Commonwealth Foundation
for PUBLIC POLICY ALTERNATIVES

PUBLIC POLICY & FREE ENTERPRISE

IN PENNSYLVANIA

A COMPILATION

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Foreword

Nathan Benefield

Public Policy and Free Enterprise in Pennsylvania represents a partnership with the Commonwealth Foundation and the department of economics at Duquesne University. The papers were prepared by advanced-level undergraduate and graduate economics students alongside Dr. Antony Davies, an associate professor at Duquesne and a member of the Commonwealth Foundation's Council of Scholars. This project represents the beginning of an increased effort to connect scholars in the academic world with current public policy issues facing the Keystone State.

The topics examined include five of the key public policy issues and economic trends facing Pennsylvania.

In "**The Cost of Labor Unions in Pennsylvania**," Laura Vicinie and Dr. Davies find:

- Over the past sixty years, increases in union membership rates correlate with slower growth in real per-capita income growth slows, a decline in real imports, and no significant change in unemployment rates or real exports.
- These results suggest that increased union membership has no positive effect on the economy. While some of the results are not statistically significant, they all point in a direction that suggests increased union membership has a negative effect on the economy.
- The reality of unions changed from protecting workers against employers' monopsony power in the past to protecting union workers against non-union workers.

In "**Public Teacher Compensation**," Jonathon Scott and Dr. Davies find:

- The cost to taxpayers of a newly hired teacher—from age 22 through age 80 starting at the baseline salary of $40,800—will be $13 million. Of this total, $6 million is the teacher's future salary, $1 million is the teacher's future health care benefits, and $6 million is the teacher's future pension benefits.
- The average salary for public school teachers varies significantly across regions. Schools in the Allegheny Mountains area have the lowest-paid teachers at an average salary of $49,819, while teachers in the Philadelphia area earn 25% more, or $62,568 on average.
- The strongest predictors of teacher salaries are geographic area, years of service, and education.

In "**Medical Malpractice Reform in Pennsylvania**," Kait Wolf and Dr. Davies find:

- Legal reforms designed to limit medical professionals' liabilities result in lower medical malpractice premiums and will attract more medical professionals to Pennsylvania.

- Over the past five years, there have been over 1,000 medical malpractice suits settled or awarded in Pennsylvania. At an average award of $330,000 (in 2009 dollars), those cases represent a combined cost to medical malpractice insurers of over $375 million. Non-economic damage reform would have reduced this amount by almost $150 million.

- The average settlement and award in states and years with joint and several liability reforms is $275,000 versus more than $350,000 for states and years with no reform.

- States with punitive damages rules exhibit an average settlement and award amount of $278,000. States without punitive damage rules exhibit an average settlement and award of $320,000, or 15% higher.

In "**Gaming and Socioeconomic Indicators: Evidence from the States**," Lauren Mondschein and Dr. Davies find**:**

- State and local tax revenue per capita is higher among gaming states than among non-gaming states, but that there is no significant difference in state and local tax revenues among the categories of gaming states.

- Gaming revenue adds significantly to tax revenues for states that allow private gaming, but not for states that have state-sponsored gaming only.

- The data between gaming and unemployment rates is ambiguous, but per-capita income is significantly higher in gaming states than in non-gaming states.

- The incidence of violent crime is lowest among states with state lotteries only, and higher among states with no gaming and with private gaming.

In "**The Effects of Trade in Pennsylvania**," Devin Bowen and Dr. Davies find:

- In Pennsylvania, employment is higher during times of greater trade. Average incomes are also higher during periods of greater trade.

- Opening markets to free trade costs the state jobs in less competitive industries, but adds jobs in our more competitive industries. In sum, trade shifts Pennsylvania's job base from unhealthy to healthy industries, leaving the commonwealth with more jobs, better-paying jobs, and an economic base built on more industries that are better able to survive into the future.

These five papers offer unique and important insights for Pennsylvania policymakers and advocates on the fiscal and economic effects of key policy areas. Dr. Davies and his students have answered some critical questions about the benefits of international trade, the impact of legalized gambling, the potential savings from medical malpractice reform, the costs of public school teachers, and the economic impact of union membership for Pennsylvania residents.

The Cost of Labor Unions in Pennsylvania

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Union membership, the fraction of the labor force that belongs to a union, has been declining nationwide from a high of over 32% in 1953 to just over 12% today. Union coverage, the fraction of the labor force that belongs to a union or is covered by a union's collective bargaining agreements, is around one-half of a percentage point more than union membership. In Pennsylvania, union coverage has been about one-third greater than union coverage nationwide (see Figure 1). Labor union proponents claim that unions foster a more stable and productive workforce by giving workers a stronger voice in company decisions. Opponents claim that unions cause higher unemployment by putting upward pressure on wages and shutting out non-union workers from jobs.

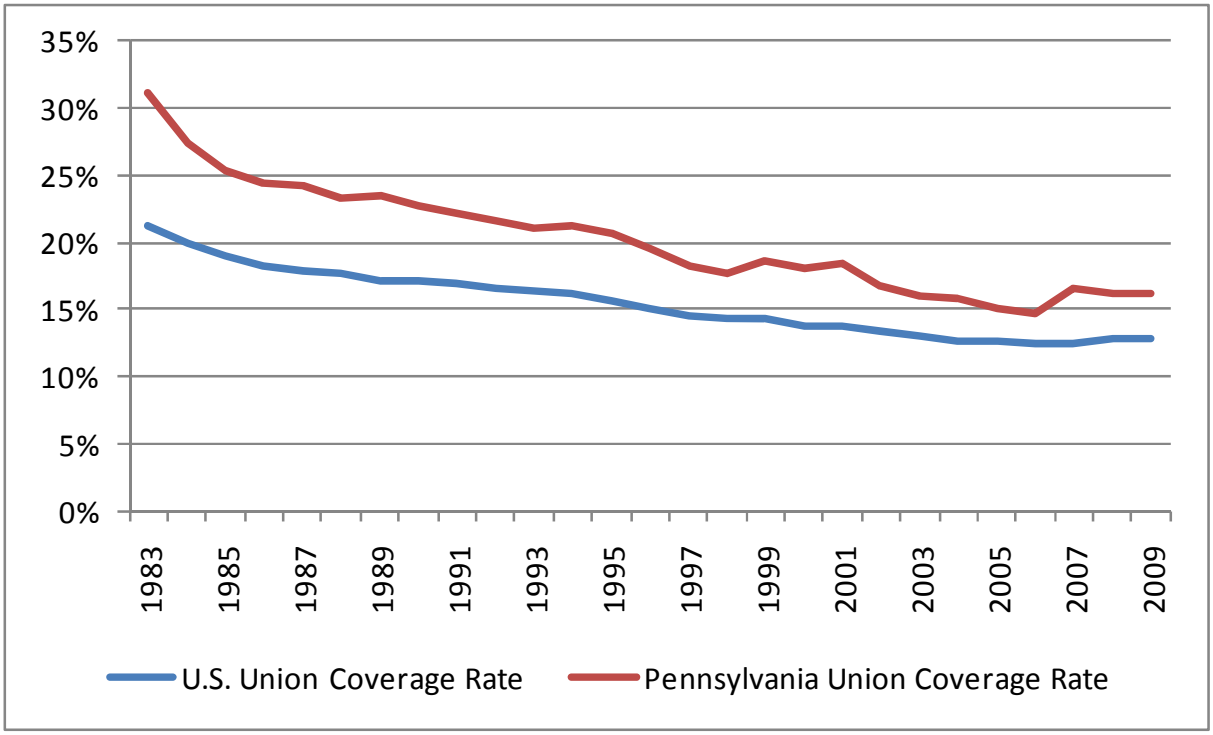

Figure 1. Union Coverage in Pennsylvania and the U.S. (1983-2009).[1]

[1] Source: Union Membership and Coverage Database.

The industrial revolution gave rise to modern labor unions. As firms took advantage of new-found economies of scale, they grew in size such that a single firm could end up employing hundreds of workers. With limited transportation and communication, it was harder for workers to change employers; employers were able to exercise monopsony power—that is, the labor market had become a "buyer's market" in which a small number of employers faced with a large labor pool were under no pressure to raise wages or improve working conditions in order to attract labor. By bringing workers together into a small number of unified groups, labor unions were able to counterbalance the monopsony power of the employers with the new-found monopoly power of the unions. Workers' wages and working conditions improved with their negotiating power, which in turn improved with their ability to act as a unified whole rather than as numerous competing entities.

The industrial revolution also gave rise to new markets as entrepreneurs discovered new inventions and founded new companies. As innovation increased the number of employers, so increased the competition for labor. Within a generation, employers' monopsony power began to wane, while the monopoly power of the unions remained. By the last quarter of the twentieth century, the power imbalance had reversed and, opponents claim, unions had become the source of the very labor problems they had been founded to rectify. Unions would be blamed for wages that were so high that they prevented employers from competing, which curtailed the ability of firms to create new jobs. These high wages benefited union workers, but those benefits came at the expense of unemployed workers.

In this paper, we use data from Pennsylvania's labor markets to examine the relationships between labor unions and personal income, the employment-population ratio, the unemployment rate, the tax rate and the poverty rate.

What is Seen and Unseen

Most errors in economic thinking are due to an imbalance in observation. One sees the effects that result from an action, but does not see the effects that would have come to pass had the action not been taken. One of the functions of a union is to push for higher wages for its workers. When the union is successful, one can see the greater wages that accrue to the workers, but one does not see what would have happened had the wage increase not been gained. A good case study is the minimum wage. While the minimum wage is imposed by government edict rather than as the result of union negotiation, the effects of an increased minimum wage are the same as the effects of union-negotiated higher wages. When the minimum wage increases, it is as if all low-wage workers in the country had belonged to a union and the union had successfully negotiated an increase in their wage rates.

When the minimum wage increases, what is seen is that low-income workers' wages rise. What tends to remain unseen (or unacknowledged) is that some workers are laid off and others, who might have been hired at the lower wage, are not hired. Using workers with less than a high school education as a proxy for "low-wage workers," Figure 2 shows the unemployment rate for low-wage U.S. workers compared to the minimum wage. While there are exceptions, there is also a clear trend and the trend matches what economic theory predicts – as the government

requires firms to pay higher wages to low-wage workers, unemployment among low-wage workers rises.

What is seen is that the increase in the minimum wage increases low-wage workers' incomes. What is unseen is revealed in Figure 2: the money to pay for low-wage workers' increased wages comes from other low-wage workers who are either laid off or never hired. In short, rather than being a mechanism to protect workers' wages from employers, it is a mechanism to protect the wages of the employed at the expense of the unemployed.

