting an NFL franchise may indeed be a good deal for cities and their residents.

Rapid population growth in many metropolitan areas in the United States has made them economically viable locations for professional sports franchises such as those of Major League Baseball (MLB) or the National Football League (NFL). But since all four of the major sports leagues tightly control both the creation of new franchises and the relocation of teams, cities' demand for teams far exceeds the supply.<sup>1</sup>

<sup>1</sup> The other major sports leagues are the National Hockey League (NHL) and the National Basketball Association (NBA).



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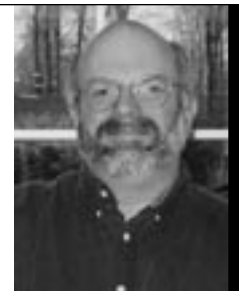
As a result, the price cities have to pay to get teams has gone up. Cities have offered favorable stadium deals in their efforts to retain or attract teams. Partly as a result of this fierce competition for teams, "America is in the midst of a sports stadium construction boom," as noted by Roger Noll and Andrew Zimbalist. Professional sports teams are demanding — and receiving — subsidies from local governments for the construction or restoration of sports stadiums. According to Raymond Keating, the total cost of 29 sports facilities that opened between 1999 and 2003 is expected to be around \$9 billion. Keating found that taxpayers' money financed around \$5.7 billion, or 64 percent, of this \$9 billion.

The boom in stadium construction coupled with the increased public support for these facilities raises the question: "Are subsidies to sports teams a good investment for cities?" The answer has been controversial.

Often, subsidies are justified by claims that attracting or retaining sports teams more than pays for itself in increased local tax revenue by creating new jobs and more spending. More recently, local officials have come to view a downtown stadium project as an important part of the revitalization of the central city's urban core. Advocates of this approach point to Jacobs Field in Cleveland, Coors Field in Denver, and Camden Yards in Baltimore as models of how stadium-based development can work. However, independent studies by economists often indicate that taxpayers may not be getting such a good deal. Most studies that have attempted to quantify the creation of jobs, income, and tax revenue have found that the direct monetary impact felt by a city hosting a sports team is less than the sizable outlay of public funds. Yet civic leaders continue to make the case for professional sports and the beneficial role they play in the community.

Recently, economists have pointed out that previous studies missed a basic point: Professional sports teams add to residents' quality of life in cities that host teams. It's possible that people obtain benefits from having a local sports team even if they never go to a game. They root

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for the local athletes, look forward to reading about their success or failure in the newspaper, and share in the city-wide joy when the home team wins a championship.

Economists have long studied the effects of an area's quality of life on wages and the cost of housing. Past studies have found that people are willing to pay indirectly for local amenities, such as good weather, scenic views, and nearness to the ocean, in the form of higher rents and lower wages. Similarly, if people benefit from having a professional sports franchise in their community, they are presumably willing to pay for it — if not directly through the purchase of tickets, then indirectly through an increased willingness both to pay more for housing in the area and to accept lower wages.

We did a study in 2003 in which we looked at the quality-of-life benefits residents receive in cities that host an NFL team. We found that once quality-of-life benefits are included in the calculus, the seemingly large public expenditure on new stadiums appears to be a good investment for cities and their residents.

## THE POLITICAL ECONOMY OF SPORTS FRANCHISES

Professional sports teams play in facilities heavily subsidized by local governments. Typically, cities use general revenue bonds to finance their share of the cost of a stadium. These bonds are paid off through a variety of sources, for example, ticket surcharges, taxes on hotel rooms and car rentals, and state lottery proceeds. These stadiums are usually publicly owned and leased to teams. A city derives revenue from publicly built stadiums in a number of ways. Chief among them are rental payments made by teams; the local government's share of parking, concessions, and luxury boxes; prop-

erty taxes on the stadium paid by the team; and rent received for nonsports activities, such as concerts.

On the cost side, the city must account for depreciation and maintenance of the stadium, and the city's share of the cost of providing utilities, refuse collection, and police, fire, and rescue services. In addition, municipalities must account for what economists call opportunity costs: local governments' spending on stadiums lowers spending for other worthy

## Economists have long studied the effects of an area's quality of life on wages and the cost of housing.

projects or programs. For example, suppose the annual cost of a stadium in City A is \$20 million a year for the next 30 years. If an entry-level teacher's salary (including benefits) runs about \$60,000 annually, one measure of the opportunity cost of the stadium is the 333 teachers that could have been added to the city's school system. Indeed, to keep the Cincinnati Bengals from making good on a threat to move to Baltimore in 1995, local officials agreed to a \$540 million deal for two new stadiums (one for the Reds, too). Although the action might not have been linked to the stadium-funding bill, *The Economist* noted that shortly before the vote on the stadium-funding bill, Cincinnati laid off 400 staff members from its school district, including 200 teachers.<sup>2</sup>

In principle, cities could set rental payments to cover all the costs associated with constructing and operating municipal stadiums. In practice,

<sup>2</sup> "Footloose Football," *The Economist*, September 9, 1995, p. 90.

since all four major sports leagues exercise considerable control over the geographic mobility of established teams as well as over the creation of new franchises, cities do not set rental payments in this way. In the intense competition for teams, cities have offered favorable stadium deals in their efforts to retain or attract sports franchises.

Numerous independent studies by economists have shown that any revenue cities receive typically fails to cover costs because of favorable clauses in the lease regarding rent; the teams' share of parking, concessions, and luxury boxes; and partial or full forgiveness of property taxes. For example, according to Michael Leeds and Peter von Allmen, the NFL's Baltimore Ravens pay no rent, while MLB's Chicago White Sox pay \$1 a year for the use of New Comiskey Park. In examining 25 sports facilities built between 1978 and 1992, James Quirk and Rodney Fort calculated that the annual subsidy to professional sports teams averaged \$9.2 million (or \$12.3 million in 2002 dollars). Even then, the annual subsidy is underestimated because data were not available for investments made to facilities subsequent to original construction. Quirk and Fort also estimated that the annual subsidy jumps to \$20 million (\$29 million in 2002 dollars) for the average stadium when investments subsequent to original construction are included in the calculus.<sup>3</sup>

## THE ECONOMIC DEVELOPMENT RATIONALE AND EVIDENCE

The question becomes: Why do local governments provide

<sup>3</sup> John Siegfried and Andrew Zimbalist point out that the escalating costs of recent stadium construction suggest that the average subsidy has surely grown since 1992.



such large subsidies to professional sports teams? One justification for the subsidy has been that sports teams increase employment and income and promote growth of the local economy. Obviously, public investment in stadiums can be beneficial, but how do we evaluate a new sports facility's contribution to local economic growth?

To address this question, most proposals to use public funds for building stadiums are accompanied by an economic impact analysis. These studies attempt to evaluate the costs and benefits of a new stadium.

The costs and benefits fall into four broad categories: direct benefits, indirect benefits, construction costs, and operating expenses. Direct benefits stem from new spending that a team generates for the city. This includes spending by fans in local restaurants and hotels and for souvenirs and spending by players and other team employees and the team's spending for local goods and services.

These direct expenditures by teams, their employees, and their fans become income for other city residents, who then re-spend part of this income when purchasing other local goods and services. This re-spending process, which continues through second, third, and subsequent rounds, is the indirect benefit. Since direct expenditures lead to indirect expenditures, the direct expenditures are said to have a "multiplier" effect on the local economy. Thus, for example, if a dollar of direct spending resulted in an additional dollar of indirect spending in the local economy, total spending in the local area would be \$2 and the multiplier's value is 2.<sup>4</sup> According to Joseph Bast, impact studies have used multipliers with values as high as 3.

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<sup>4</sup> Jordan Rappaport and Chad Wilkerson provide summary details for a representative sample of recent stadium impact studies.

One potential shortcoming of impact studies is that they are often commissioned by proponents of the stadium projects, such as teams themselves, and conducted by accounting

sports teams, economists have used other sorts of calculations to study this impact. These studies have attempted to measure the local impact of hosting a team using three different methods.

## Because of the difficulties in using "multiplier analysis" to assess the economic impact of professional sports teams, economists have used other sorts of calculations to study this impact.

firms or local chambers of commerce. According to Noll and Zimbalist, the authors of impact studies tend to make very favorable assumptions about the income and number of jobs generated and how much of this income stays in the local economy. In addition, they may make unrealistic assumptions regarding construction and operating costs and fail to account for the opportunity cost of the funds tied up in these projects; therefore, the net benefits of stadium projects can be vastly overstated depending on the assumptions made.

For example, in its analysis of the new stadium being built for the NFL's Baltimore Ravens, the Maryland Department of Business and Economic Development estimated an annual economic benefit to the Baltimore metropolitan area of \$111 million and the creation of almost 1400 new jobs. According to Leeds and von Allmen, independent analysis found a much smaller impact on annual income (\$33 million) and jobs (534). In general, independent studies by economists suggest that the value of local multipliers is at most 1.25, less than one-half of the value suggested in some impact studies.

Because of the difficulties in using "multiplier analysis" to assess the economic impact of professional

First, some studies have compared the growth rates of income or employment in cities and metropolitan areas that have teams with growth rates of these variables in cities that do not have teams. For example, in a 1994 study, Robert Baade found no significant difference in per capita personal income growth during the period 1958 to 1987 between metropolitan areas with major league sports teams and those without.

Another way to measure teams' impact on the local economy is to compare growth before and after the acquisition of a new major league team. In a 1997 study, Baade and Sanderson looked at the impact on employment and output in 10 metropolitan statistical areas (MSAs) that had acquired new teams between 1958 and 1993. They found that while certain sectors closely related to professional sports do show some employment gain, aggregate employment shows little impact from the existence of sports teams.

A final way is to measure the impact of a specific team (such as the Baltimore Orioles) on economic development in a specific location (Maryland). For example, in a 1997 study Bruce Hamilton and Peter Kahn found that even at Camden Yards — widely believed to have been a good investment for Baltimore — public expen-

diture cannot be justified on grounds of local economic development. They estimate that Maryland and its municipalities lose about \$9 million annually on Camden Yards.<sup>5</sup> They report that the stadium generates enough revenue to cover capital and maintenance costs, but under the conditions of the lease, the team's owners keep most of this revenue.

Regardless of the method used by independent researchers, the bottom line is that subsidies to sports teams appear to be much greater than the economic benefits they generate for cities. Findings such as these led Siegfried and Zimbalist to conclude that "few fields of empirical research offer virtual unanimity of findings. Yet, independent work on the economic impact of stadiums and arenas has uniformly found that there is no statistically significant positive correlation between sports facility construction and economic development."

Moreover, economists have pointed out that local spending related to professional sporting events may result in less spending on other recreational activities. While the attraction of a new team to a city or the construction of a new stadium may lead to entirely new spending in the local economy, it's more likely that much of the local spending by fans is redirected from activities occurring elsewhere in the local economy. Since households have limited budgets for and time to spend on leisure activities, sporting events may merely shift the timing

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<sup>5</sup> According to Hamilton and Kahn, the cost to the Maryland Stadium Authority for operating the stadium is approximately \$20 million annually (\$14 million in real interest and depreciation and \$6 million in maintenance). The Maryland Stadium Authority receives approximately \$6 million in rent annually from the Orioles and another \$5 million in admission tax revenue; therefore, it incurs a deficit of approximately \$9 million per year.

and location of spending within the metropolitan area but leave aggregate spending unchanged.<sup>6</sup>

One exception would be if sports events attracted a large number of "out-of-town" fans, thus bringing new spending into the region. According to Noll and Zimbalist, these types of fans account for only 5 percent to

**The subsidies granted to professional sports teams, in some sense, suggest that civic leaders and residents view professional sports teams as valued assets of a city.**

20 percent of all fans attending major league sporting events. Siegfried and Zimbalist point out that there is considerable evidence that out-of-state fans do not come to town because of regular season sporting events. They are in town for other reasons, such as a business trip or a visit to family and friends. Thus, if they had not attended a regular season game, they would have spent money on other types of leisure activities the region has to offer.

These findings pose the question: Is there an economic justification for subsidizing professional sports teams in an era in which local governments' budgets are under intense pressure and given the sizable opportunity cost associated with these types of projects?

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<sup>6</sup> The shift in spending may be meaningful to an area's central city if sports fans who spend money because they are attending games would have patronized suburban establishments in the absence of a game.

## EXTERNAL BENEFITS TO THE RESCUE

The subsidies granted to professional sports teams, in some sense, suggest that civic leaders and residents view professional sports teams as valued assets of a city. Frequently, civic leaders speak of the intangible benefits of hosting major league sports, such as civic pride. A typical statement expressing these sentiments comes from Philadelphia's mayor, John Street: "We are incredibly fortunate to be the home of great professional sports franchises. They enrich our community, fortify our tax base, and provide major support for the region's future economic growth. And then there are the intangible benefits: These Phillies [Philadelphia's major league baseball team], if we give them our full support, will bring us together [and] solidify a sense of community with civic pride as they drive toward the pennant."

Similarly, economists have noted that professional sports teams contribute to the *quality of life* in an area by increasing the satisfaction or happiness of residents in general, not just those who attend games. As we noted earlier, it's likely that many city residents get pleasure from the presence of local professional sports teams even when they neither attend games nor pay for sports programming on cable TV. Mayor Street's words speak to the "civic pride" that can result from a successful franchise. Therefore, perhaps residents should think of a professional sports team in the way they think of a new art museum or new symphony hall or, indeed, an environmental resource such as an old-growth forest: It's a commodity from which they receive enjoyment just by having it around.

The interest that professional sports franchises generate suggests they are far more important than these other public goods. In the controver-

sial words of Art Modell, owner of the Cleveland Browns-Baltimore Ravens franchise:<sup>7</sup> “The pride and the presence of a professional football team is far more important than 30 libraries” [quoted in Leeds and von Allmen’s book].

So teams create value for local residents that owners of sports franchises cannot capture. That is, the team can’t charge a fan for just being a fan. But that doesn’t make this “external benefit” any less real. If the value of these external benefits is large enough, they alone might justify the subsidies that local taxpayers grant to teams. But because no one is excluded from enjoying the external benefit generated by local sports team, it becomes difficult to know how much this matters to people, precisely because you can’t charge them for the privilege of being a fan. While these benefits are hard to measure in dollar terms, economists have made significant strides in quantifying the value residents place on similar types of quality-of-life benefits, such as clean air, scenic views, nearness to the ocean, or good weather.

**Measuring the External Benefit.** The value of a city’s special traits, such as good weather or the existence of professional sports teams, is determined by what people are willing to pay in order to live there. This amounts to the sum of what people are willing to pay for each local character-

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<sup>7</sup> In validating the bonds to construct Raymond James Stadium in Tampa, home to the NFL Buccaneers, the Florida Supreme Court described the public benefits of stadium construction in *Poe v. Hillsborough County*. The court explained: “[T]he Court finds that the Buccaneers instill civic pride and camaraderie into the community and that the Buccaneer games and other stadium events also serve a commendable public purpose by enhancing the community image on a nationwide basis and providing recreation, entertainment and cultural activities to its citizens.”

istic that either adds to or reduces the quality of life in an area. The trick is to determine the prices of these local amenities, or traits, since they are not bought and sold in markets.

Even though there is no explicit price for local amenities such as the presence of an NFL team, there is an *implicit* price. Suppose you are considering moving to either City A, which has an NFL team, or City B, which does not. Other than their NFL status, these cities are alike in all other aspects. Because the presence of an NFL team is something you value, you

## Teams create value for local residents that owners of sports franchises cannot capture.

are willing to pay some extra amount, say, \$1000, for having a team in your city.

There are two ways in which you could pay your extra \$1000. One is by bidding up land prices, and ultimately rents, in City A relative to City B. But it is not necessarily the case that you will ultimately pay \$1000 more to rent a house in City A. Part of the cost of living in a city with an NFL team could be paid in the form of lower wages than you would have accepted in City B. What must be true is that rent and wage differentials sum to \$1000. Thus, the extent to which land rent is higher and wages are lower is the extent to which the amenity value of an NFL team is capitalized into local land markets and local labor markets. Put differently, since NFL status is the only difference between the two cities, a household’s willingness to pay the extra \$1000 to live in City A must be due to the difference in NFL status.

**Measuring the Amenity Value of the NFL.** Economists have developed statistical techniques to measure the variation in rents and wages that are attributable to each of the local area’s traits, and economists have used these estimated implicit prices of amenities to rank areas according to their attractiveness. In our 2003 study, we argued that if people like having professional sports teams in their community, they are presumably willing to pay for it — if not directly through the purchase of season tickets, then indirectly through an increased willingness to pay for housing in the area and an increased willingness to accept marginally lower wages.

Bruce Hamilton and Peter Kahn first broached the idea that differentials in local wages and rents may provide a basis for valuing the social benefit of sports teams. They argued that while such differentials may exist, correlations between the presence of sports teams and wages and rents will surely be confounded by the correlation between these variables and city size (and perhaps other city-specific characteristics).<sup>8</sup> For example, because rents tend to increase with city size and large cities tend to host NFL teams, isolating the effects of an NFL team’s presence on rents may be difficult.

In our study we confronted this issue in a number of ways. We focused our attention on NFL football franchises in the 1990s, since there was movement and expansion of NFL teams in both moderate-size cities (Jacksonville, Nashville, and Charlotte) and exit of franchises in larger metropolitan areas such as Los Angeles and Houston, the nation’s second and fifth largest metropolitan areas,

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<sup>8</sup> See also the article by Rappaport and Wilkerson.

respectively. We assume that the movement and expansions will weaken the correlation between city size and NFL teams sufficiently to facilitate estimation of an NFL effect. Still, only eight of the 32 cities had a change in their NFL status between 1993 and 1999, the period of our study, making it hard to identify an NFL effect in local wages and rents.

In addition to looking at the recent movement to moderate-size cities, we focused our attention on NFL football franchises, for two more obvious reasons. The first is the pre-eminent attention the NFL receives among all sports in the United States. If any professional sport generates a measurable differential in wages and rents across cities, football is likely to be the one. Moreover, the most serious rival for that attention, Major League Baseball, has had very little expansion in recent years and no franchise movements since the early 1970s. The NFL, on the other hand, has had a bit more expansion and substantially more franchise movement.

Perhaps more important, the location of NFL franchises probably has less to do with city-specific characteristics, such as population size and growth, than in any other major sports league. Most of an NFL franchise's revenue comes from an egalitarian split of the national TV contracts, and even locally generated stadium ticket revenue is split more equitably (60 percent to the home team, 40 percent to the visiting team) than in other sports leagues. In contrast, baseball team revenue is far more heavily weighted toward local sources, particularly local TV contracts.

In our study, we estimated the change in rents and wages resulting from a change in NFL status between 1993 and 1999. We estimated two equations: one for wages and another for rents. We found that the presence

of an NFL team raises annual rents, on average, 8 percent. We also found that wages were about 2 percent lower in cities that host an NFL team, but the differential was not statistically significant. Perhaps the demand for labor adjusts more rapidly than the supply of housing, and this more rapid adjustment tends to ameliorate the effect on wages. In addition, if the NFL amenity makes workers more productive, the demand for labor could also increase, and the effect on wages would be ambiguous. In what follows, we will focus only on the rental premium.<sup>9</sup>

#### Cost-Benefit Analysis.

Since the 53 cities in our sample had, in 1999, an average monthly rent of \$500, the finding of an average rental premium of 8 percent implies an NFL amenity premium of about \$40 a month per housing unit, or \$480 annually, on average, in cities hosting NFL

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<sup>9</sup> Our study uses regression analysis in which we relate the level of rents and the level of wages in a city in each of two years to whether the city had an NFL franchise in 1993 or 1999. We control for city-specific traits that did not change between 1993 and 1999, such as nearness to an ocean, and we controlled for a variety of city characteristics that did vary between the two years, such as city size, city population growth, the rate of crime, local fiscal variables, and so forth. In addition, we also controlled for a large number of individual housing characteristics, such as number of rooms and age of the unit, and a random effect that controls for individual characteristics that do not vary over time. The implicit price of a professional sports franchise is measured by the coefficient of a dummy variable indicating the presence of an NFL franchise in the particular city and year. Given the existence of city-specific traits, the identification of this NFL effect comes from league expansion and franchise movements into and out of cities over the years between the two panel observations. As indicated in this article, eight of these cities had a change in NFL team status between 1993 and 1999. Six cities (Baltimore, Charlotte, Jacksonville, Nashville, Oakland, and St. Louis) did not have an NFL franchise in 1993 but had gained one by 1999. Two cities (Houston and Los Angeles) hosted an NFL team in 1993, but not in 1999. Twenty-four cities hosted an NFL team in both 1993 and 1999.

teams. In 1999, there were approximately 290,000 households in a typical central city, so \$480 per household implies that the aggregate amenity value to a city that hosts an NFL team is, on average, about \$139 million per year (or about \$184 per person).<sup>10</sup>

How do the estimates of the amenity value of hosting an NFL team compare with the subsidies? Earlier we pointed out that James Quirk and Rodney Fort calculated that the annual subsidy to professional sports teams, including investment subsequent to the original cost, averaged \$20 million in 1989 dollars (or \$27 million in 1999 dollars).<sup>11</sup> The annual quality-of-life benefit of \$139 million found in our study is substantially larger than the annual subsidy, suggesting that these subsidies were good investments for the typical city. Our study showed that the quality-of-life benefit to households easily exceeds the subsidies granted in all cities that hosted an NFL team during the 1990s.

#### Cost-Revenue Analysis.

While the finding that the aggregate value of the quality-of-life benefit may justify the subsidies is good news for city residents, public officials may be more concerned with the impact these subsidies have on local budgets. Our results suggest that team subsidies can also potentially pass the cost-revenue test. This means that if cities could effectively appropriate through taxation the rise in property values that resulted

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<sup>10</sup> The average central city in our sample had a population of 753,705 in 1999. According to the *Statistical Abstracts of the U.S.*, there were 2.6 people per household in 1999, suggesting there are almost 290,000 households in a typical central city.

<sup>11</sup> Interestingly, in their 2000 study that examined the 1995 budgets for eight cities, Donald Alexander, William Kern, and Jon Neill found an annual stadium subsidy in the range of \$22 million to \$29 million, depending on the city under consideration.



from the local team's existence, any such subsidy has the potential to be self-financing. This is because higher rents imply higher housing prices for cities that host NFL franchises. The higher property values will lead to increased tax revenues for central cities when properties are reassessed.

Consider our representative city once again. In 1999, the median price of a house across the cities in our sample was \$123,433. If 8 percent of this value reflects an NFL premium in these cities and if we use the average property tax rate of 1.75 percent, available for 50 of the 53 cities in our sample, that means the NFL premium yields property tax revenue of just under \$173 per year per household.<sup>12</sup> This could potentially be worth about \$50 million a year in tax revenue for our representative city with 290,000 households if it hosted an NFL team. The potential increase in property tax revenue of \$50 million associated with hosting an NFL team is almost twice as large as the \$27 million annual subsidy reported by Quirk and Fort, suggesting that, on average, these subsidies are good investments for cities. Those who benefit from the team in terms of higher property values would be paying for its subsidization. If the city could not effectively design a property tax in this way, the stadium subsidies would come out of general funds. In that case, subsidies may crowd out other expenditures that may have even greater benefits. Thus, our results do not constitute a blanket endorsement for stadium subsidies.<sup>13</sup> We found that the potential increase

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<sup>12</sup> We were limited to 50 of the 53 cities in calculating the potential increase in property tax revenue, since the property tax rate was not available for three cities. The median house price of \$123,433 is based on the 50 cities for which property tax rates are available.

in property tax revenue exceeds the known subsidies granted to NFL teams in 22 of the 25 cities that provided stadium subsidies (see *Cost and Benefits to Individual Cities*).<sup>14</sup>

**Other Studies.** While these estimates of the benefits may appear large, they are broadly consistent with estimates found in other studies that have quantified the benefits for various types of amenities. For example, Joseph Gyourko and Joseph Tracy found that the annual value for just *one* extra sunny day is \$7 per year per household, and Glenn Blomquist, Mark Berger, and John Hoehn found an annual value of \$12.<sup>15</sup> Based on these studies, Jordan Rappaport and Chad Wilkerson estimated that a metropolitan area with 2 million people should be willing to pay between \$14 million and \$24 million a year for just one additional sunny day. While direct comparisons are always difficult, Rappaport and Wilkerson's numbers, along with ours, suggest that the addition of an NFL franchise makes up for a week or so of cloudy days.