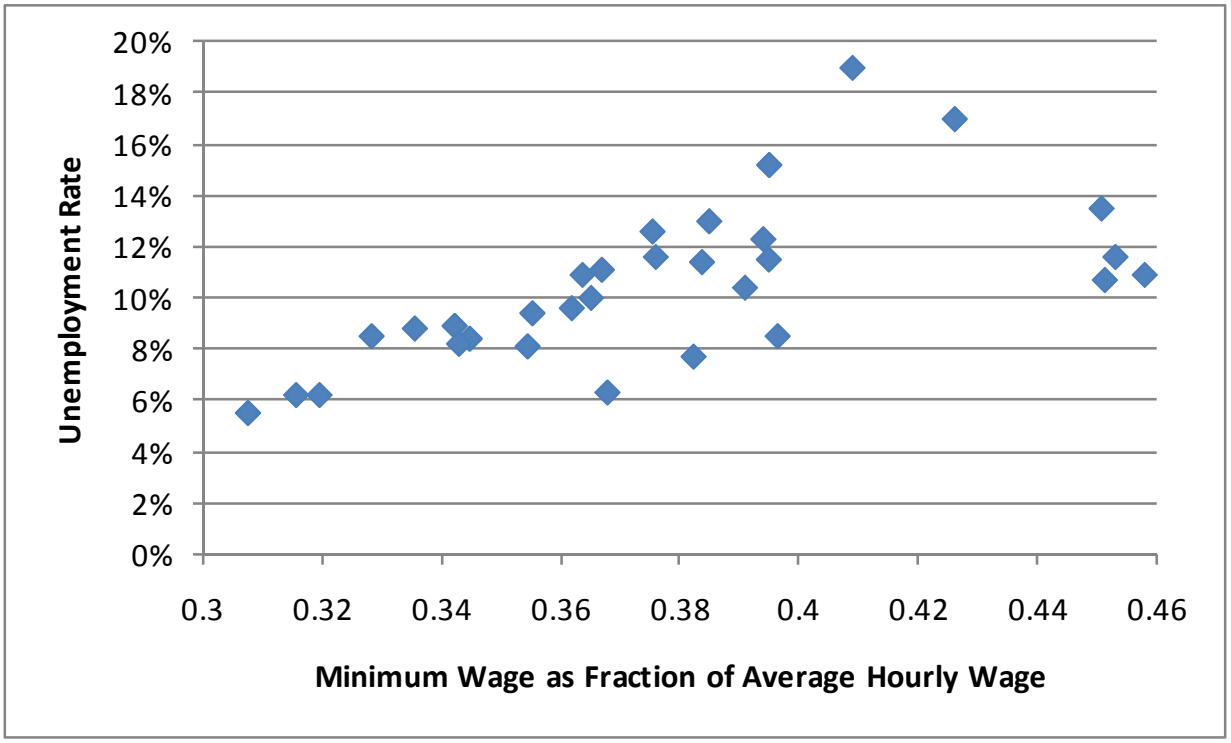

Figure 2. Unemployment rate among U.S. workers with less than a high school education rises as the minimum wage rises (1978-2008).[2]

Unions are not the government. However, when a union obtains higher wages for its workers by threatening to strike, and when the firm does not have the choice

[2] Source: Bureau of Economic Analysis.

to replace the union workers with non-union workers, the union ends up dictating wages in the same manner as the government dictates wages via a minimum wage.

The Socio-economic Impact of Unions

Clearly, unions benefit union workers who retain their jobs. The important question is whetherunions benefit all workers. If unions do not benefit all workers on average, then the benefits that unions accrue for employed union workers come at the expense of unemployed union workers and non-union workers. If unions benefit all workers, then we should observe an improvement in socio-economic measures as union membership rises. For example, if unions benefit all workers, we would expect to see incomes rise, the unemployment rate to fall, and the economy to grow when union membership increases, and for the reverse to happen when union membership falls. If, however, unions benefit employed union workers at the expense of unemployed union and non-union workers, we should expect to see no change, or perhaps even a decline, in socio-economic measures as union membership increases.

An interesting phenomenon of labor unions is that although they are able to achieve higher wages and better benefits for their members, union membership has been in near constant decline since the late 1940s. Economic theory predicts that unions, as labor cartels, will be unable to survive in competitive markets, and that the benefits they accrue to their members will come at the expense of the rest of the economy. By restricting the movement of labor and making wages less flexible, economic theory predicts that unions will contribute to delaying economic

recoveries by preventing wages from falling and thereby discouraging firms from creating new jobs.

Because union membership has been steadily declining, we cannot compare socio-economic measures in periods of high union membership to socio-economic measures in periods of low union membership because it would not be possible to distinguish between the effect of union membership and the effect of the passage of time. A better approach is to compare changes in socio-economic measures to changes in union memberships. If union membership is beneficial, then we should expect to see socio-economic measures improve when union membership rises and socio-economic measures to decline when union membership falls. Figure 3 shows changes in union membership rates for the U.S. broken down into two parts. Over the period 1948 to 2009, union membership fell, on average, by 0.3 percentage points. The red bars in Figure 3 indicate the thirty-three years in which the change in membership rates was above average (i.e., the membership rate either increased or, if it fell, it did so by less than 0.3 percentage points). The blue bars indicate the twenty-eight years in which the change in membership rates was below average (i.e., the membership rate declined by more than 0.3 percentage points).

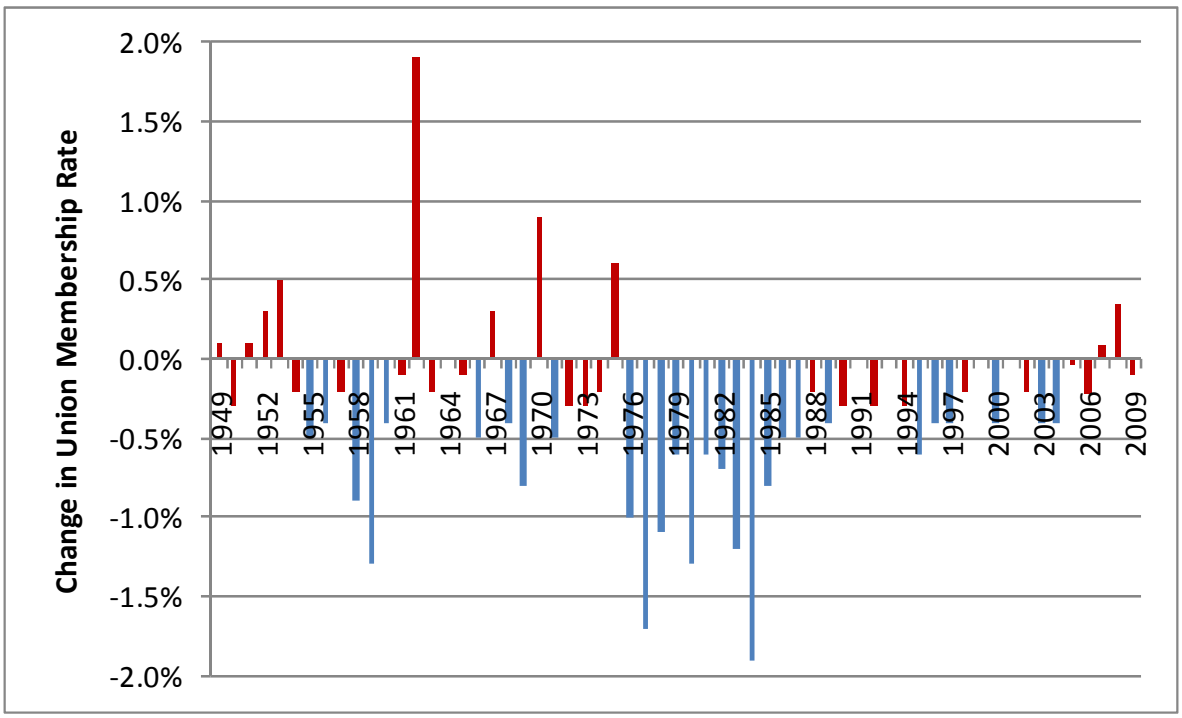

Figure 3. Annual change in union membership rates in the U.S. (1948-2009).[3]

Effect of Change in Union Membership on Economic Outcomes

Comparing the unemployment rates in the years of low union decline to those in the years of high union decline, we find that the unemployment rate grew, on average, 0.3 percentage points when union membership grew or had minimal decline and that the unemployment rate declined more than 0.1 percentage points in years of high union decline. These results are shown in Figure 4 for both the United States as a whole and for Pennsylvania.[4] If it is true that union membership benefits all workers, then we would expect to see unemployment decline when union membership grew faster and to increase when union membership grew more slowly. Figure 4 shows the reverse—that unemployment accelerates as union membership accelerates. While the difference is not statistically significant (i.e., the observed

[3] Source: Union Membership and Coverage Database.
[4] Due to data availability, the data set for Pennsylvania only goes back to 1983.

difference could well be due to random chance), for both the U.S. and Pennsylvania, the numbers point in the opposite direction of what union proponents would claim.

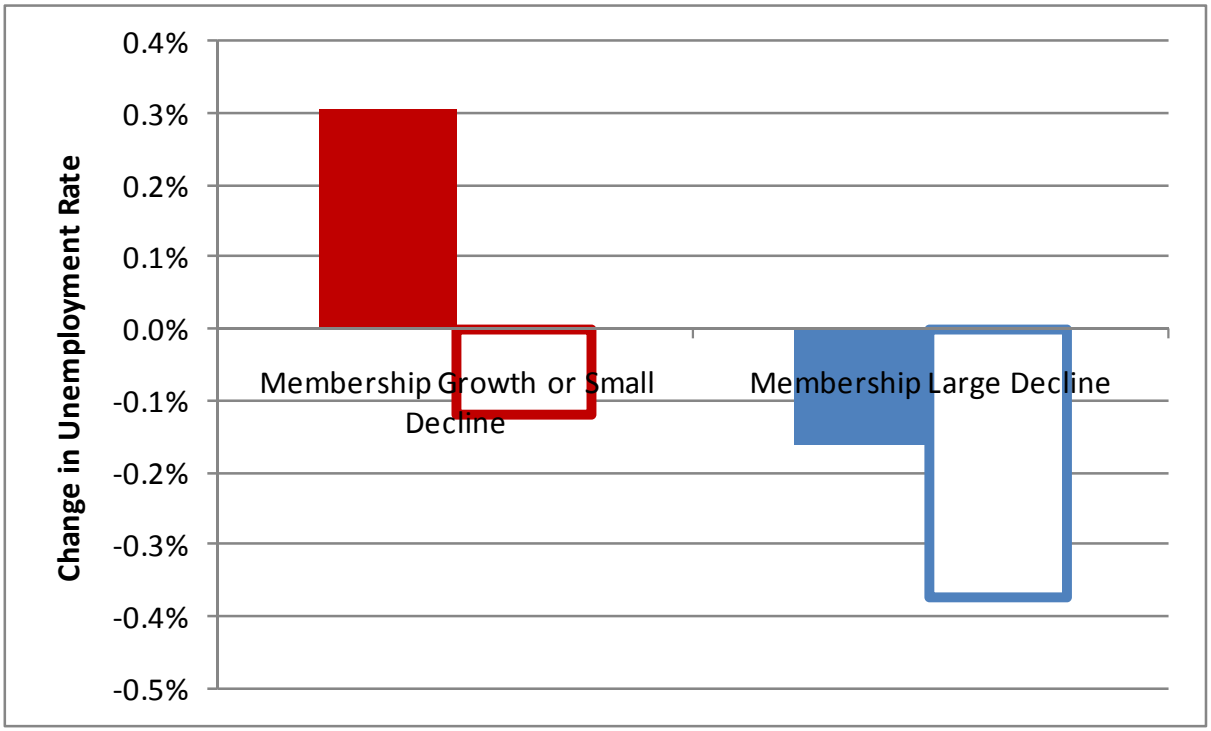

Figure 4. Average change in U.S. unemployment rate in years of union membership growth or small declines versus years of large declines. Solid bars are for the U.S. (1949-2009), hollow bars are for Pennsylvania (1983-2008).[5]

A counter-argument is that, even if increased union membership is associated with no change in unemployment or even a small increase in unemployment, this may be tolerable if increased union membership were associated with increased income. In other words, unions will be good for workers as a whole if unions have a positive effect on incomes. Figure 5 shows that, both for the U.S. and for Pennsylvania, this is not the case. After adjusting for inflation, per-capita personal income rose more slowly in years of greater union growth and faster in years of

[5] Calculated from data provided by the Union Membership and Coverage Database and the Bureau of Labor Statistics.

greater union decline. Moreover, this result is statistically significant for the U.S., meaning that the difference we observe in Figure 5 is likely not due to random change.[6]

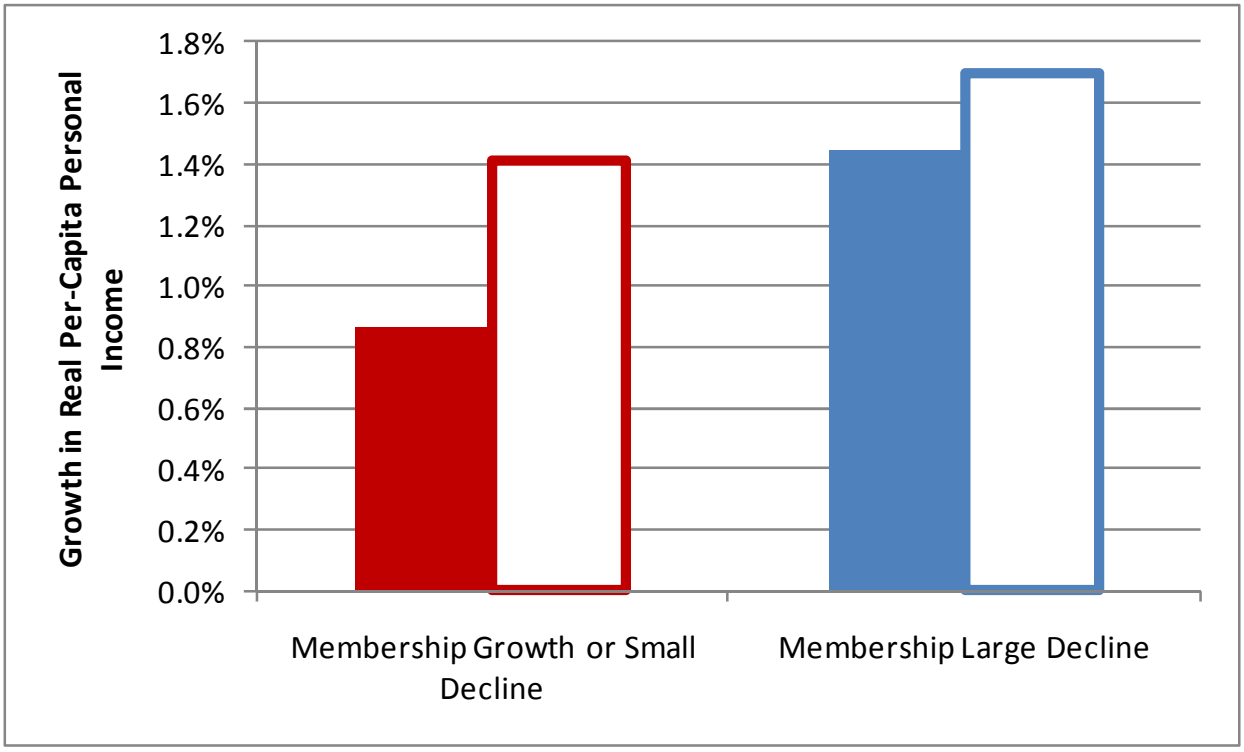

Figure 5. Average change in inflation-adjusted per-capita personal income in years of union membership growth or small declines versus years of large declines. Solid bars are for the U.S. (1949-2009), hollow bars are for Pennsylvania (1983-2008).[7]

The results in Figures 4 and 5 are consistent with Sherk (2009), who argues that the higher wages paid to union employees reduce total company profits, thereby reducing investment. In turn, this results in unionized firms becoming less competitive over time. Sherk also notes that unionized firms shed jobs more frequently and expand less frequently than do non-unionized firms.

[6] The difference is significant with p = 0.016 for the US, but is insignificant for Pennsylvania.
[7] Calculated from data provided by the Union Membership and Coverage Database and the Bureau of Labor Statistics.

The call for unionization frequently accompanies the call for protection against low-priced foreign products. The mantra of the International Ladies Garment Workers Union, "look for the union label," was an overt call to favor domestic union-made garments over imported garments. As we see in Figure 6, inflation-adjusted imports grew at significantly lower rates in years of union membership growth.[8]

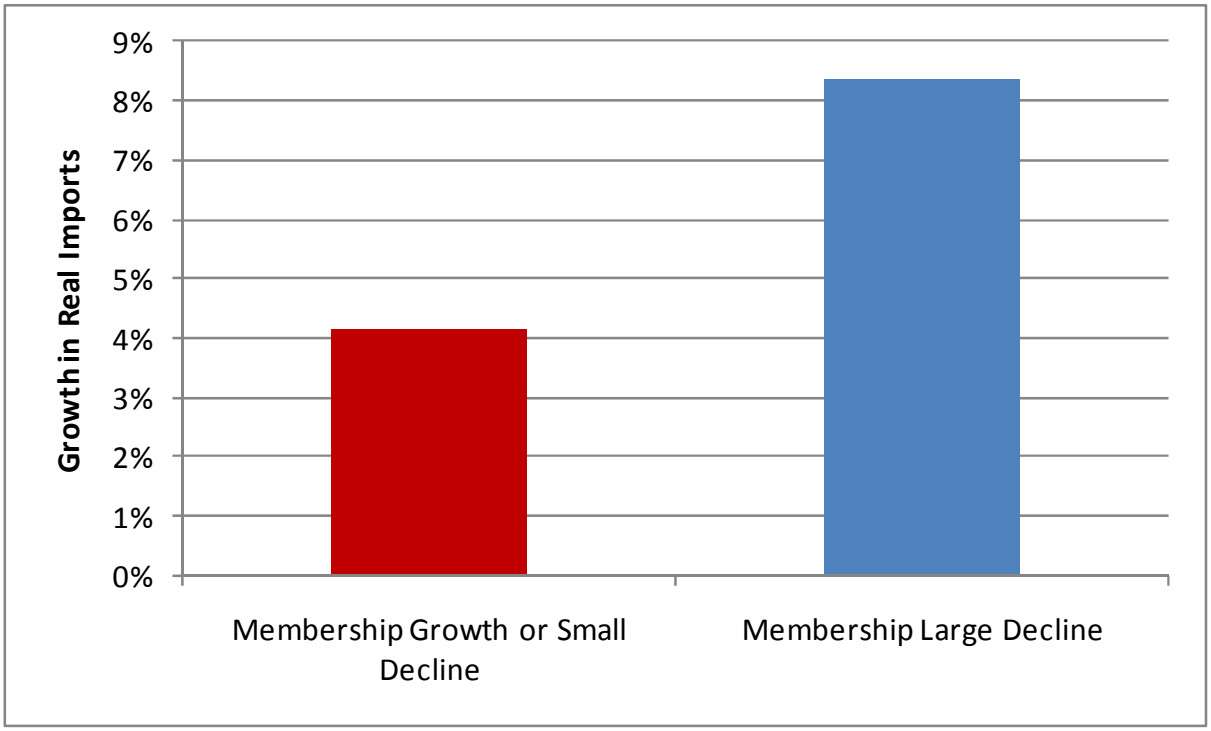

Figure 6. Average change in inflation-adjusted imports in years of union membership growth or small declines versus years of large declines (1949-2009).

The question is whether the growth in union membership was accompanying a strengthening of the U.S. trade balance or merely the discouraging of imports. To address this question, we can compare U.S. exports in periods of union growth versus periods of union decline.

[8] The difference is significant with p = 0.015.

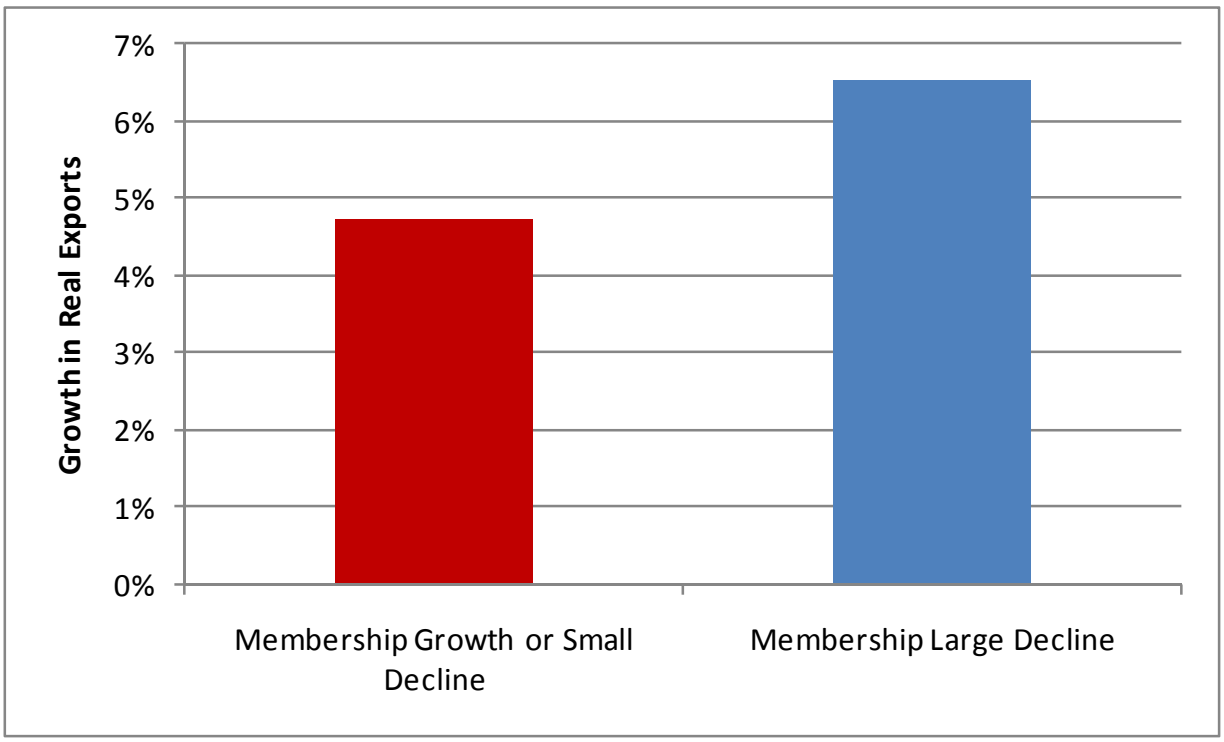

Figure 7. Average change in inflation-adjusted exports in years of union membership growth or small declines versus years of large declines (1949-2009).

Figure 7 shows that real exports grew more slowly in years in which union membership grew more quickly, though the difference is not statistically significant. Figures 6 and 7 together suggest that, while Americans purchased fewer foreign goods in years in which union membership was growing, there was no corresponding increase in exports. Thus, the growth in unions is not so much associated with a strengthening of American industry in world markets as it is the transfer of wealth from American consumers to union workers.