In their study, Rappaport and Wilkerson also noted that cities' aggressive bids to replace teams further supports the view that the external benefits associated with hosting an

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<sup>13</sup> The cost-revenue analysis we have presented here is for an average, or representative, city. Of course, the costs and revenue associated with hosting an NFL team will differ widely across cities.

<sup>14</sup> The 8 percent increase in rents is an average effect across the 53 cities comprising our study. In addition, we assume that the effect on rents is the same for cities that gain a team as for those that lose one. In the long run, the supply of housing may increase and rents and housing prices may go up by less than the initial increases. Still, the greater number of housing units will lead to increased property tax revenue without the need to reassess housing values for tax purposes.

<sup>15</sup> The annual values are expressed in 1999 dollars.

NFL team may exceed the cost of doing so. They point out that of the six cities that have lost NFL teams since 1980, "all but Los Angeles subsequently allocated considerably more public financing to attract a new NFL team than it would have cost to keep their old team." For example, voters in St. Louis approved \$280 million in public funds to build a new football stadium after the Cardinals departed for Arizona in 1987. St. Louis voters declined to allocate \$120 million toward a new stadium when the Cardinals were playing in St. Louis.

In February 2000, Bruce Johnson, Peter Groothuis, and John Whitehead conducted a survey of residents of the Pittsburgh metropolitan area, asking them how much they would be willing to pay in higher taxes to keep the NHL Pittsburgh Penguins from leaving the city.<sup>16</sup> The average response was \$5.57 per household per year. Since there are almost 960,000 households in the Pittsburgh metro area, Johnson and his co-authors report that this gives an aggregate quality-of-life value of almost \$5.2 million per year — a present value of \$66 million if we use an 8 percent interest rate and assume a stadium life of 30 years.

According to Rappaport and Wilkerson, between 1994 and 2000, the average public contribution to NBA/NHL sports arenas was \$84 million. The quality-of-life-benefit of \$66 million represents only about 80 percent of the average subsidy. While the \$5.2 million annual quality-of-life benefit associated with hosting the

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<sup>16</sup> At the time of the survey there was some concern that the Penguins could not survive in Pittsburgh. The Penguins declared bankruptcy in October 1998. In addition, they continue to play in the oldest arena in professional hockey, and Pittsburgh is a relatively small market.



## Costs and Benefits to Individual Cities

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he cost-benefit analysis reported in the text is for a representative, or average, city used in our 2003 study. Obviously, the analysis will differ dramatically across cities. Three things will affect the potential increase in property tax revenue for a given city: the increase in property values (actually in assessed property values), the number of housing units, and the property tax rate. Obviously, property tax revenue will increase with all three variables.

The table gives the present value of the potential increase in property tax revenue, assuming that the median price of housing reflects either an 8 percent premium in cities that currently host an NFL team or a similar increase in housing values in cities that do not currently host a team. Recall that the 8 percent housing price premium is an average across cities, and this premium may be somewhat larger or somewhat smaller in any particular city. In addition, reassessment practices are not uniform across cities, and these conventions will also influence the potential increase in property tax revenue that comes from hosting an NFL team. The values shown in the second column of the table assume that the median house value in each city has been reassessed to reflect the 8 percent NFL premium.\*

The table shows the cities ranked in terms of the present value of the potential increase in property tax revenue, based on a 6 percent interest rate and a stadium life of 30 years. The present value of the potential increase in property tax revenue is largest in New York City: more than \$12 billion. Second largest is Los Angeles, at \$3.6 billion, underscoring the need to have an NFL team in the area. Among cities that host an NFL team, the present value of the potential increase in property tax revenue is smallest in St. Louis: \$140.6 million.

The final column of the table shows all sources of public subsidies (state and local) provided to NFL

teams for the construction of new stadiums in 1999 dollars, obtained from the National Conference of State Legislators, in an April 1998 report called "Playing the Stadium Game." The subsidy exceeds the present value of the potential increase in property tax revenue in only three of the 25 cities that provided subsidies (New Orleans, Pittsburgh, and St. Louis). In Cincinnati and Kansas City, the present value of the potential increase in property tax revenue is only somewhat larger than the subsidy.

The escalating costs of recent stadium construction suggest that the average subsidy has surely grown over time, potentially putting more cities on the unfavorable side of the cost-revenue analysis. In the 1970s, cities contained stadium costs by building stadiums that were used for both baseball and football. Today, stadiums are dedicated to single use and include more costly features, such as luxury boxes and skyboxes. For example, Three Rivers Stadium in Pittsburgh, which opened in September 1970, cost \$159 million in current dollars and was home to both the NFL Steelers and the NL Pirates. Heinz Field, which opened in August 2001, cost \$281 million and is home to the Steelers only. The Pirates play in PNC Park, which opened in the spring of 2001 and cost \$216 million. Together these two parks cost almost \$500 million to construct, with state and local governments footing two-thirds of the cost.

In 1999, recognizing the increasing cost of stadiums, the state of Pennsylvania created the Redevelopment Assistance Fund to finance the four stadiums in Philadelphia and Pittsburgh, as well as the Giant Center in Hershey and other sports and arts facilities. The state capped its contribution at no more than one-third of the costs. Despite the escalation in the cost of stadiums, our findings suggest that team subsidies can potentially pass the cost-revenue test for the vast majority of cities that provide these subsidies.

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\* For any given city, we assumed that an 8 percent increase in rents resulting from the NFL premium also leads to an 8 percent increase in housing prices.

## TABLE

### Potential Cost and Benefit to Individual Cities for Hosting an NFL Team (millions of 1999 dollars)

City	Value of the Potential Increase in Property Taxes <sup>a</sup>	Subsidies <sup>b</sup>	City	Value of the Potential Increase in Property Taxes <sup>a</sup>	Subsidies <sup>b</sup>
New York	12254.5	219.5 <sup>c</sup>	Denver	305.6	6.9
Los Angeles	3629.3		Cleveland	296.4	
Chicago	3037.1	21.9	Memphis	289.3	
San Francisco	2414.9	138.3	New Orleans	280.3	414.3
Houston	1619.5	166.7	Minneapolis	263.0	117.7
San Jose	1326.2		Las Vegas	259.1	
San Diego	1205.3	134.5	Cincinnati	227.0	198.7
Seattle	1107.6	330.8	Sacramento	214.7	
Dallas	990.0	143.9	Raleigh	200.4	
Philadelphia	867.0	205.5	Fort Lauderdale	189.5	
Detroit	804.8	172.4	Newark	179.6	
Austin	720.9		Oklahoma City	172.0	
Phoenix	670.7	5.7	Salt Lake City	167.8	
Boston	607.1	0.0	Rochester	161.6	
Milwaukee	546.9		Kansas City	150.7	85.6
Washington	501.5	105.7	Pittsburgh	148.3	149.8
Jacksonville	475.7	132.8	Tampa	145.8	30.0
Columbus	474.1		St. Louis	140.6	313.7
Baltimore	447.9	204.4	Orlando	129.6	
Nashville-Davidson	446.7	319.2	San Antonio	120.6	
Atlanta	430.0	254.1	Greensboro	115.4	
Oakland	422.9	131.2 <sup>d</sup>	Hartford	108.7	
Miami	417.9	0.0	Providence	106.0	
Indianapolis	416.3	76.1	Grand Rapids	103.9	
Fort Worth	395.2		West Palm Beach	55.6	

<sup>a</sup> Based on an estimated increase in property tax revenue resulting from an 8 percent increase in median housing price. The annual stream of property tax revenue is converted into present value terms using a 6 percent rate of discount and assuming a stadium life of 30 years.

<sup>b</sup> Source: National Conference of State Legislators: [www.ncsl.org/programs/fiscal/lfp106tb.htm](http://www.ncsl.org/programs/fiscal/lfp106tb.htm). The source provided information only about subsidies for cities that had an NFL team in 1995. (Los Angeles and Cleveland did not have teams that year.)

<sup>c</sup> It's not clear whether the money came from New Jersey or New York.

<sup>d</sup> The cost of the original stadium was \$131.2 million. Currently, \$127.0 million of renovations are under way.

Penguins seems small, the external benefit is likely to be much larger for other professional sports, such as football. In the United States, hockey continues to have the smallest fan base

of the four major league sports. According to Rappaport and Wilkerson, in 2001, nine of the 24 NHL teams (38 percent) did not have local network television contracts. They also point

out that ratings for televised NHL games are only half those of NBA games.

The evidence provided in our study combined with the high valu-

ation placed on other quality-of-life characteristics found in other studies and the increased willingness to expand public funding for new NFL stadiums, even after a city has lost a team, substantially demonstrates that the quality-of-life benefits associated with hosting an NFL team may justify the seemingly large public expenditures.

Still, assessing the benefits and costs associated with sports teams is a complex problem. Despite our careful attempt to control for the many local factors that could affect rents, it's possible that our estimate of the implicit value of an NFL amenity is overstated because we failed to control for some factor that is positively correlated with both the presence of an NFL team and rents. If our estimate of the implicit price of an NFL amenity is overstated, our estimate of the benefits used in the cost-benefit analysis is overstated.<sup>17</sup> On the cost side, while the dollar amount to build a stadium is


known, the opportunity cost of funds may be harder to estimate.

## CONCLUSION

Public officials and civic boosters are often criticized for encouraging the provision of subsidies to sports franchises. But if the subsidization we discuss in this article is

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<sup>17</sup> To see if our findings hold up under scrutiny, we performed a variety of tests. For example, we controlled for the presence or absence of museums, another recreational amenity, and found that this variable was not statistically significant, regardless of whether the NFL variable was included in or excluded from the regression. We also found an 8 percent rental premium associated with NFL status, regardless of whether city population size was included in or excluded from the regressions. In addition, baseball added two teams during our sample period (one in Phoenix and one in Tampa Bay) that started playing in 1998. After controlling for the addition of these new teams, we found the quality-of-life premium associated with hosting an NFL team fell slightly below the 8 percent effect on rents reported in this article. The decline, however, does not appreciably affect the findings and conclusions reported here.

so politically unpopular, it is doubtful that officials would be so much in favor of it. But as we have argued, the debate over public subsidies to stadiums has focused on job and income creation in the cities in which the facilities are built. Although on that score stadium subsidies appear to be a bad idea, the range of potential effects goes beyond those involving income and job creation. While large public expenditures on the construction of new sports stadiums are, and will continue to be, controversial, our findings suggest that sports are popular, and once the quality-of-life benefits are included in the calculus, public spending on new stadiums may be a good investment for central cities and their residents. This, of course, is not the same thing as recommending that cities immediately decide to fund stadiums if only because the opportunity cost of appropriating such funds is the elimination of other, possibly more worthy programs, such as building new schools. 

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# The Evolution of the Philadelphia Stock Exchange

BY JOHN P. CASKEY

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he Philadelphia Stock Exchange (PHLX), the nation's oldest, has survived alongside much larger and more liquid securities markets. How has it managed to do so? In this article, John Caskey explains some of the factors that account for the PHLX's long life and how their importance has varied over time. Although Caskey focuses on the evolution of the PHLX, he also profiles some of the seismic shifts in U.S. securities markets in recent decades and illuminates the role of the largely overlooked regional stock exchanges.

Conventional wisdom holds that securities trading will shift to the most liquid markets. After all, all else being equal, people buying a security would like to direct their orders to the market with the largest number of sellers, and people selling a security would like to direct their orders to the market with the largest number of buyers. This maximizes the chances that buyers and sellers get the best price possible for their trades and that they will complete their trades quickly.

Market professionals have long acknowledged this effect and have succinctly captured it in the

common phrase "liquidity attracts liquidity." This point has also been recognized by academic economists, who refer to it as an "order flow externality," or more generally, a "network externality."<sup>1</sup> It is an externality because when one person directs an order to a particular market, it benefits other people trading in the same market.

Over most of its long life, the Philadelphia Stock Exchange (PHLX) has survived alongside much larger and more liquid securities markets. This article explains how it managed to do so despite order flow externalities.<sup>2</sup> In brief, a number of factors played a

role, including communication costs, membership standards on dominant exchanges, incentives to avoid fixed trading commissions, a differentiation of trading technologies, an unwillingness to permit markets to compete in the trading of equity options, and the development of new products that were not traded on other markets.

The importance of these factors has varied over time. While focusing on the evolution of the PHLX, in the background, I will profile some of the seismic shifts in U.S. securities markets in recent decades and illuminate the role of the largely overlooked regional stock exchanges.

## PRE-1960: COMMUNICATION COSTS AND NYSE MEMBERSHIP AND LISTING STANDARDS

The Philadelphia Stock Exchange dates its founding to 1790, making it the country's oldest stock exchange.<sup>3</sup> Although the New York Stock Exchange (NYSE) was founded two years later, it soon surpassed all other stock exchanges in trading volume. By the late 1830s, for example, the reported share volume on the PHLX was about 14 percent of that on the NYSE. Undoubtedly this reflected the fact that by the 1830s, New York City had become the major center for commerce.

Over the 19th century, an increasing share of the trading in financial securities, especially for the largest



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<sup>1</sup> The book by Larry Harris contains an excellent nontechnical discussion of order flow externalities as well as competition among centers for trading securities.

<sup>2</sup> This article draws heavily on my working paper, which contains a much more detailed and more fully documented discussion of the evolution of the PHLX.

<sup>3</sup> A stock exchange is a place where buyers and sellers meet to trade securities (see the Glossary on page 28).



firms or public projects, migrated to the NYSE because of the liquidity and depth of that market. But relatively high communication costs enabled the regional exchanges to compete in the first half of the century. Philadelphians could not quickly discover the prices of securities trading in New York, nor could they quickly transmit orders to trade to that city. In other words, communication costs offset the tendency for the trading of securities to concentrate in one market center, and regional securities exchanges flourished.

The development of the telegraph in the 1850s and the ticker tape in the 1870s began to change this situation. The Philadelphia Stock Exchange, and other regional exchanges, responded by increasingly listing and trading the securities of firms that could not meet the listing requirements of the NYSE, such as an exchange-specified minimum aggregate market value of publicly held shares or an exchange-specified minimum number of public shareholders. The firms that were unable to meet the NYSE listing requirements tended to be younger and smaller firms little known outside their local markets. In addition, many states exempted any company listed on an exchange, including the regional exchanges, from their “blue sky” laws. These laws offered some protection against fraud by requiring that securities sold within a state be registered with that state. The exemption created a strong incentive for firms that were unable to meet NYSE listing standards but that did not want to incur the costs of registering their securities in multiple states to list on a regional exchange.

In the 1920s, the volume of trading on the PHLX, as on many other regional exchanges, increased dramatically. In the subsequent stock market crash and economic depres-

sion, many of the firms listed on the regional exchanges failed or were absorbed in mergers, and trading volume fell precipitously. In addition, states changed their blue sky laws to limit exemptions for securities listed on regional exchanges, and the newly created Securities and Exchange Commission (SEC) required the exchanges to impose stricter listing requirements. These developments greatly decreased listings and trading volume on the

most cases, the only person buying or selling a particular stock on the floor of the exchange was the designated specialist (see the Glossary). There were no competing market makers on the floor, and it was rare for brokers representing buy and sell orders to interact directly. The counterparty to nearly all trades was the specialist. This was true for the trading of unlisted securities on the other regional exchanges as well (SEC, 1963, p. 932).

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regional exchanges. Gradually, the over-the-counter (OTC) market (see the Glossary) replaced the regional exchanges as the location where newly issued equities would trade and become “seasoned” before the issuing firm might seek a listing on the NYSE or the American Stock Exchange (AMEX).

As the regional exchanges lost listings and trading volume, they responded by starting to trade securities listed on the NYSE and the AMEX. In 1931, for example, the PHLX allowed trading to begin in any security listed on the NYSE or the AMEX. Since these securities were generally not listed on the PHLX, this was called “unlisted” trading. By 1961, only 1.2 percent of the dollar volume of stock trading on the PHLX came from the 88 stocks that had sole listings on that exchange (SEC, 1963, Table VIII-76). The vast majority of stocks traded on the PHLX were ones listed on the NYSE.

As the PHLX evolved into an exchange that mainly traded equities listed on the NYSE, it also evolved to resemble more closely a dealer market rather than an auction market. In

Over the 1950s and into the 1960s, brokers directed orders to the PHLX rather than to the more liquid NYSE for a variety of reasons. For one, specialists on the PHLX would generally set their prices to within \$0.125 of the price of the last reported transaction on the NYSE, thereby guaranteeing brokers that their prices were nearly as good, and sometimes as good, as those on the NYSE. This practice was common on the regional exchanges. In addition, small and medium-size brokerage firms with their headquarters in the mid-Atlantic region were often members of the PHLX but not the NYSE, since membership in the PHLX required far less capital. If such firms received an order to trade a security listed on the NYSE and they directed it to the NYSE for execution, they would have to pay the “public” fixed commission paid by all non-members. Alternatively, if such firms executed the order on the PHLX, they could keep most of the public commission paid by their customers, paying only a minor member commission to the PHLX.

Firms that were sole members of the PHLX would direct some

orders to the NYSE, either because the trade was too large to be executed quickly on the PHLX or because the security was not traded on the PHLX. Since a member's cost of executing an order on the NYSE was well below the minimum public commission, members competed aggressively to attract orders from nonmembers. The NYSE did not permit its members to discount public commissions or offer cash rebates to compete in attracting orders; however, the members could reward nonmember brokerage firms that were members of a regional exchange by sending them orders to execute on the regional exchange. Such orders were referred to as reciprocal order flow, and they accounted for a significant share of the trades directed to the PHLX and other regional exchanges during the 1950s and 1960s. In this way, the brokerage firm that was a sole member of a regional exchange could indirectly earn public commissions for handling orders that it directed to an NYSE member.

With the decline of regional brokerage firms and the rise of the OTC market, between 1930 and 1960 most of the regional exchanges saw a fairly consistent decline in their market share, measured as a percentage of the value of equities traded on all exchanges. Many regional exchanges closed or were absorbed by other exchanges during this era. The PHLX managed to survive, but by the 1950s, its market share in exchange-traded equities hovered fairly consistently around 1 percent.<sup>4</sup> This is despite its absorption of the Baltimore Stock Exchange in 1949 and the Washington, D.C. Stock Exchange in 1953.

<sup>4</sup>Except where specifically indicated otherwise, I measure an exchange's market share using the dollar volume of trading as a percentage of overall exchange-based trading in dollars.

### 1960-74: A NICHE CREATED BY FIXED COMMISSIONS

The dollar volume of shares traded on the PHLX grew rapidly between 1960 and 1972 (Figure 1).<sup>5</sup> By 1972, the market share of the PHLX in exchange-traded equities had risen to 2.5 percent. This rebound for the PHLX was largely due to its ability to exploit opportunities created by the fixed commission rules.

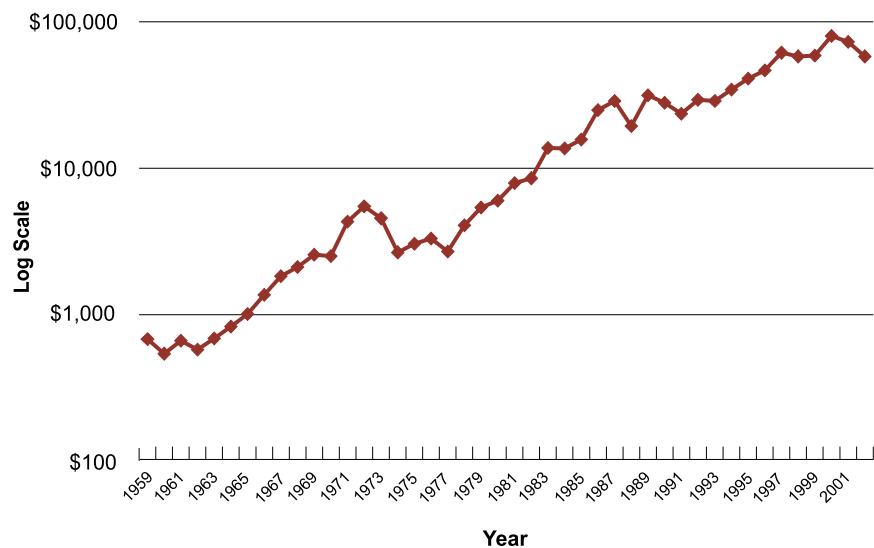
As noted earlier, the NYSE and the regional exchanges specified minimum public commissions with

no volume discounts. NYSE rules prevented cash rebates by members to nonmembers, but members could share commissions with other members. In the early 1960s, the regional exchanges had similar rules. At the same time, the Investment Company Act of 1940 placed a cap on the commissions that mutual funds could pay retail sales organizations. Mutual funds often wished to exceed this cap in order to sweeten the incentive for retail brokerage firms to sell shares in their funds. They found several ways to evade the cap. If a firm that sold shares in the mutual fund was a member of the NYSE, the mutual fund could reward it by asking it to execute trades on its behalf, paying the firm the fixed commission for this service. If the mutual fund preferred to use its traditional NYSE-member firm for executing trades, it could direct that firm to share its trading commission with another NYSE-member firm that the

<sup>5</sup>The data for all of the figures come from the annual reports of the Philadelphia Stock Exchange. Figures 1 and 2 present the data using log scaling, also called ratio scaling, since this allows a clearer picture of percentage changes. For example, an increase in volume from \$100 to \$1,000 represents the same percentage change as an increase from \$1,000 to \$10,000.

**FIGURE 1**

### Volume of PHLX Equity Trades in Millions of Dollars



mutual fund wished to reward. This was known as a give-up.

But many small brokerage firms that sold shares in mutual funds to retail clients were not members of the NYSE. If they were members of a regional exchange, there was a way to reward them for these sales. Assuming the firm that traditionally executed trades for the mutual fund was not only a member of the NYSE but also a member of the regional exchange in which the smaller brokerage firm was a member, the mutual fund could ask its brokerage firm to execute some trades on that regional exchange and share commissions with the smaller firm. In the early 1960s, such arrangements accounted for a substantial share of the order flow on regional exchanges (SEC, 1963, p. 316-17). The regional exchanges could handle the associated large block trades because the trades were generally pre-arranged off the floor of the exchange.

In 1965, to attract even more business based on mutual fund-directed give-ups, the PHLX changed its rules to permit commissions to be shared with brokerage firms that were not members of the PHLX (1965 PHLX Annual Report). Some small brokerage firms that sold shares in mutual funds were not members of any exchange, so mutual funds could direct trading orders to the PHLX in order to reward them.

The New York Stock Exchange was, of course, unhappy to see trades that would normally be executed on its floor diverted to regional exchanges. It lobbied the SEC to halt all cash give-ups. The SEC agreed with the NYSE that give-ups could undermine fixed trading commissions and the cap on mutual fund sales commissions. In December 1968, all commission splitting ended when the exchanges agreed to ban the practice under pressure from the SEC.

The loss of institutional business associated with the end of give-ups could have been a major blow to the PHLX. It was not, however, because the PHLX instituted two new measures to attract institutional trades. In the 1960s, the NYSE did not allow institutions active in a wide range of activities to become members of the exchange. Membership was open only to entities whose *primary* purpose was serving the public as brokers or market makers. In addition, the NYSE did not

effectively received a discount from public commissions. Not surprisingly, this strategy was very successful for the PHLX. As reported in the PHLX *Annual Report* for 1969, 37 percent of its stock trading volume came from institutional trades in 1968 and 45 percent in 1969.<sup>8</sup>

Trading on the PHLX boomed between the early 1960s and 1972 as the exchange employed these means for institutional investors to evade caps on mutual fund sales com-

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permit foreign-owned securities firms to become members. This forced large foreign banks, many of which actively traded American securities on behalf of clients, to pay the public commission to trade on the NYSE.

Prior to 1967, the PHLX had similar policies. However, beginning in 1967, the PHLX allowed securities firms that were owned by mutual fund companies, insurance companies, and foreign-owned financial institutions to become members.<sup>6</sup> By early 1971, 39 such institutionally affiliated securities firms had joined the PHLX and began to trade on behalf of the institutions that owned them.<sup>7</sup> The institutional investors still had to pay the minimum public commission, but they paid it to firms owned by the institutions themselves. In this way, the institutions

missions and minimum public trading commissions. But by the late 1960s, many influential policymakers and policy analysts had become very critical of exchange-specified minimum trading commissions, and they advocated price liberalization. In April 1971, the SEC approved negotiated commission rates on orders above \$500,000. This led institutions to redirect some of their large trades to the NYSE, since they could negotiate discounted commissions. With this change, the PHLX's market share fell slightly between 1972 and 1974.