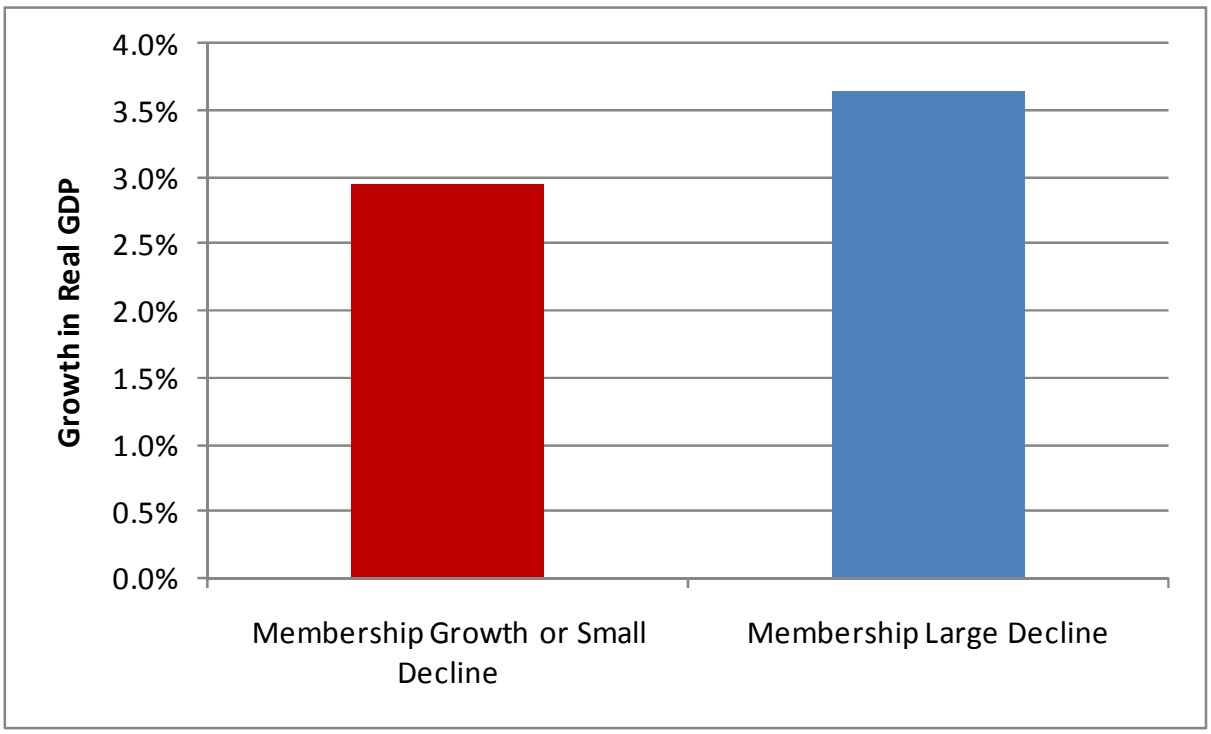

Figure 8. Average growth in real GDP in years of union membership growth or small declines versus years of large declines (1949-2009).

Finally, Figure 8 shows that the economy grows at a faster rate during years when union membership is in decline, though the difference is not statistically significant. Vedder and Gallaway (2002) argue that, as wages for union workers increase, job opportunities in unionized industries decrease. By increasing the unemployment rate, labor unions impose a deadweight loss on economic output, which results in a slowing of economic growth. While the difference in Figure 8 is not statistically significant, it is consistent in direction with Vedder and Gallaway's argument.

Unions and Labor Market Regulation

Historically, unions have been staunch supporters of minimum wage, living wage, and prevailing wage laws—despite the fact that union workers typically earn far more than the minimum wage.[9] Living wage laws are simply minimum wage laws in which the wage is set according to some function of the cost of living. Prevailing wage laws require that workers employed by private contractors on publicly funded projects be paid at a rate commensurate with the "prevailing" union wage in the area where the project is located.

Under the guise of helping all workers attain higher wages, unions support minimum, living, and prevailing wage legislation because it benefits union workers by reducing labor competition. Bauer (1959) shows that unions in apartheid-era South Africa overtly claimed to support minimum wage laws because they prevented black workers from competing for jobs held by white workers. Kessler and Katz (2001) found that the repeal of wage control laws is associated with a decrease in the union wage premium and a decrease in the difference between the wages of black and non-black construction workers.

Another popular argument for labor unions is that they enable workers to have a stronger voice in their government. This argument only holds for those members whose political ideals align with the majority of the labor union. Clark (1999) claims that a significant percentage of union members do not support labor's involvement in politics. Paycheck protection laws require unions to obtain advance written authorization from their members before union dues are used for political

[9] For further discussion, see Cox and Oaxaca (1981, 1982).

purposes. Though opponents argue that paycheck protection laws benefit private industry by reducing unions' political power, there is no question that these laws serve to guard the individual rights of workers.

In response to declining membership, unions are focusing their energies on influencing labor laws to substitute membership growth. In so doing, labor unions are transforming from workers' collectives that operate on the principle of free association to lobbying organizations that operate on the principle of co-opting the government's coercive powers. An example of this transformation is union support for Project Labor Agreements (PLA) as a solution to disputes between union and non-union contractors. PLAs are pre-hire collective bargaining agreements that cover the terms and conditions of employment on a specific construction project. These agreements require that all contractors on a project—both union and non-union—abide by the terms and conditions of the agreement for the duration of the project. In a comprehensive study on PLAs, Belman et al. (2007) found no evidence that PLAs influence either project costs or the numbers of bidders. Conversely, while Tuerck et al. (2009) found no difference in the incidences of labor disputes, labor shortages, or problems with labor coordination for PLA versus non-PLA projects, they did find that PLA projects cost from 12% to 18% more than non-PLA projects. A study by Ernst and Young (2001) is consistent with Tuerck et al's findings. Ernst and Young were asked to review a PLA in Erie County, New York. They found that the PLA was detrimental to taxpayers in that it reduced competition for publicly bid projects, thereby driving up the costs of the projects, and had no beneficial effect in

mitigating labor disruptions. Cole (2009) reviews similar studies that find that PLAs increase the cost of projects while having no effect on labor disruptions.

Conclusion

Labor unions cultivate an image as champions of the worker against the exploitation of the employer. At the dawn of the labor union movement in this country, this image of labor unions was steeped in reality. Through monopsony power, employers exploited workers through artificially low wages and, sometimes, horrid working conditions. As the economy grew, competition among employers broke the monopsony power, and the reality of unions changed. No longer did they protect workers against employers, but rather they protected union workers against non-union workers. To paraphrase Robert LeFevre, unions became a disease masquerading as its own cure.

Our examination of fluctuations in union membership over the past sixty years reveals that, as union membership rates rise, unemployment rates do not fall, real per-capita income growth slows, real imports decline, but real exports remain unchanged. At the very least, these results suggest that increased union membership has no positive effect on the economy. While some of the results are not statistically significant, they all point in a direction that suggests increased union membership actually has a negative effect on the economy.

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Public Teacher Compensation

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Why Does Teacher Compensation Matter?

The largest portion of Pennsylvania's state budget, about $9.6 billion for 2010-2011, goes to funding Pre-K-12 education, a $146 million increase from fiscal year 2009-2010—almost 35% of the state's General Fund budget. Not only is this the single largest line item increase in the budget, but it occurs against a backdrop of budget cuts to many other state programs. This against a backdrop of a major budget shortfall—estimated to be $3 to $5 billion next year, with the loss of federal stimulus money and other one-time revenue sources.

The Commonwealth Foundation estimates that state and school property taxes for the typical homeowner will have to increase by $800 to pay off unfunded liabilities for the Public School Employees' Retirement System (PSERS). Beyond this, an additional $390 per household will be needed to cover the State Employee Retirement System (SERS) (Commonwealth Foundation, 2009). These tax increases represent a double-whammy to Pennsylvanians working in the private sector. Private sector workers have to work harder to replenish their own diminished retirement funds, and now are being required to pay higher taxes so that public sector workers can maintain their pensions. This raises an important question of equity: Why shouldn't public sector workers have the same retirement plans private sector workers do?

The monthly retirement benefit for a public school teacher is based on the number of work years (counting both school service and credited non-school service), and the teacher's average salary from the last three years of employment.

The fact that pensions are tied to teachers' salaries means that reducing or freezing teachers' salaries has a doubled effect on the budget. Not only would the school district's annual wage expense be reduced, but also the pension obligation and the funds needed to pay for the pension obligation would be reduced. This would provide much needed relief to Pennsylvania taxpayers.

In this paper, we explore the cost of public school teachers, compare the cost to the costs of other professionals, and examine the relationship between teacher salaries and SAT scores. While it is emotionally satisfying to argue that, when it comes to our children, we should spare no expense, the laws of nature and economics cannot be denied. No amount of magnanimity changes the fact that our resources are finite. Every dollar we spend on teachers is a dollar that we cannot spend on other things—some of which may be as (or more) important to our children's futures.

The Cost of a New Hire

We take 2008-2009 salary data for 153,235 Pennsylvania public school teachers. To eliminate outliers in the data, we exclude the 2,552 part-time teachers, 355 teachers who have more than 40 years of service, 1,330 teachers who do not have college degrees, 2,268 who have doctorates, 37,964 who are listed neither as elementary, secondary, or special education teachers, 459 who are recorded as earning less than $15,000, and 7 who are recorded as earning more than $120,000. After removing these observations, we have 112,041 teachers in our database.[10]

[10] This number is not the total minus each of the categories we excluded due to overlap.

Using these data, we can establish a "baseline" salary—the salary one can expect for teaching special education (the lowest paid position), with a bachelors degree (the lowest educational level), and zero years of experience. Based on these 112,041 salary figures, we estimate the baseline salary to be $40,800.[11] On average, teachers' salaries change as they change positions, obtain additional education, and accumulate years of service. On average, each additional year of service adds an average of $850 dollars (above inflation) to teachers' annual salaries, but the gains are larger in the earlier years. Over the first ten years, each year of service increases teachers' salaries by an average of $1,700 per year. These annual increases decline to an average of $600 per year in years 20 through 30.

This pattern of salary increases is due to "jump steps." Jump steps are specific salary increases specified in teacher contracts that provide for an extraordinarily large salary increase over a short span of time. For example, a Pittsburgh public school teacher with a bachelor's degree gets an automatic 52% salary increase (from $47,200 to $71,600) in their tenth year of service. Under their current contract, North Allegheny teachers receive a 61% salary increase (from $56,000 to $90,000) in their fourteenth year of service. Jump steps appear to be unique to Pennsylvania and exist in each of the state's school districts.[12] For the teachers' union, jump steps have the advantage of effectively hiding teacher raises. Because public school teachers are tenured after only two or three years and because the jump step salary adjustments

[11] In 2008-2009, the average salary for the 13 teachers who fit this description was $42,450, which differs from the $40,800 quoted here. The $40,800 figure is based on an econometric model that uses data from all employees to estimate the baseline salary. The $42,450 average was based on only 13 teachers.

[12] We thank Dr. Matthew Marlin of Duquesne University for background information on jump-steps.

are automatic, they encourage people who may be sub-standard teachers—or who do not even enjoy being a teacher—to remain in the profession to gain the lucrative jump steps.

Acquiring a master's degree adds $5,400 to the average annual salary.[13] Moving from special education to elementary education adds nothing, and moving from elementary education to secondary education adds $250. The average earnings per full-time job in Pennsylvania were approximately $49,000 in 2009.[14] This figure is 15% less than the average teacher salary of $57,600.[15]

According to a report by The Pew Charitable Trusts, the annual cost of health care benefits for the average public employee was $13,000 in 2008.[16] The Kaiser Family Foundation reports that, in 2002, the annual cost of health care benefits for the average Pennsylvania public employee was $5,200,[17] and that, from 1999 to 2008, health insurance premiums grew at an average annual rate of 9.1%.[18] Growing $5,200 at this rate gives us an estimate of $10,400 for the cost of health care benefits for the average Pennsylvania public employee in 2010.

In addition to salary and health care benefits, public school teachers receive guaranteed pension payments after (typically) thirty-five years of service. Annual pension benefits equal the average of the last three years of salaries multiplied by

[13] Each of the increases shown here are marginal effects. For example, while teachers with masters degrees will, on average, have more years of service. The $6,400 average increase for a masters degree is the increase left after filtering out the effects of years of service.
[14] Economic Research Service, US Department of Agriculture.
[15] The median teacher salary in our database is $54,800.
[16] "Report Finds Philadelphia's Pension and Health Care Costs for Public Employees Growing at Unsupportable Rates," The Pew Charitable Trusts, 2008.
[17] "2002 State Employee Health Plans," Kaiser/HRET Survey, 2002.
[18] "Trends in Health Care Costs and Spending," Kaiser Family Foundation, 2009.