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<sup>8</sup>At this time, there was another interesting development in the history of the PHLX. In December 1968, in response to a fiscal crisis, Philadelphia imposed a \$0.05 per share stock transfer tax for all transactions on the PHLX. On January 2, 1969, the PHLX moved its trading floor to an office building just across the street from the city boundary to avoid the tax. In February 1969, a court ruled that the tax was illegal, and the PHLX moved its trading floor back to its headquarters in the city.

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<sup>6</sup>See the book by Joel Seligman.

<sup>7</sup>See the Elkins Wetherill reference.

## AFTER 1975: SURVIVAL BY DIFFERENTIATION, INNOVATION, AND UNIQUE OPTION LISTINGS

**Equities.** In May 1975, all of the exchanges eliminated minimum public trading commissions. This led to a rapid fall in commissions, especially for institutions with large trading orders. Institutions that had been directing some of their trades to the PHLX to evade the fixed commissions began to return to the NYSE because of its superior liquidity and price competition.

The deregulation of brokerage commissions also led to the rise of “discount” brokerage firms that charged low fees for providing basic retail trading services. Since they charged low commissions for handling the trades, they had to execute these trades at a very low cost in order to make a profit. Since the profit on each trade was small, they sought to handle a high volume of retail trades. The discount brokers therefore valued fast and reliable executions of their trades more than they valued a time-consuming search for the best possible price. Discount brokers argued that, in most cases, their customers gained more from low commissions than they would from the slightly improved prices they might get from slower executions.

The PHLX responded to the changes that diminished its order flow from institutions by developing systems to meet the needs of the discount brokers. In other words, it hoped to overcome the order flow externality by

offering a trading system that was intentionally differentiated from that of the NYSE and designed to better meet the needs of a subset of traders.

To attract the order flow from the emerging discount brokers, the PHLX had to offer automated, reliable executions at prices close to the best prices available anywhere. To do so, in 1975 the PHLX introduced a computerized order-handling and execution system called PACE. PACE would route a retail order to the proper specialist. Orders that met predetermined criteria could be executed automatically by the specialist. The specialist

specialists rarely faced competition on their floors.

Partly in response to the automation of retail order flow by several of the regional exchanges and third market dealers, the NYSE also moved to automate much of its retail order flow. But for many years its system had built-in delays to allow competing bids or offers from the floor of the exchange. PACE did not have this feature, making its system faster. PACE succeeded in attracting a new flow of retail orders to the PHLX, but the exchange continued to lose market share as large institutional orders returned

to the NYSE following the 1975 deregulation of fixed trading commissions.

As noted earlier, specialists on the regional exchanges and OTC dealers competed with each other to attract retail order flow since they could profit from the spread

would frequently guarantee that the price of the trade would match that of the best bid or offer quoted on any other exchange. As they bought and sold shares, the specialists hoped to profit from the spread between the bid and ask prices.

Matching the best quoted bid or offer shown on other exchanges did not necessarily mean that orders sent to a PHLX specialist received as favorable a price as they might have, had the order gone to the NYSE. Often, competitive bidding on the floor of the NYSE would lead to price improvements over the best quoted price. Such price improvements were infrequent on the regional exchanges, since their

between the bid and ask price. Not surprisingly, in competing for this order flow, specialists on the regional exchanges and OTC dealers began to offer financial incentives to brokerage firms that were willing to direct orders to them. This became known as payment for order flow. It is not clear who initiated the practice and when, but by the mid-1980s, there were reports that the practice was widespread.<sup>9</sup> Discount brokers, who were competing with each other to charge the lowest trading commission, were particularly likely to seek payments for order flow. These

<sup>9</sup> See the article by Jane Sasseen, and *Securities Week*, February 17, 1986.





payments enabled them to cover their operating costs by means other than commissions. Many people took a dim view of payment for order flow out of concern that it could lead brokers to direct trades on the basis of the payments rather than their clients' best interests.

Over most of the 1980s and 1990s, the PHLX saw the volume of its equity trading grow, as did all stock exchanges in the generally booming markets. But for the management of the PHLX and its traders, there were also worrying trends. During this era, the PHLX slowly lost market share. In 1980, the PHLX handled 1.6 percent of the dollar value of stocks traded on exchanges. By 1999, this had declined to 0.65 percent. In addition, the per-trade profit margins of the specialists declined as competitive pressures forced them to pay to attract orders. Plus spreads had narrowed because of the move to pricing stocks to the penny, rather than in fractions of a dollar, by 2001. Not only did the PHLX specialists compete with specialists on other exchanges for orders, but in late 2001, the PHLX also permitted more than one specialist to be designated for a stock, leading to potential competition within the exchange for orders.

**Options.** By 2001, however, the PHLX was trading more than just stocks. In June 1975, the PHLX began to trade options on equities.<sup>10</sup> It was the third exchange to do so. The Chicago Board Options Exchange (CBOE) had pioneered this path when it began to trade stock options in April 1973. In January 1975, the American Stock Exchange became the second exchange to trade equity options. It was followed shortly afterward by the PHLX and the

Pacific Stock Exchange. These later entrants could overcome the order flow externality because the exchanges generally did not trade options traded on another exchange.

When the PHLX introduced options trading, it started on a limited basis and expanded slowly over time. The main reason that the PHLX was slow to add new equity options was that the CBOE and the AMEX had already listed the most desirable options

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by the time the PHLX began to look for listings. Prior to 1977, although there was no rule that prevented the exchanges from doing so, the exchanges rarely listed options contracts that were already traded on another exchange.

As I discuss below, people later charged that the options exchanges did not list each other's options because of an implicit agreement to limit competition among the exchanges. In addition, the SEC and the exchanges expressed concerns about multiple listing of options contracts, since, unlike the equity exchanges, the options exchanges were not "linked": that is, there was no organized system to tell traders instantly on one exchange about the quoted bid and offer prices and volumes on other exchanges. Furthermore, there was no process to ensure that an order directed to

one exchange would not trade at a price less favorable than the quote on another exchange. The SEC worried that public investors might be taken advantage of in such "fragmented" markets.

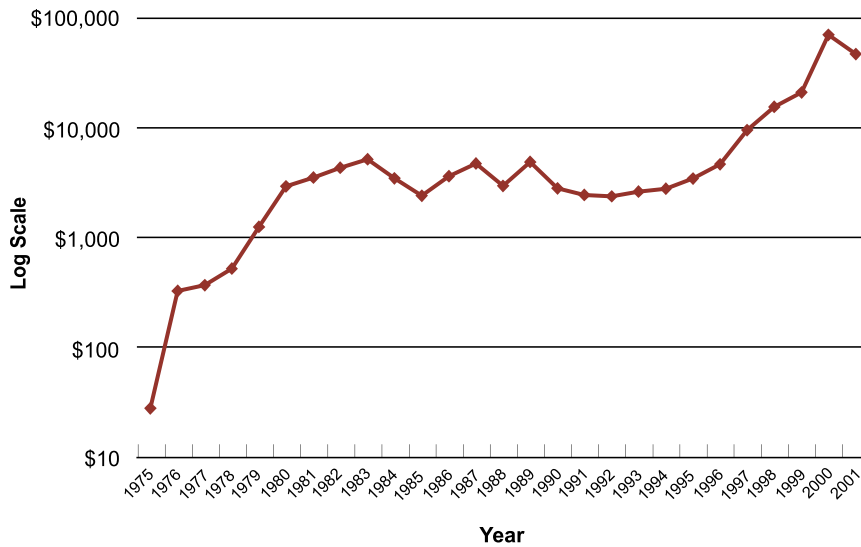
In 1977, the SEC conveyed its concerns about market fragmentation by placing a moratorium on the listing of new equity options while it studied the options market. In June 1980, the SEC initiated a lottery for allocating the right to trade any new options on equities. Under this system, the exchanges would let the SEC know which equity options they wished to list. The SEC then used a lottery to allocate the exclusive right to trade these options to specific exchanges.

Under the SEC lottery system, the flow of option trades to the exchanges depended on their ability to attract business for the options they had listed prior to the moratorium of 1977 and their luck in obtaining the right to list desirable equity options through the lottery. By these measures, the PHLX did well. The market share that the PHLX had in equity options hovered around 3 percent between 1976 and 1978. During this period, the CBOE, with its first-mover advantage, had over 70 percent of the market. The AMEX's share hovered around 20 percent.

But the rapid growth in equity option trades on the PHLX between 1978 and 1983 led to a tripling of its market share (Figure 2). By 1983, it had almost 9 percent of the overall volume of equity option trades on exchanges. This created bustling activity on the options floor because unlike the equity floor, it was active with market makers trading for their own accounts alongside brokers and specialists. In addition, in 1983, the PHLX began to trade options on stock indexes. Over time, these would become a significant part of its options business.

<sup>10</sup> A stock option gives the purchaser the right, but not the obligation, to purchase or sell a stock at a specified price on or before a specified date.



**FIGURE 2****Volume of PHLX Equity Options Trades in Millions of Dollars**

Reportedly, a substantial share of option orders in the 1980s came from individuals and institutions speculating on possible takeover targets. The PHLX, along with other options exchanges, experienced a slump in the volume of options trading between 1990 and 1992. This is commonly attributed to the end of the corporate takeover era associated with the 1990 failure of the investment bank Drexel Burnham and the creation of more effective corporate takeover defenses.

Beginning in 1996, there was a renewed boom in equity option trading, much of which represented speculation or hedging in the stocks of high-flying technology companies. Since many of these firms were relatively young, the CBOE and the AMEX had not generally listed options on their stocks prior to the entry of the PHLX into options trading. Thus, the PHLX had almost as substantial

a listing of options on the stocks of these firms as did any other exchange. When the boom began, the PHLX was well positioned to participate. Whether measured in absolute trading volume or market share, between 1996 and 1998, the PHLX saw rapid growth in trading on its equity options floor.

Throughout the 1980s and into the 1990s, the system of listing an equity option on only one exchange was constantly threatened. While it held the lotteries, the SEC pressured the options exchanges to create a linkage system. But the options exchanges failed to do so. Frustrated, the SEC decided to end the exchanges' monopolies in options listings.

The SEC took an incremental approach. In 1985, it decided that the right to trade options on OTC stocks would not be allocated through a lottery. These options could be listed on multiple exchanges. In January 1990, the SEC ended its lottery system for

allocating options on exchange-listed stocks. The SEC ruled that henceforth any options listed for the first time on an exchange could be listed on another exchange.

These changes in policy had only modest effects. By the mid-1990s all restrictions on multiple listings had been lifted, but the exchanges still chose not to list options that had been allocated to other exchanges under the lottery system. In mid-1999, about 60 percent of equity options still traded on only one exchange, and these included most of the more active options.<sup>11</sup> The PHLX, for example, was the only exchange to trade options in Dell computers prior to late 1999. This was an extremely active option — it alone accounted for 30 to 50 percent of the volume in equity options on the PHLX during much of 1999.

By 1999, two developments finally led to the breakdown of the practice of listing equity options contracts on only one exchange. First, in 1998, several large securities firms announced that they were investing in the creation of an all-electronic options exchange, to be known as the International Securities Exchange (ISE). The backers of the ISE also announced that this exchange would trade the most active options contracts traded on other exchanges. In other words, it planned to break the monopolies that the exchanges had enjoyed in many options listings. Second, the SEC and the U.S. Justice Department charged that there was a “gentleman’s agreement” among the exchanges not to compete in equity options, and they filed lawsuits against the exchanges.

By late 1999, the litigation threat and the threat by the ISE to list other exchanges’ options contracts

<sup>11</sup> *Financial Times*, August 19, 1999, p. 28.

finally had the result the SEC desired. In August 1999, the CBOE and AMEX broke the alleged gentleman's agreement when they began to trade options in Dell computers. They immediately attracted a significant share of the Dell order flow away from the PHLX. Not surprisingly, the PHLX retaliated by listing several of the most actively traded options listed on the CBOE and AMEX.<sup>12</sup>

By early 2000, the four options exchanges (CBOE, AMEX, PHLX, and Pacific Stock Exchange [PSE]) were increasingly listing the options contracts that were active on other exchanges. This competition became even more heated when the ISE options exchange opened for business in May 2000. As its backers had pledged, it listed the most active options contracts from other exchanges.

Many people had argued that multiple listing of options contracts might be particularly damaging to the PHLX, since it had a relatively small market share and depended heavily on a small number of active options contracts. Contrary to these concerns, the move to multiple listings benefited the PHLX in the near term, partly because of the way the PHLX managed it. When the CBOE and the AMEX began to trade the Dell options that were the backbone of the PHLX in the late 1990s, the PHLX immediately retaliated by permitting several of its specialists to begin trading some of the options contracts from other exchanges.

After that, however, the PHLX proceeded at a more deliberate pace. The exchange would announce plans to trade an options contract active on another exchange. But rather than allocating the specialist

position to one of the firms already active on the PHLX, it would offer it to a large specialist operation that had not previously traded on the PHLX. In this way, the PHLX used the opportunity to list desirable new options contracts to entice the largest and best capitalized specialist firms to become active on the PHLX. Since these firms could attract a high volume of order flow, this brought new orders to the floor of the PHLX.

**Although the PHLX demonstrated foresight in moving relatively early to trade equity options, it cannot claim to have pioneered this development.**

As the exchanges competed for each other's order flow, it is perhaps not surprising that the specialists on the various options exchanges began to pay for order flow.<sup>13</sup> In July 2000, the CBOE escalated this competition by instituting a system that effectively taxed all its specialists and market makers to raise funds for order flow payments. In August 2000, the PHLX retaliated, instituting a system similar to that of the CBOE but with even higher fees on its specialists and market makers and higher order flow payments. This policy, along with the increasing presence of large specialist firms trading on the PHLX, helped feed a boom in PHLX order flow in late 2000 and early 2001. Between mid

2001 and late 2003, the CBOE, the PHLX, and the AMEX stopped their exchange-sponsored payment for order flow systems. But they re-instituted them as they lost market share to the PSE and the ISE, which had maintained their systems.

#### **Currency Options.**

Although the PHLX demonstrated foresight in moving relatively early to trade equity options, it cannot claim to have pioneered this development. It simply copied the innovation that the CBOE had launched. In the case of currency options, the PHLX was the innovator.

In the late 1970s, there was a huge spot market in foreign exchange and active over-the-counter forward and exchange-based futures markets. There was no organized market for foreign exchange options. A staff member of the PHLX proposed that the PHLX initiate trading options on foreign currencies. Following his suggestion, the PHLX started a long and complicated process to obtain approval from the SEC.

The PHLX opened its currency options trading floor in December 1982. Trading volume started small and grew slowly but steadily. Orders came from small-scale speculators and from nonfinancial and financial businesses, many based in Europe, that used the exchange to hedge risks. In the first year of trading, the product appeared to be headed for success.<sup>14</sup>

As the PHLX worked to promote its fledgling currency options market, large commercial banks and investment banks increasingly began to write tailor-made currency options contracts for their corporate customers who were looking for better ways

<sup>12</sup> *New York Times*, August 24, 1999, p. C3.

<sup>13</sup> *Wall Street Letter*, October 25, 1999.

<sup>14</sup> *Financial Times*, October 6, 1983, p. I16.

to hedge exchange-rate risks.<sup>15</sup> The banks hedged their own net risk exposures by taking appropriate positions in the spot market or futures market, by trading currency options with each other in a developing OTC market, and by trading options on the PHLX. When the banks traded on the PHLX, their orders were generally far larger than the specialists and market makers could handle. The banks would therefore use a broker to find another institution, generally another bank, willing to take the other side of the trade. Once the two parties agreed to the terms of the trade, they would execute it on the floor of the exchange. This practice enabled the exchange to handle large trades smoothly, and it contributed to a rapid growth in trading volume between 1983 and 1987 (Figure 3).

By mid-1984, the PHLX had become the dominant trading center for what could become a very large market. Financial officers at large and internationally active firms that never knew Philadelphia had a stock exchange were now acutely aware of its presence.<sup>16</sup> The success the PHLX was having with currency options was not lost on other exchanges, several of which also began to trade them. The CBOE, for example, began to trade currency options two years after the PHLX initiated the market. But it could never overcome Philadelphia's first-mover advantage, and few traders could see any reason to divert order flow from the PHLX. In August 1987, the CBOE withdrew from the business.

After several years of rapid growth, the volume of trades on the PHLX leveled off between 1987 and 1990. This was primarily due to the

<sup>16</sup> *Financial Times*, October 2, 1984, p. I13.

<sup>15</sup> *American Banker*, January 24, 1984, p. 1.

growth of the over-the-counter market and the creation of exchange-rate bands for the European currencies that belonged to the European Monetary System. The reduced volatility of these currencies relative to each other reduced the demand to hedge currency risks and opportunities for speculation. Nevertheless, this was a halcyon era for many PHLX currency options traders, who reaped substantial profits from market-making and speculating on the floor of the exchange that dominated currency options. Growth in trading volume resumed with the turmoil among European exchange rates of the early 1990s.<sup>17</sup>

After the peak in 1993, the volume of trading in currency options on the PHLX started a precipitous decline. By 2000, trading volume was so low that currency options represented an insignificant part of the business of

<sup>17</sup> *Philadelphia Inquirer*, September 18, 1992, p. A16.

the exchange. This decline was mainly caused by the continued growth of the OTC market. Many corporations preferred to hedge in the OTC market, since banks would tailor contracts to their specific needs. In addition, the major international banks that had provided much of the order flow to the PHLX began to deal exclusively in the OTC market. By the early 1990s, this market was well developed, with numerous very well-capitalized market makers. As the market had developed in the mid-1980s, the options contracts that banks traded among each other to hedge their net exposures became standardized, adding to their liquidity.<sup>18</sup>

## LESSONS FOR THE FUTURE

This brief account of the evolution of the PHLX illustrates

<sup>18</sup> *Financial Times*, December 11, 1985, p. III6. In a report issued by the International Monetary Fund, Garry Schinasi and co-authors (2000, p. 64) describe the forces that led the OTC market to displace much of the exchange-traded derivatives market.

**FIGURE 3**

### Volume of PHLX Currency Options Traded



two basic points that should be kept in mind as financial markets continue to evolve and policymakers face difficult decisions about setting or altering regulatory parameters. First, competition among financial institutions can promote beneficial changes. With the fall in communication costs in the mid-19th century, stock exchanges in different geographic regions began to compete with each other. At various points, the PHLX successfully competed for order flow against the much larger NYSE by listing firms unable to list on the NYSE, by opening membership to brokerage firms that could not afford membership in the NYSE, by altering its rules to attract trades from institutions seeking to reward brokerage firms for mutual fund sales or to avoid the high fixed commissions that prevailed prior to 1975, and by offering fast automated executions for discount brokers. The PHLX also competed with larger exchanges by creating a new product, currency options, that enabled firms to hedge unwanted risks.

Although some of these competitive steps, such as the lax listing standards of the 1920s, may have had adverse social implications, most were probably beneficial to the broader public interest, for they led to lower trading commissions, faster trading technologies, and new mechanisms to reduce risk. The alleged gentleman's agreement among the options exchanges not to compete in the case

of equity options contracts already listed on an exchange illustrates the second point: Competition among financial institutions should not be taken for granted, especially when a small number of firms co-exist in markets where regulations or other factors create barriers to entry.

In the case of the PHLX, its future is uncertain. In equity trading, its market share of exchange-traded equities had fallen to well under 1 percent by 2003. In the trading of equity options, all of the floor-based exchanges must be worried by the rapid success of the all-electronic ISE. By early 2003, the ISE had displaced the CBOE as the exchange with the highest volume of equity options orders. In addition, the Boston Stock Exchange, in partnership with others, launched its own fully electronic options exchange in February 2004.

The management of the PHLX is acutely aware that the ex-

change is a small operator in a highly competitive and increasingly automated trading environment.<sup>19</sup> Management has stated that it sees strategic partnerships, and perhaps mergers, with automated trading platforms and other exchanges as the best way to continue to attract the order flow and the technology that will enable the PHLX to compete successfully in the future. As part of this strategy, the PHLX is in the process of converting from a mutual institution to a for-profit stock corporation. Until recently, all securities exchanges in the U.S. were set up as mutual organizations, meaning that the members of the exchange were also its owners with the right

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<sup>19</sup> In recent testimony before Congress, the chairman of the PHLX (see Frucher reference) succinctly presented his views on the role of the regional exchanges, the challenges facing the PHLX, its business strategies, and the regulatory environment in which it operates.




to approve or disapprove of proposed fundamental changes in an exchange's operations. If the exchange were a for-profit corporation, its owners would be its shareholders, who could include individuals and organizations far removed from the securities trading business. PHLX management believes that this organizational change will enable the exchange to implement new initiatives more quickly, facilitate the

formation of strategic relationships, and strengthen the exchange's financial position, since it will be able to tap new sources of capital.<sup>20</sup>

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<sup>20</sup>The article by Roberta Karmel provides a nice summary of the motivations for a securities exchange to switch from a mutual organizational structure and reviews the process some exchanges in the U.S. have followed to achieve this end.

Given the remarkable changes that the PHLX — and securities markets generally — has made over its history, it would be foolish to forecast the future of the nation's oldest stock exchange. Perhaps the only safe statement is that more changes, undoubtedly, lie ahead. 

## GLOSSARY

**Securities Exchange:** A securities exchange is a centralized physical or electronic location where all buyers and sellers of a security can meet to trade using some type of auction process. Generally, the buyers and sellers must conduct their trades through brokers who are members of the exchange. By centralizing securities trading and setting the trading rules, securities exchanges reduce investors' search costs (the cost of finding a counterparty for the trade) and transaction costs (the cost of exchanging the securities and the funds).

**Over-the-Counter (OTC) Market:** An over-the-counter securities market is a decentralized market consisting of designated dealers who quote prices at which they are willing to buy or sell a specified quantity of a security. By ensuring that dealers always quote buy and sell prices, an organized OTC market provides continuous liquidity for small traders.

**Broker:** A broker conducts a trade on behalf of a public investor. The broker traditionally charges a commission for handling the trade.

**Specialist:** A traditional specialist is responsible for maintaining well-functioning markets for a designated security traded on an exchange. The specialist sometimes functions as a broker, directing incoming orders to the best counterparty. The specialist also maintains the limit order book, a list of orders with designated prices that cannot be filled at current market prices. Finally, the specialist trades for his or her own account but is supposed to do so only when this improves the market.

**Market Maker:** A market maker is anyone who quotes prices and quantities at which he or she is willing to transact. Many floor-based exchanges authorize market makers to operate on the floor, competing with each other and the specialists and providing additional liquidity. Market makers, like specialists, hope to profit over time by always quoting buying prices that are somewhat below their selling prices. This gap is called the spread.



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# Deficit-Financed Tax Cuts and Interest Rates

BY SYLVAIN LEDUC

**P**roposals to lower taxes often meet with opposition in Congress. One argument is that lowering taxes without an equivalent fall in government spending may lead to future budget deficits, which will translate into higher long-term interest rates and a lower level of income. In this article, Sylvain Leduc examines the theoretical arguments under which budget deficits lead to higher interest rates. He also surveys empirical studies that used data on expected budget deficits to document the possibility that increases in future budget deficits are associated with higher real long-term interest rates.

In 2001 and 2003, the Bush administration proposed a significant reduction in income taxes, which was later adopted by Congress. In general, reducing income taxes could be beneficial for the economy, since it raises the incentive to work and leads to a higher level of income. Yet, the proposal to lower taxes was met with opposition. One popular argument against lowering taxes is that without an equivalent

fall in government spending, a drop in taxes may lead to future budget deficits, which will translate into higher long-term interest rates and a lower level of income.

Recently, the debate over budget deficits' impact on interest rates has created a lot of turmoil in the financial press. For instance, an editorial in the *Wall Street Journal* stated that "the notion that deficits cause interest rates to rise is a fiction argued by Robert Rubin, President Clinton's Treasury secretary. There wasn't any empirical evidence to support this argument when Mr. Rubin trotted it out, and there's still isn't." However, in his testimony to Congress in February 2003, Alan Greenspan, Chairman of the Federal Reserve Board, stated: "There is no question that if deficits go

up, contrary to what some have said, it does affect long-term interest rates; it does have a negative impact on the economy."