2.5% for each year of service. For example, a teacher who retires after 35 years and whose last three years' salaries averaged $70,000 would receive an annual pension payment of $70,000 x 35 x 2.5% = $61,2500. Notice that the pension formula gives the teacher significant incentive to stay on the job longer. If the teacher retires after 45 years (assuming the same average salary of $70,000), the annual pension would be $70,000 x 45 x 2.5% = $78,750.

Because this analysis is based on a cross-section of salaries from a single year, the results that flow from the analysis will be in inflation-adjusted dollars. Let us begin with a teacher who is newly hired at age 22 and earns the baseline salary of $40,800. The teacher will receive, on average, an $850 raise each year,[19] and will receive a salary increase for attaining an advanced degree.[20] Of the teachers in our data set, 70% are females and 30% are males, meaning that the average newly hired 22 year old can expect to live to age 80. When the teacher retires at age 67 with forty-five years of service, he or she will receive an annual pension of $89,900 (in 2009 dollars). Assuming that future inflation averages 3% (the median inflation rate since 1954), taxpayers can expect to spend around $13 million on this teacher from age 22 through age 80. Of this $13 million, $6 million is the teacher's future salary, $1 million is the teacher's future health care benefits, and $6 million is the teacher's future pension benefits.

[19] Because the figures are in inflation-adjusted dollars, the $850 average raise is $850 in addition to any cost of living adjustment.

[20] The average teacher with a masters degree has 15 years of service, and 46% of full-time public school teachers in Pennsylvania have masters degrees. The average teacher with a doctorate has 18 years of service. We exclude doctoral degree holders from our data set because only one-half of one-percent of full-time public school teachers hold doctoral degrees. Let our representative teacher obtain a masters degree after 15 years of service, at age 37, with probability 46%.

Of course, taxpayers don't spend the entire $13 million at once. The money is paid out over the 59 years of the teacher's remaining life. We can convert these future payments into their equivalents in present-day terms. Present value calculations give us the amount that, were taxpayers to spend it all on the day the teacher was hired, would be the equivalent of spending $13 million over the teacher's life. That amount is $4.6 million. In other words, the total amount of money taxpayers will pay for a single new teacher (including future salary, future raises, future health care benefits, and future pension payments) is the equivalent of a one-time payment of $4.6 million made at the time the teacher is hired. Of this $4.6 million, $2.7 million is the present value of the teacher's future salary payments, $600,000 is the present value of the future health care benefits, and $1.3 million is the present value of the future pension benefits. The stream of future payments (adjusted for inflation) resulting from hiring the teacher are shown in Figure 1. Because public school teachers are tenured after only two or three years, the stream of costs shown in Figure 1 are solid future spending commitments a district is making simply by hiring a single teacher.

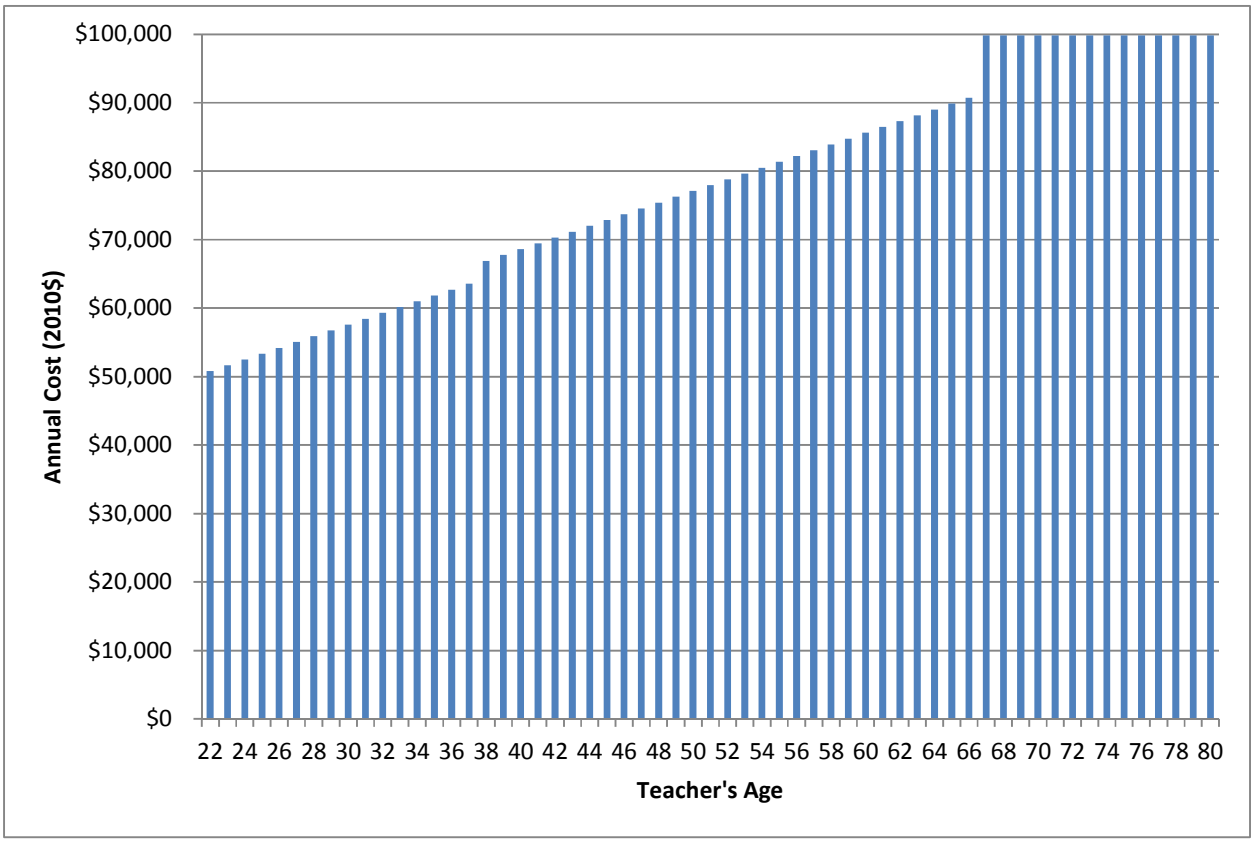

Figure 9. Annual salary, health benefits, and pension costs for the average full-time Pennsylvania public school teacher from hire at age 22 until age 80.[21]

Regional Differences

Dividing Pennsylvania into the seven regions used by many of the state's agencies (Great Lakes, Pittsburgh and its countryside, Pennsylvania Wilds, Allegheny Mountains and Valleys, Pennsylvania Dutch Country, Northeastern Mountains, and Philadelphia and its countryside), we can see that the average salaries for public school teachers varies significantly across regions. Schools in the Allegheny Mountains area have the lowest paid teachers (at an average salary of $49,819). Teachers in the Philadelphia area earn 25% more, or $62,568 on average.

[21] The bump in compensation shown at age 37 reflects the probability of the teacher completing a masters degree.

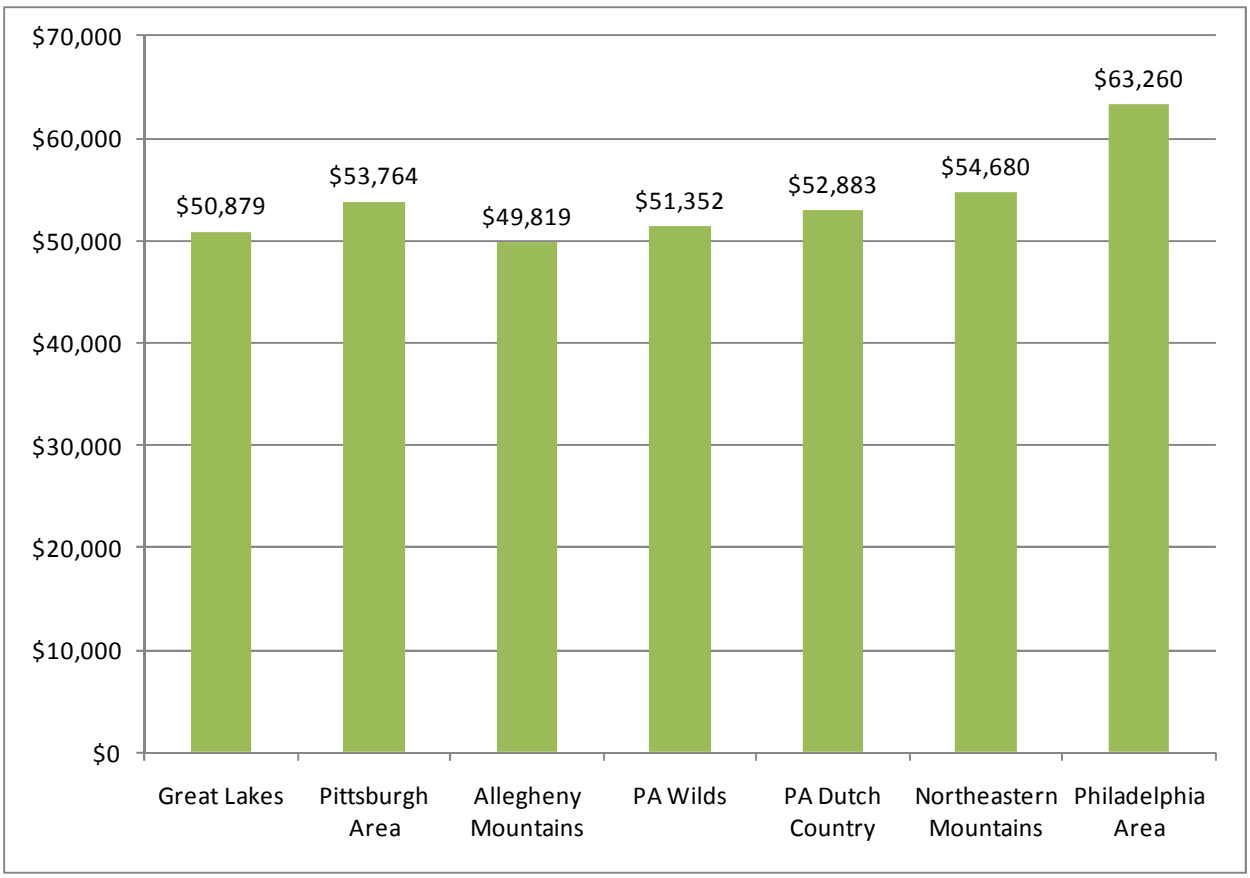

Figure 10. Average public school teacher salaries across regions of Pennsylvania (2009).

Educational Outcomes

Of great concern is that the characteristics that most affect an individual teacher's salary are not correlated with increases in student achievement. Our analysis shows that the strongest predictors of teacher salaries are geographic area, years of service, and education. Research shows that neither advanced degrees

(Clotfelter, Ladd, and Vigdor 2007) nor additional years of experience (Rivkin, Hanushek, and Kain 2005) have a significant effect on student achievement.[22]

We compare 2009 SAT scores (verbal, math, and writing combined) to average faculty salaries for 390 school districts and find a statistically significant, though small, relationship (see Figure 3). On average, a $10,000 increase in teacher salaries is associated with a 70 point increase in SAT scores.[23] Two caveats are worth noting. First, the association is correlational, not necessarily causal. For example, it may indeed be the case that higher paid teachers achieve better results—i.e., salaries drive SAT scores. But, it may be that school districts with better performing students can afford to pay teachers more—i.e., SAT scores drive salaries. Alternatively, it may be that both salaries and SAT scores are higher in more affluent areas—i.e., both scores and salaries are mutually driven by a third effect. Because school districts obtain revenue from property taxes and parents' educations tend to be strongly correlated with both property values and students' academic performances, this third effect explanation is plausible (see Vedder 2003).

[22] Clotfelter, Ladd, and Vigdor see achievement increases in the first three years of teacher's careers, but nothing after that time.
[23] Similar relationships hold for verbal, math, and written scores separately.

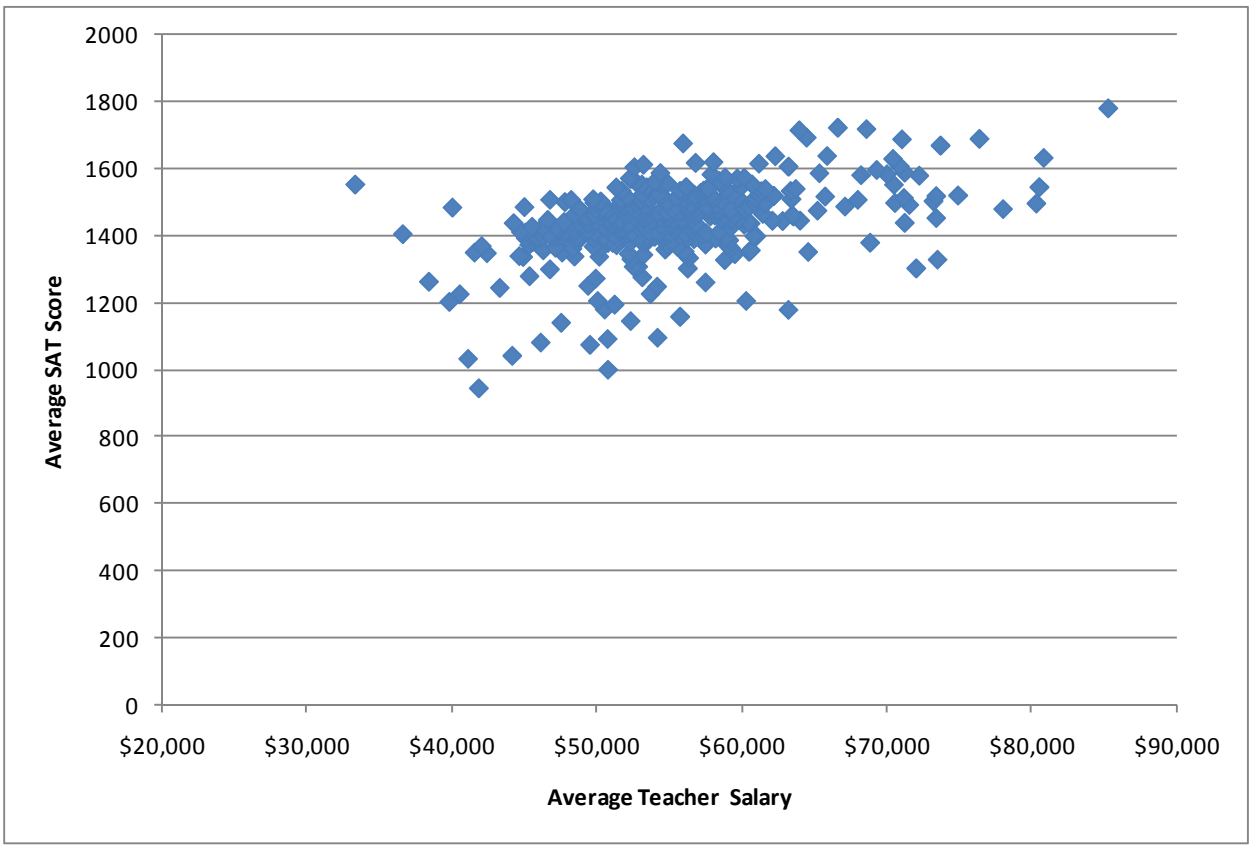

Figure 11. Average teacher salaries compared to average SAT scores for school districts in 2009.

Finally, even if teacher salaries did drive SAT scores, evidence suggests that the cost is exorbitantly high. To increase a teacher's salary by $10,000 means that the teacher will cost, over the course her career, $1.6 million more. At an average of 300 teachers per school district, an across-the-board $10,000 raise would cost a school district $3 million per year, or $480 million over the course of the teachers' careers. All of this for a 70-point increase in SAT scores. To put this in perspective, a 70-point increase in SAT scores is so small it would only move one-third of the bottom 10% of schools up to the bottom 20%.

Cost Comparisons

Policy debate concerning teacher salaries frequently begins with the unchallenged assumption that teachers are underpaid. Greene and Winters (2007) look at salaries for public school teachers nationwide and find that public school teachers make an average of 36% more than the average non-sales white collar worker. They also find that public school teachers are paid 11% more than the average professional specialty and technical worker. Specifically: editors and reporters earn 24% less, architects 11% less, psychologists 9% less, chemists 5% less, mechanical engineers 6% less, and economists earn 1% less, on average.

The counter argument is that teacher salaries should not be subject to such close scrutiny because teachers take care of our children. However, following this logic we should see similar wages and salaries for other positions that require one to care for children. The average salary for a job in child and youth services is $28,900—30% less than the average for Pennsylvania public school teachers.[24] The average salary for a job in the child day care services industry is $18,400—55% lower than the average for Pennsylvania public school teachers.[25] The average salary in junior colleges is $33,600, and the average salary for a school bus driver is

[24] Bureau of Labor Statistics, NAICS 62411.
[25] Bureau of Labor Statistics, NAICS 6244.

$17,800—18% and 43% less, respectively, than the average salary for Pennsylvania public school teachers.[26]

Conclusion

Hanushek and Rivkin (1997) find the majority of increased spending in public education has gone to three things: reducing class sizes, increasing real wages for teachers, and increasing out-of-classroom expenditures. While one may argue that additional spending is necessary to maintain educational quality, the supposed benefits are hard to identify. Davies (2007) compares income and unemployment figures for those with high school diplomas to those without high school diplomas and finds that the present discounted lifetime value of a high school diploma has fallen by more than one-half million dollars since 1977. Meanwhile, comparing similar figures for those with college degrees to those with high school diplomas, he finds that the value of a college education has risen by almost one million dollars. These findings are consistent with the claim that, as educational quality in public schools declines, American colleges are being forced to take up the educational slack.

Those who argue for school choice in our public school system claim that competition would both lower costs and improve quality. While teachers unions fight all efforts at experimenting with choice, all around us there is an ongoing experiment that continues to yield telling results. In 2011, more than 90% of American high school seniors will graduate from a public school while 10% will

[26] Bureau of Labor Statistics, NAICS 6112 and 4854.

graduate from private schools.[27] Meanwhile, only 60% of college students will attend public universities. Those public universities, while partially funded by taxpayers, are subject to market forces in much the same way as are private universities. Further, fewer than 13% of professors at American colleges and universities are unionized.[28] Even among Americans, American public schools are regarded as among the worst in the world. Meanwhile, America's colleges and universities are regarded as the best. "Exports" of higher education (i.e., foreign students coming to the U.S. for college studies) is one of the largest and fastest growing of all U.S. exports. We have spent decades wrestling with the question of what to do with our public schools. The simple answer has been lying quietly at our feet all this time: bring market principles from higher education into K-12, both in terms of student choice and teacher compensation and rewards.

[27] National Center for Education Statistics, U.S. Department of Education.
[28] Carroll, J., 2005. Americans in labor unions: Who wears the union label? Gallup.

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Medical Malpractice Reform in Pennsylvania

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Medical Malpractice Costs

In 2010 Pennsylvania was ranked 46th out of 50 in the United States for high litigation costs contributing to increased insurance premiums and reduced access to health care (McQuillan and Abramyan 2010). Proponents of medical malpractice reform argue that tort reform will reverse physician job losses by lowering malpractice costs and thus lowering malpractice insurance premiums (Samuel 2009). Opponents argue that malpractice awards are not responsible for higher insurance premiums, and cite recent increases in physician employment in Pennsylvania as evidence that higher premiums are not causing physicians to leave the state. Coulombe and Boughton (2004) show that employment of physicians in Pennsylvania grew almost 40% from 1985 to 2001—a rate that is greater than those experienced in neighboring states. They also show that the frequency of malpractice cases in Pennsylvania is falling, as is the frequency of cases that result in damages of over one million dollars.

In this paper, we examine data from all fifty states and the District of Columbia over the period 1970 through 2009 to test the relationship between several types of tort reform and the sizes of case settlements and awards, and employment in the health and legal sectors.

Medical Malpractice Reforms

In this study, we examine the effects of statutes of limitations reform, joint and several liability reform, non-economic damages reform, collateral source reform, and punitive damages reform.

Statutes of limitations reforms limit the amount of time a patient has to file a malpractice claim following a medical injury or the discovery of a medical injury. The purpose is to provide medical practitioners with the certainty that they cannot be sued beyond a pre-specified time horizon. The median statute of limitations among the states is four years. We divide the states into two groups: those in which the statute of limitations was at or above the median, and those in which the statute of limitations was below the median.

The rule of joint and several liability allows a plaintiff to collect damages from any party involved in the negligence regardless of their contribution to that negligence. Under the rule of joint and several liability, a plaintiff is able to collect the *entirety* of his award from any physician considered even partially at fault. Joint and several liability reforms, which restrict the damages that can be collected from defendants who are only partially at fault, have been enacted in forty-four states. In Pennsylvania, a 2002 law established that defendants could only be held jointly liable if they were responsible for at least 60% of the negligence (McCullough, Campbell, and Lane 2007). In 2006, the Pennsylvania Supreme Court ruled that the law was unconstitutional.

In an effort to curb excessive damages awarded by overly-sympathetic juries, thirty-one states have implemented reforms that place caps on non-economic damage awards. Economic damages include objectively measurable damages such as lost wages, hospital bills, counseling fees, and related expenses. Non-economic damages include damages that are not objectively measurable, such as pain and suffering. The goal of non-economic damage reform is to ensure that the patient is

fully compensated, while preventing juries from awarding excessive damage payments. Limits on non-economic damages also aim to prevent awards of vastly different amounts for similar injuries (Budetti and Waters 2005).

The collateral source rule allows injured parties to receive duplicate payments for injuries by preventing the admission of evidence showing that the plaintiff has already been compensated for his loss. For example, the collateral source rule would prevent a defendant from presenting evidence that the plaintiff has received compensation from an insurance company for his injury. Without this evidence, the plaintiff is able to collect twice on his injury—once from the insurance company and a second time from the defendant. Critics of this reform argue that patients should not be subject to diminished awards because of measures previously taken to protect their own health (Budetti and Waters 2005). Currently, thirty-five states have passed reforms that permit admission of evidence of collateral sources of compensation.

Punitive damages are damage awards intended to punish the defendant for negligent behavior and to deter any future similar actions. Forty states have enacted reforms that limit awards for punitive damages.

We use data from the National Practitioner Database to compare settlements and awards across states that have and have not enacted medical malpractice reforms. The data include individual payment amounts for both settlements and trials from all fifty states and the District of Columbia over the period 1970 through 2009. We convert all awards and settlements to 2009 dollars using the CPI. Following McQuillan and Abramyan (2009), we use the magnitude of settlements

and awards as a proxy measure for medical malpractice tort costs (McQuillan and Abramyan 2009). A summary of the reforms and the states that have enacted the reforms is shown in Table 1.