Let's examine the theoretical arguments under which budget deficits lead to higher interest rates and survey empirical studies that used data on expected budget deficits to document the possibility that increases in future budget deficits are associated with higher real long-term interest rates.

## THE DEBATE IS NOT NEW, AS PRESIDENT REAGAN WILL TELL YOU

Until recently, budget deficits were closely associated with either economic downturns or military expenses during periods of war (Figure 1).<sup>1</sup> For instance, World War I brought about a cumulated budget deficit that reached 17 percent of GDP in 1919, but the budget was brought back into surpluses in the 1920s. Similarly, because of the combined effects of the Great Depression in the 1930s and World War II, the federal government posted deficits from 1931 to 1946. The war effort pushed the budget deficit to a level as high as 30 percent of GDP in 1943. The deficit also rose during the Korean and Vietnam wars.

However, the close relationship between budget deficits and periods of war or recessions came to an abrupt end at the beginning of the 1980s. Indeed, the federal budget was



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<sup>1</sup> See the *Business Review* article by Lee Ohanian on the consequences of financing wars via increases in borrowing or taxes.

in deficit throughout that decade and most of the roaring 1990s, even though this period coincided with the longest peacetime expansion in U.S. history. The break in the relationship occurred in President Reagan's first term in office. In 1981, the Republican Party won the White House on a platform to cut marginal income tax rates and decrease nondefense government spending. The underlying goal was to diminish the economic distortion associated with income taxation. By lowering after-tax income, high marginal income tax rates might decrease the incentive to work and hamper economic performance. (This is often referred to as supply-side economics, since it emphasizes taxation's effect on the supply of goods in the economy. In comparison, Keynesianism emphasizes taxation's impact on the demand for goods in the economy.)

In Reagan's first year in office, Congress adopted his proposal to lower marginal tax rates. However, lower revenues due to the tax cut and the recession of 1981-82, combined

with the increase in defense spending, contributed to the large budget deficits throughout his first term. The budget deficit reached 4 percent of GDP in 1982 and 6 percent of GDP in 1983.

**According to the standard theory, the way a government decides to finance a given level of expenditure has important repercussions for the economy.**

We have to go back to 1934, in the midst of the Great Depression, to observe a level of peacetime budget deficits as high as those in the early 1980s.

Then, as now, a debate raged over the consequences of the deficits. For instance, the Council of Economic

Advisers under the chairmanships of Murray Weidenbaum and Martin Feldstein warned of the potential negative impact of large (prospective) budget deficits on the economy.<sup>2</sup> The Council of Economic Advisers and the OMB would, in the end, convince President Reagan to tackle the deficit issue by raising taxes. But the U.S. would have to wait until 1998 before the red ink had all been spilled and the government's finances returned briefly to the black.

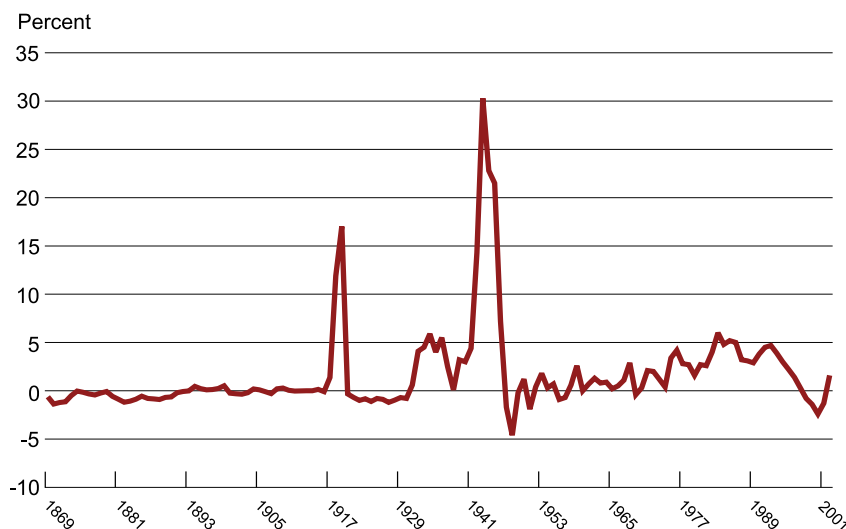
### DEFICITS CROWD OUT INVESTMENT

According to the standard theory, the way a government decides to finance a given level of expenditure has important repercussions for the economy. In particular, suppose the government decides to lower income taxes and starts financing its spending by increasing the amount of funds it borrows from the public. Consumers, according to this view, will save only part of the rise in their after-tax income and spend the remainder on goods. Since the fall in government savings is not fully matched by a rise in private savings (since consumers spend part of their tax cut), total savings in the economy must fall. For economies without access to (or that do not make use of) foreign sources of funds, the level of national savings — which is the difference between output and consumption — has important implications for the future level of output.

In today's world of highly developed financial markets, countries often borrow and lend to each other. For instance, a country may decide to

**FIGURE 1**

### Federal Budget Deficit (as a percent of GDP)



<sup>2</sup> In the 1983 *Economic Report of the President*, the Council notes that "a succession of large budget deficits is likely to reduce substantially the rate of capital formation," since "high budget deficits would cause interest rates to rise."

consume more than it produces by importing relatively more goods from other countries than it exports and paying for them by borrowing in financial markets. In economic terminology, the current account would be in deficit, while the capital account would be in surplus.<sup>3</sup> However, if an economy does not have access to financial markets, it will not be able to finance a trade deficit — that is, import more than it exports — by borrowing from other countries. The only way to pay for imports would be with revenues from exports. In other words, net exports would have to be zero.

To understand the implications of having zero net exports, we need to make a small detour to the world of accounting. The national income and product accounts (NIPA) divide the amount of output produced in the economy into four broad categories: private consumption, government consumption, investment, and net exports. In other words, the output produced in any given period can be used by the private sector or the government, invested, or traded with other countries. If the amount of goods produced in the economy is larger than the sum of investment and consumption by the private sector and the government, net exports will be positive because the country would export the output left over after accounting for consumption and investment.

Because the difference between output and consumption (by both the private sector and the government) is defined as national savings, the national accounts tell us that national savings must equal national

investment, whenever net exports are zero. The important consequence for a country without access to foreign sources of funds (that is, net exports are zero) is that if national savings fall following a tax cut, investment must also necessarily fall. This is achieved through an increase in long-term interest rates that works to choke off investment and to bring it in line with the lower level of national savings. And the lower level of investment will be reflected in lower levels of real GDP in the future.

The outcome would be different for an economy with access to foreign sources of funds. In this case, an increase in the amount of funds borrowed from foreigners would make up for the fall in the level of national savings. In other words, a country could consume and invest more than it produces by importing relatively more goods from abroad than it exports (that is, the current account would be in deficit) and finance it by borrowing funds from foreigners (that is, the capital account would be in surplus). De-

pending on how important the country is in world financial markets, the demand for foreign funds may still push interest rates upward. However, investment would not have to fall as a result. In an economy with access to foreign sources of funds, domestic investment does not need to equal national savings. Because the country can borrow from foreigners, domestic investment can be financed out of national savings or foreign sources of funds and via a current account deficit.

In fact, at the same time that the U.S. saw its budget deficit mushroom in the 1980s, it also saw a growing current account deficit (Figure 2). However, even in the face of a growing current account deficit, Martin Feldstein, chairman of the Council of Economic Advisers at the time and a proponent of the standard theory, continued to argue that the fall in investment would be very substantial. His argument was based on a finding that he and Charles Horioka uncovered in the early 1980s. They found that even though capital flows increased

**FIGURE 2**

**Current Account (as a percent of GDP)**



<sup>3</sup> The current account is defined as the sum of the trade balance — that is, exports minus imports — and investment earnings abroad. Typically, the latter is a very small fraction of the current account. Therefore, the current account is approximately equal to the trade balance.

substantially across countries, the fact remained that domestic investment was closely linked to domestic saving. Indeed, Figure 3 shows that movements in domestic investment closely mimic those in national savings, the difference between the two being accounted for by the current account.

In other words, countries did not take advantage of foreign sources of funds, since net exports and current account deficits/surpluses remain relatively small. Therefore, a fall in national savings stemming from a rise in the budget deficit would very likely be followed by a fall in investment and capital formation. In a nutshell, the economy would pay for the fall in taxes today with a lower level of output in the future.

### WHAT COMES DOWN MUST GO UP!

The main tenet of the standard theory is that national savings falls following a shift in government finance away from taxes toward borrowing. The reason is that consumers will save only part of their tax cut and spend what is left. But why would consumers save only part of the tax cut? Why not save it all? After all, the government will have to repay the money it borrowed some day, and it will have to raise taxes to do so. A forward-looking consumer will anticipate this necessity and accurately predict that his level of taxation will rise at some later date. As a result, he may very well decide to save *all* his current tax cut. If this occurs, the fall in government savings would be matched by an equivalent increase in private savings, leaving national savings constant. Since national savings does not change, interest rates would not have to rise and thereby choke off investment. In the case of an open economy—that is, one that engages in international trade and financial transactions—the amount of

funds borrowed from foreigners would not have to increase to keep the same level of investment constant. Since the level of borrowing from abroad remains the same, a rise in the budget deficit would also have no impact on the current account.

This approach to budget deficits was first formulated by the 19th century English economist David Ricardo, but it was rediscovered and formalized by Robert Barro in a very influential article published in 1974. Economists refer to this view as *Ricardian equivalence*. This theory argues that the way the government finances a given level of expenditure (such as a national army or a public road system) is irrelevant. Taxing or borrowing will lead to the same economic outcome because people are forward looking.

One important assumption buried underneath this elegant theory is the way the government taxes individuals. The theory assumes that each individual in the economy must pay the same amount in taxes irrespective of his income or of what he consumes.

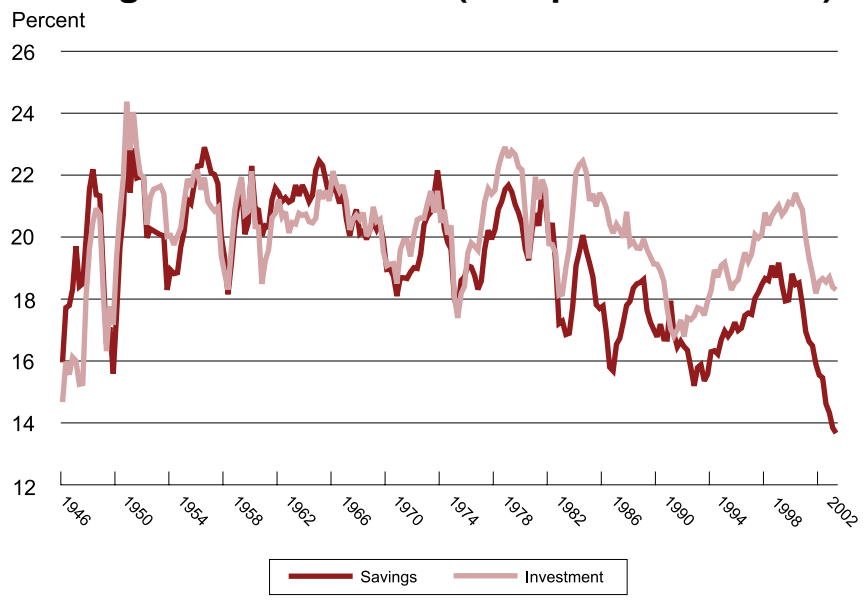
In other words, taxes are paid in a lump sum. Because taxes are not tied to the level of labor or capital income that an individual earns or to how much he consumes, lump sum taxes do not distort incentives to work, invest, and consume.

In reality, to raise revenues, governments most often resort to taxes on labor and capital income or to taxes on goods and services. One could then be tempted to disregard the Ricardian equivalence theory as a cute abstraction that is empirically flawed and, therefore, not a serious guide for policymaking. Consequently, an increase in the budget deficit would most likely lead to a fall in national savings and to an increase in interest rates.