Table 1. Medical Malpractice Reforms

Malpractice Reform	Description	Reforms Enacted in States
Statutes of Limitations[29]	Restrictions on the length of time a patient has to file a malpractice suit after the initial injury occurs	Less than 4 Years Alabama, Alaska, Arkansas, Arizona, Colorado, Colorado, Connecticut, District of Colombia, Delaware, Idaho, Louisiana, Maine, Minnesota, Nebraska, New Hampshire, New Mexico New York, Oklahoma, Rhode Island, South Dakota, Tennessee, and Virginia 4 or More Years California, Florida, Georgia, Hawaii, Iowa, Illinois, Kansas, Kentucky, Massachusetts, Maryland, Michigan, Missouri, Mississippi, Montana, North Carolina, North Dakota, New Jersey, Nevada, Ohio, Oregon, Pennsylvania, South Carolina, Texas, Utah, Vermont, Washington, Wisconsin, West Virginia, Wyoming
Joint and Several Liability Restrictions	Restriction on damages that can be sought from partially responsible defendants	Alaska, Arkansas, Arizona, California, Colorado, Connecticut, Florida, Georgia, Hawaii, Iowa, Idaho, Illinois, Indiana, Kansas, Kentucky, Louisiana, Massachusetts, Michigan, Minnesota, Missouri, Mississippi, Montana, North Dakota, Nebraska, New Hampshire, New Jersey, New Mexico, Nevada, New York, Ohio, Oklahoma, Oregon, , South Carolina, South Dakota, Tennessee, Texas, Utah, Virginia, Vermont, Washington, Wisconsin, West Virginia, Wyoming
Non-Economic Damage Restrictions	Limit on non-economic damages	Alaska, Alabama, California, Colorado, Florida, Georgia, Hawaii, Iowa, Idaho, Illinois, Kansas, Massachusetts, Maryland, Maine, Michigan, Minnesota, Missouri, Mississippi, Montana, North Dakota, Nevada, Ohio, Oklahoma, Oregon, South Carolina, South Dakota, Texas, Utah, Washington, Wisconsin, West Virginia
Collateral Source Admissions	Allow admission of evidence regarding other sources of damage recovery	Alaska, Alabama, Arizona, California, Colorado, Connecticut, Delaware, Florida, Iowa, Idaho, Illinois, Kansas, Kentucky, Massachusetts, Maine, Michigan, Minnesota, Missouri, Montana, North Dakota, Nebraska, New Jersey, New York, Nevada, Ohio, Oklahoma, Oregon, Pennsylvania, Rhode Island, South Dakota, Tennessee, Utah, Washington, Wisconsin

[29] Source: McCollough, Campbell, and Lane, LLP.

Punitive Damages	Limit on damages intended as punishment for negligence and for deterrence of future acts	Alaska, Alabama, Arkansas, Arizona, California, Colorado, Connecticut, Florida, Georgia, Hawaii, Iowa, Idaho, Illinois, Indiana, Kansas, Kentucky, Louisiana, Maryland, Maine, Minnesota, Missouri, Mississippi, Montana, North Carolina, North Dakota, Hew Hampshire, New Jersey, New York, Nevada, Ohio, Oklahoma, Oregon, Pennsylvania, South Carolina, South Dakota, Tennessee, Texas, Utah, Virginia, Wisconsin

Statutes of Limitations

From 1970 through 2009, there were 84,658 cases decided or settled in states with statutes of limitations below the median, and 221,248 cases in states with statutes of limitations at or above the median. Among states with below median statutes of limitations, the average settlement and award is 25% greater ($350,000 versus $280,000) and the variation among the settlements and awards is 13% greater.[30] These results suggest that shorter statutes of limitations are not only associated with greater awards on average, but also with greater fluctuations in individual award amounts. Budetti and Waters (2005) claim that one purpose of statutes of limitations reform is to ensure that facts and witnesses relevant to the case are available when the claim is filed. It is possible that the difference in recency of memories, facts, and the injury itself may result in differences in jury sympathies.

[30] The difference in averages is significant with p = 0.000. The standard deviations are, respectively, $613,000 and $543,000. These are also statistically different with p = 0.000. All figures are in 2009 dollars.

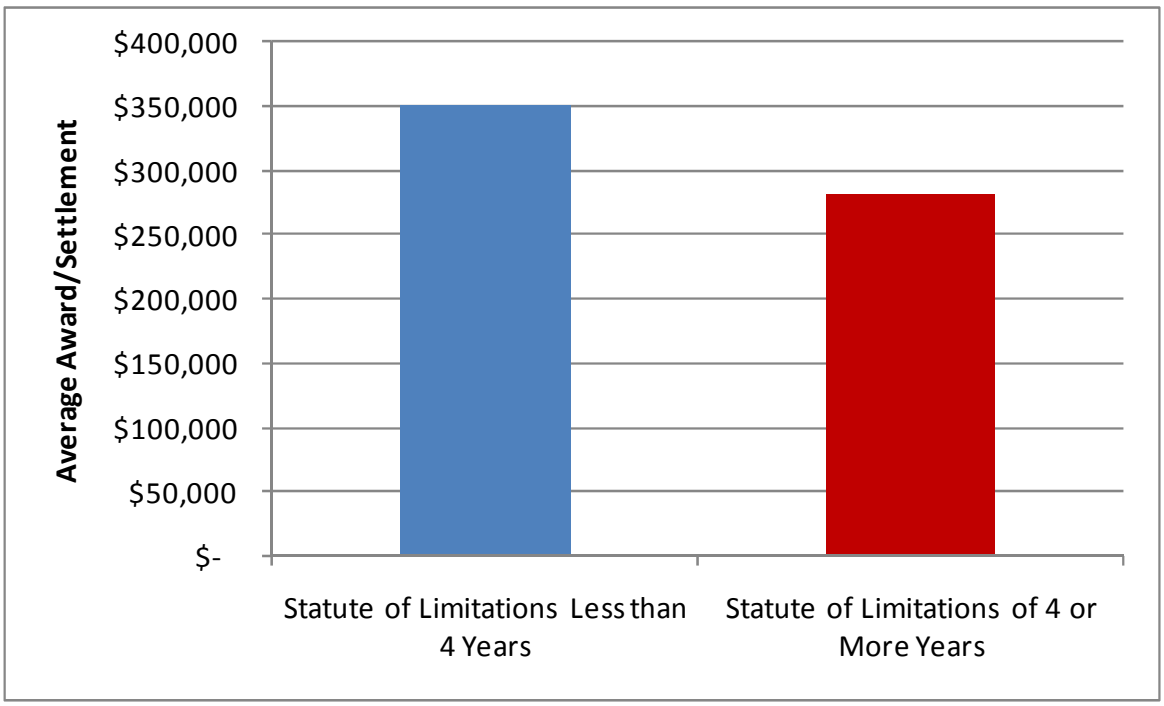

Figure 12. Average of jury awards and settlements for medical malpractice cases in states with different statutes of limitations (305,906 observations over the period 1970-2009).[31]

Joint and Several Liability

Restricting our data to states that implemented joint and several liability reform in a single year and removing from the data set all cases that were settled or judged in a year in which a reform occurred, leaves us with 184,557 cases.[32] Of these, 107,400 were decided or settled subject to joint and several liability reforms. The average settlement and award in states and years with joint and several liability reforms is $275,000 versus more than $350,000 for states and years with no reform.[33] This result is consistent with expectations and demonstrates that joint and several

[31] Calculated from data provided by the National Practitioner Data Bank and the Bureau of Labor Statistics.
[32] States that were excluded are Florida, Idaho, Illinois, Indiana, Kentucky, Michigan, Minnesota, Missouri, Mississippi, Montana, New Jersey, Nevada, Oklahoma, Oregon, Texas, Utah, and Wyoming.
[33] The difference in averages is significant with p = 0.000.

liability reforms have a significant effect on lowering medical malpractice settlements and awards. Not only is the average award almost 30% greater without the reform, but the variation in individual awards is 25% greater. This indicates that the degree of uncertainty surrounding the liability a defendant faces in non-reform states is significantly greater than in reform states.[34] Because increased uncertainty results in increased risk premia, the results suggest that joint and several liability reform can doubly contribute to reduced malpractice costs.

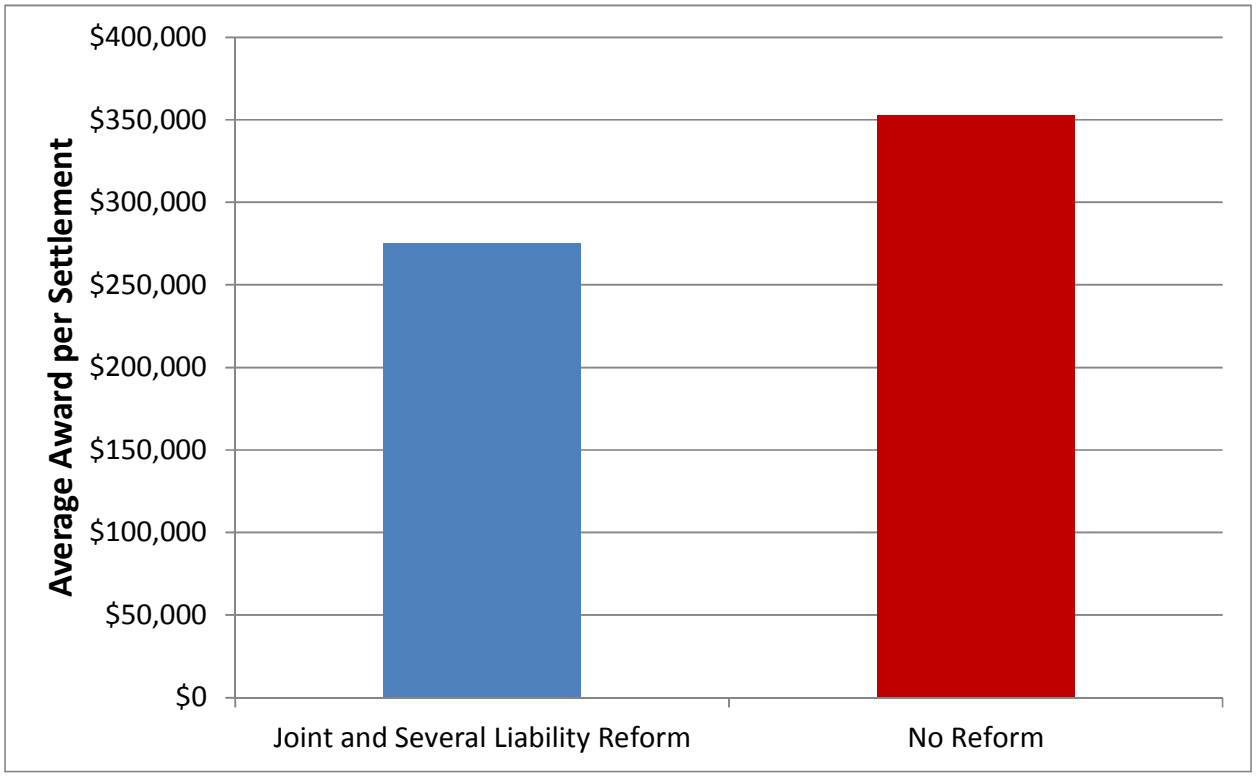

Figure 13. Average of jury awards and settlements for medical malpractice cases in states with and without joint/several liability reform (184,557 observations over the period 1970-2009).[35]

[34] The standard deviations are, respectively, $641,000 and $515,000. These are also statistically different with p = 0.000.

[35] Calculated from data provided by the National Practitioner Data Bank and the Bureau of Labor Statistics.

Non-Economic Damage Restrictions

Removing from the data set all cases that were settled or judged in a year in which non-economic damage restrictions were instituted leaves us with 268,286 cases.[36] Of these, 84,978 were decided or settled subject to non-economic damage restrictions. The average settlement and award in states and years with non-economic damage restrictions is $209,000 versus $329,000 for states and years with no reform.[37] Absent non-economic damage restrictions, the average award is almost 60% greater and the variation in individual award amounts is almost 25% greater.[38]

In states with non-economic damage caps the average settlement and award is $185,000, whereas the average settlement and award for states without this reform is $237,000. This difference is significant and indicates that states in which non-economic damages are restricted have lower average malpractice settlements and awards. This is consistent with expectations and the Pacific Research Institute's proposal for lowering medical malpractice costs (McQuillan and Abramyan 2009). This result demonstrates that non-economic damage reforms are associated with decreased settlements and awards.