However, according to Nobel laureate Milton Friedman, theories should not be judged on the plausibility of their assumptions, but rather on the accuracy of their predictions. Is an increase in budget deficits associated with an increase in real long-term, interest rates, as the standard theory predicts? Or is the Ricardian equiva-

**FIGURE 3**

### Savings and Investment (as a percent of GDP)





lence theory, in which there is no link between budget deficits and real long-term interest rates, a better representation of the world?

### CURRENT BUDGET DEFICITS AND INTEREST RATES

The Ricardian equivalence theory argues that there should be no positive relationship between budget deficits and real long-term interest rates, i.e., interest rates adjusted for expected inflation.<sup>4</sup> Proponents of this view often point out that there is indeed no clear relationship between these variables in the data (Figure 4). There are times, such as the early 1980s, when the budget deficit and the real long-term interest rate move in the same direction: an increase in the budget deficit as a percent of GDP is associated with a rise in the real long-term interest rate. However, at other times, an increase in the budget deficit as a percent of GDP is associated with a *fall* in the real long-term interest rate. For instance, since the beginning of 2000, the federal budget has gone from a surplus of 2.3 percent of GDP to a deficit of the same magnitude in the first quarter of 2003. Yet, real long-term interest rates have fallen steadily over the same period.

Note also that because the level of national savings is unaffected by a rise in budget deficits under the Ricardian equivalence theory, a change in budget deficits is not predicted to lead to a change in the amount of funds borrowed from abroad, and, therefore, the current account. In the early 1980s, opponents

of this theory often pointed out that this prediction was contradicted by the U.S. experience: the rise in budget deficits at the time was accompanied by a substantial increase in the current account deficit. Indeed, the current account deficit went from being ap-

Although they moved in opposite directions in the early 1980s, the budget deficit and the current account tended to be positively correlated between the mid-1980s and the end of the 1990s, before they once again started to drift apart in 2000 (Figure 5).

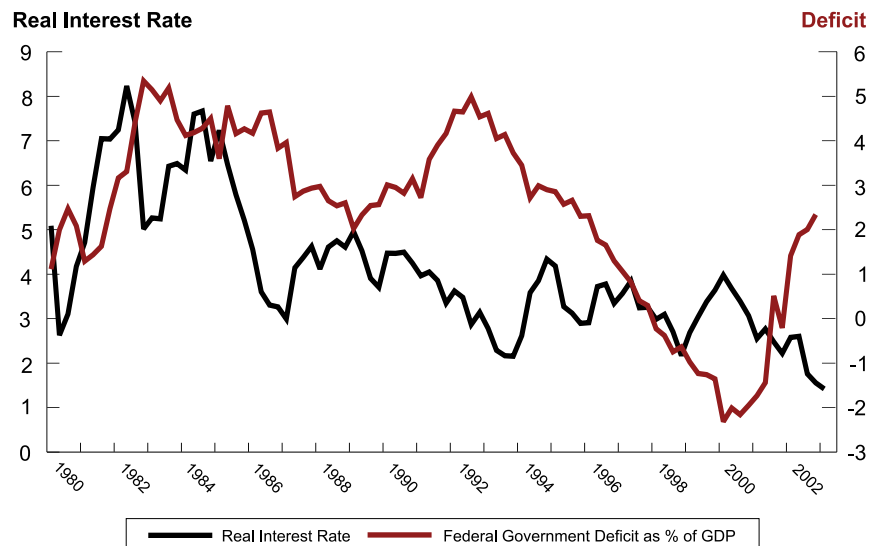
**The Ricardian equivalence theory argues that there should be no positive relationship between budget deficits and real long-term interest rates, i.e., interest rates adjusted for expected inflation.**

proximately balanced at the start of the 1980s to registering a deficit of about 3.5 percent of GDP by 1987. Yet, proponents of the Ricardian equivalence theory would point out that over a longer period of time, the relationship between the budget deficit and the current account is not that clear.

It therefore seems that, as predicted by the Ricardian equivalence theory, there is no clear relationship between current budget deficits, on the one hand, and interest rates (or the current account), on the other. However, interest rates are affected not only by current budget deficits but also

**FIGURE 4**

### Real Long-Term Interest Rate vs. Federal Government Deficit (as a percent of GDP)



<sup>4</sup> If we assume that the economy has access to foreign sources of funds, Ricardian equivalence also implies there should be no relationship between the current account and real long-term interest rates. Proponents of this theory often point out that there is no clear relationship between these two variables over long periods.

by prospective ones. Accounting for movements in prospective budget deficits turns out to be important for the empirical relationship between budget deficits and interest rates.

### BUT THE FUTURE MATTERS

We have seen there is no clear relationship between the current budget deficit and the real long-term interest rate. However, what matters for real long-term interest rates is not so much the current budget deficit, but what the budget deficit is expected to be in the future. A higher expected deficit implies that the government's borrowing needs will be higher in the future. The standard theory would then predict a higher (short-term) interest rate in the future. But higher future short-term interest rates must necessarily raise long-term interest rates today.

To see this, suppose that instead of rising, long-term interest rates stayed constant. An investor would then be better off holding a sequence of

short-term bonds paying the short-term interest rate in each period. Under this scenario, investors currently holding long-term bonds would be better off selling these assets and buying a sequence of short-term bonds instead. But this process would increase the supply of long-term bonds in the mar-

**What matters for real long-term interest rates is not so much the current budget deficit, but what the budget deficit is expected to be in the future.**

ket, causing their price to fall, and thus drive current long-term interest rates higher. This process would continue until, at the margin, the return to holding a long-term bond was equal

to the return from holding a sequence of short-term bonds, according to the *expectations theory of the term structure of interest rates*.<sup>5</sup>

So, according to the standard theory, higher expected budget deficits lead to higher real long-term interest rates. Is this theory supported by the data?

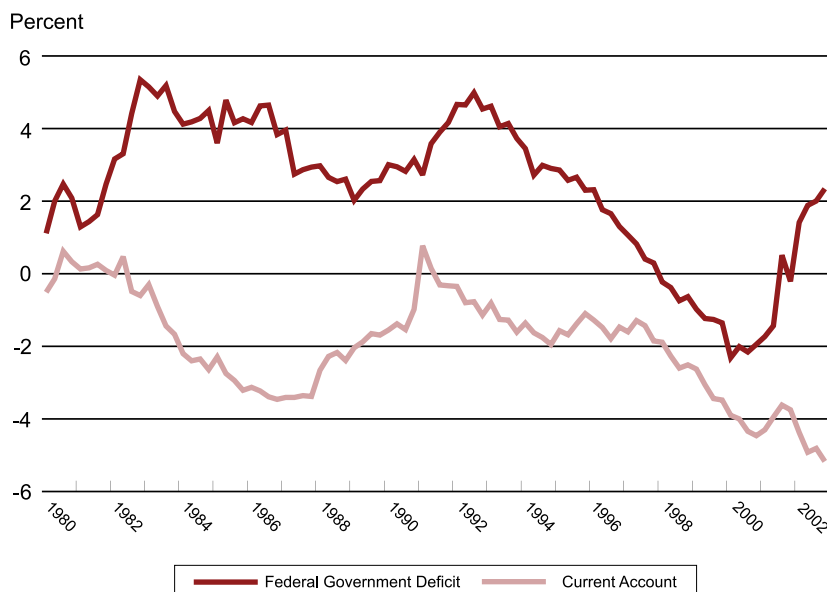
### PROSPECTIVE BUDGET DEFICITS AND INTEREST RATES

Although formal studies testing the impact of *current* budget deficits on interest rates found mixed results (see the article by John Seater), there seems to be a positive relationship between expected budget deficits and interest rates. Indeed, previous studies have highlighted the fact that prospective budget deficits and interest rates tend to move together.

Paul Wachtel and John Young conducted the first study examining the impact of prospective budget deficits on interest rates. They used the federal budget forecasts (for up to two years ahead) from the Office of Management and Budget (OMB) and the Congressional Budget Office (CBO), over the period 1979 to 1986. To capture the effect of an unanticipated movement in the prospective deficit (what economists call a shock), they used revisions in the OMB's and CBO's budget forecasts of current fiscal years. If large future budget deficits lead to higher interest rates, unanticipated announcements of such deficits should lead financial markets to revise interest rates up. Wachtel and Young found that a \$1 billion increase in the CBO's forecast of the federal budget deficit for the current fiscal year led to

**FIGURE 5**

### Current Account and Budget Deficits (as a percent of GDP)



<sup>5</sup> The term structure of interest rates refers to the relationship among interest rates on bonds with different terms of maturity.

an average 0.30-basis-point increase in interest rates.<sup>6</sup> Similarly, a \$1 billion revision in the OMB's forecast of budget deficits pushes interest rates up 0.18 basis point, on average. This impact is significant. For instance, in August 2003, the CBO revised its forecast of budget deficits for the next 10 fiscal years that it initially made in March 2003. In the spring of 2003, the CBO forecast a surplus of \$96 billion in 2010, which was revised to a deficit of \$145 billion in August 2003. Other things being equal, Wachtel and Young's estimate would imply a rise of 72 basis points in interest rates.

Recently, Thomas Laubach revisited the subject. Just as Wachtel and Young did, Laubach used forecasts of federal budget deficits from the OMB and the CBO from 1976 to 2003. One important difference between these two studies is that Laubach used forecasts with much longer horizons. Instead of studying forecasts of budget deficits two years in the future, he concentrated on the impact of budget deficits five years in the future.

There are good theoretical reasons for using longer-term forecasts. The state of the business cycle affects budget deficits. In recessions, tax revenues decline because fewer people are working. The fall in government revenues automatically raises budget deficits. Moreover, the state of the business cycle also affects interest rates: they rise during expansions and fall during recessions. Therefore, a recession would tend to lower interest rates at the same time that it raised the budget deficit. Similarly, interest rates would rise and the budget deficit would fall during an expansion. Interest rates and budget deficits should therefore be *negatively* correlated along the business cycle.

<sup>6</sup> A basis point is one hundredth of a percentage point.


Yet, since the goal is to isolate the impact of fiscal policy on interest rates — such as a decision by Congress to lower taxes, thus raising budget deficits — we need to remove the implicit negative correlation between budget deficits and interest rates that occurs over the business cycle. Using longer-term forecasts is useful in accomplishing this goal, since the impact of the business cycle is over after approximately two to three years. Indeed, Laubach found that using long-term forecasts is important. For instance, he finds that a 1-percentage-point increase in the projected deficit as a fraction of GDP is associated with a 25-basis-point rise in long-term interest rates, which is roughly twice as large as the effect uncovered by Wachtel and Young.<sup>7,8</sup>

<sup>7</sup> Note that Wachtel and Young looked at the effect of a \$1 billion change in the forecast of the budget deficit, whereas Laubach studied the impact of a 1-percentage-point increase in the forecast of the deficit as a percent of GDP. However, in Wachtel and Young, a \$1 billion change in the budget deficit was roughly equal to 0.025 percent of GDP. Thus, their study would imply that a 1-percentage-point increase in the projected deficit to GDP ratio would lead interest rates to rise 12 basis points.

<sup>8</sup> The reader should keep in mind an important caveat to these analyses. Even though prospective budget deficits and interest rates are positively correlated, it does not necessarily imply that an increase in prospective budget deficits will cause interest rates to rise. The reason is that both may be rising because of movements in some other variables that remain unaccounted for in the empirical analysis. Prospective budget deficits are more likely to cause interest rates to rise to the extent that the impact of these other variables on budget deficits and interest rates is taken into account in the empirical work.

## CONCLUSION

Are budget deficits associated with an increase in long-term interest rates? Recent empirical work shows that they are, once we account for the impact of expected future budget deficits on current long-term interest rates. Prospective budget deficits are important because by lowering the expected level of future national savings, they put upward pressure on expected short-term interest rates. According to the expectations theory of the term structure of interest rates, an increase in expected short-term interest rates raises current long-term interest rates, which can dampen investment and lead to lower levels of real GDP in the future.

The fact that a fall in national savings is associated with a rise in interest rates is consistent with the findings that, notwithstanding the increasing globalization of financial markets, national economies remain less integrated than is usually imagined. Because domestic investment is still mostly financed out of national savings, an increase in future budget deficits that lowers expected future national savings is linked to an increase in interest rates that works to lower domestic investment and reduce the future level of output. 



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