[36] States that were excluded are Florida, Idaho, Illinois, Indiana, Kentucky, Michigan, Minnesota, Missouri, Mississippi, Montana, New Jersey, Nevada, Oklahoma, Oregon, Texas, Utah, and Wyoming.
[37] The difference in averages is significant with $p = 0.000$.
[38] The standard deviations are, respectively, $577,000 and $464,000. These are also statistically different with $p = 0.000$.

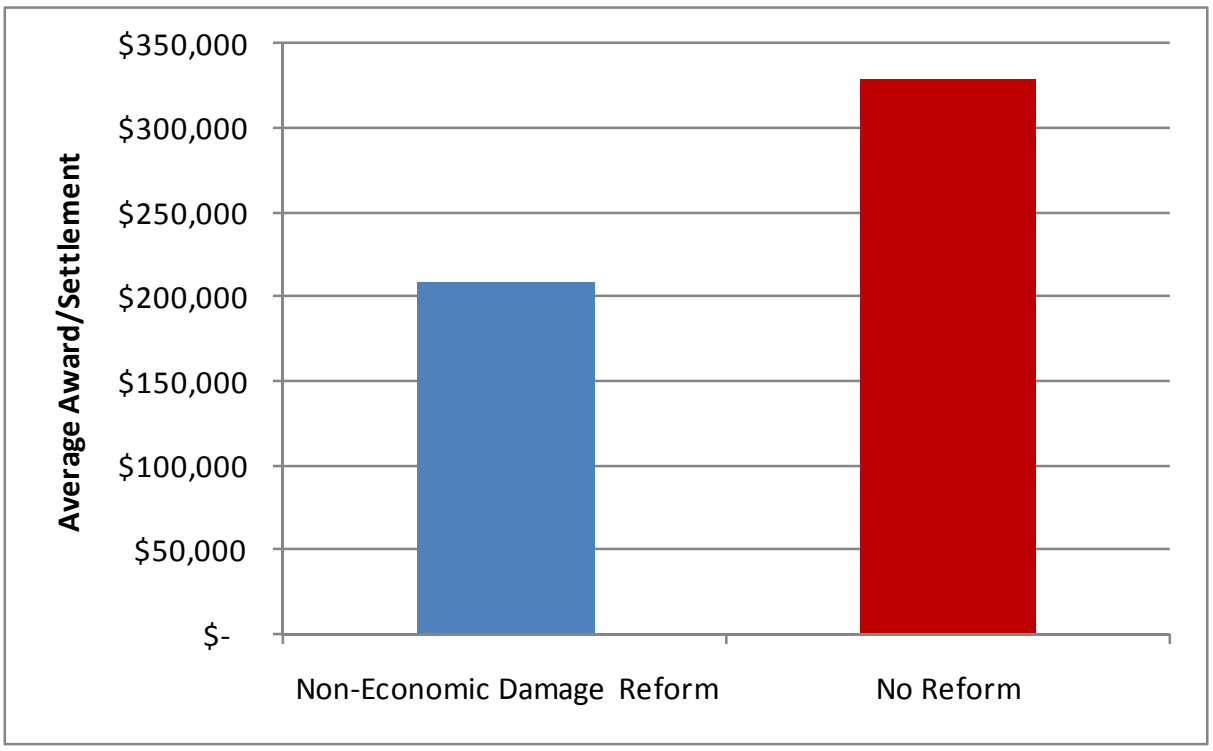

Figure 14. Average of jury awards and settlements for medical malpractice cases in states with and without non-economic damage reform (286,286 observations over the period 1970-2009).[39]

Collateral Source Admissions

In states that allow collateral source admissions, the average settlement and award is $284,000. Among states and years that collateral source admissions are not allowed, the average settlement and award is 10% greater at $313,000.[40] This significant difference suggests that allowing collateral source evidence reduces awards and so reduces malpractice costs.

[39] Calculated from data provided by the National Practitioner Data Bank and the Bureau of Labor Statistics.
[40] The difference is significant with a p-value of 0.000.

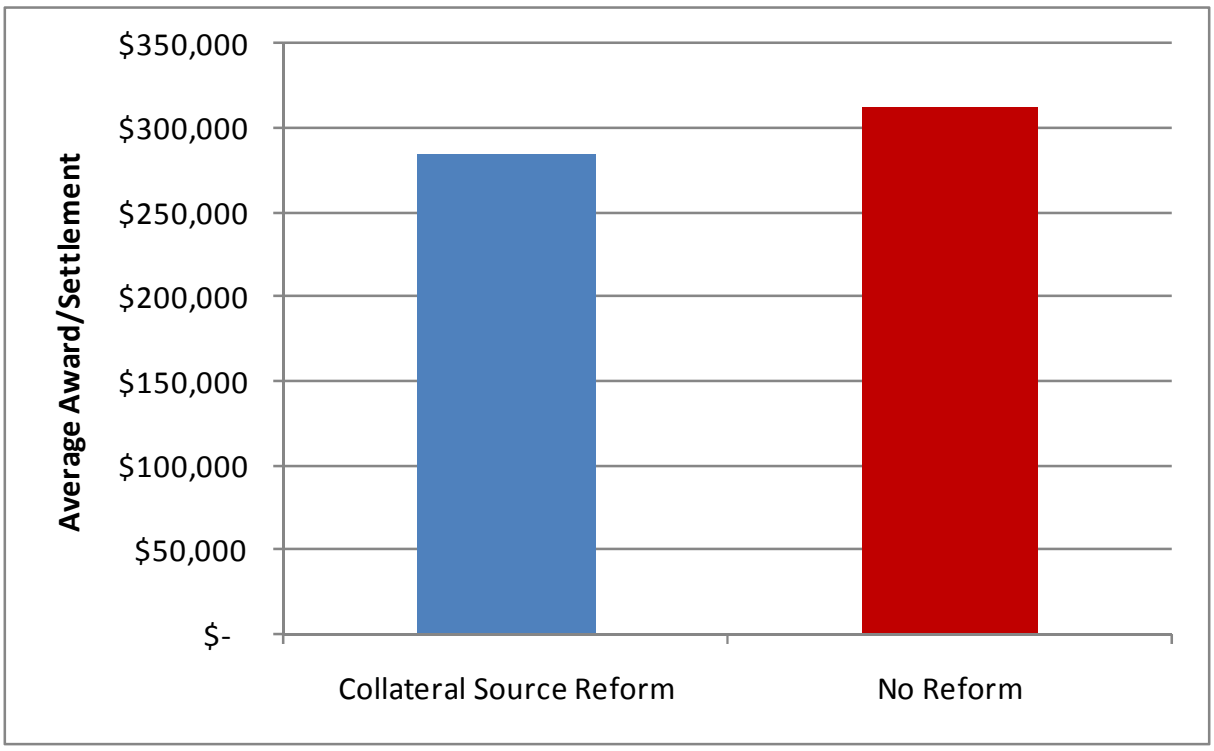

Figure 15. Average of jury awards and settlements for medical malpractice cases in states with and without collateral reform (264,218 observations over the period 1970-2009).[41]

Punitive Damages

States with punitive damages rules exhibit an average settlement and award amount of $278,000. States without punitive damage rules exhibit an average settlement and award of $320,000—15% higher.[42] This difference reveals that the average settlement and award amount for states without punitive damages reform is significantly less than the average amount for states with punitive damages reform.[43]

[41] Calculated from data provided by the National Practitioner Data Bank and the Bureau of Labor Statistics.

[42] The difference is significant with a p-value of 0.000.

[43] A reasonable counter-argument to these findings is that, because settlement and award numbers represent lost wages, the appropriate time adjustment is the average wage rate, not the CPI. We have recalculated the above tests using such an average wage index and find no qualitative difference in our results versus using the CPI.

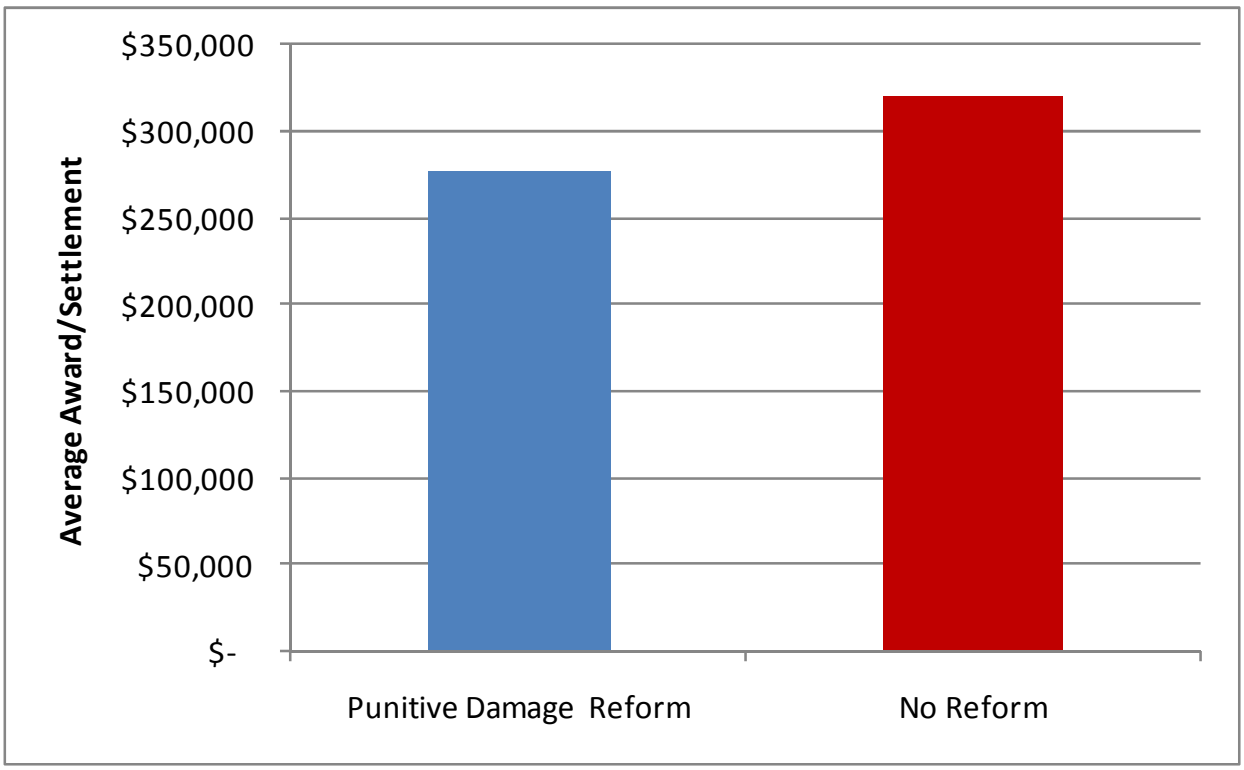

Figure 16. Average of jury awards and settlements for medical malpractice cases in states with and without punitive damage reform (217,074 observations over the period 1970-2009).[44]

Policy Implications

An oft-cited problem with the current medical malpractice system in Pennsylvania is physician job loss due to high premiums and an increased risk of patient suits. The above evidence demonstrates that legal reforms designed to limit medical professionals' liabilities result in significantly reduced awards and settlements. Reduced settlements and awards result in reduced medical malpractice insurance premiums (Congressional Budget Office, 2006). As medical malpractice premiums fall, Pennsylvania will attract more medical professionals (Kessler et al., 2005).

[44] Calculated from data provided by the National Practitioner Data Bank and the Bureau of Labor Statistics.

Of the five types of malpractice reform discussed here, Pennsylvania has instituted three. Of the remaining reforms, limiting non-economic damages appears to have the most impact on reducing the size of awards and settlements. Over just the past five years, there have been over one-thousand medical malpractice suits either settled or awarded in Pennsylvania. At an average award of $330,000 (in 2009 dollars), those cases represent a combined cost to medical malpractice insurers of over $375 million. Based on our estimates, we expect that non-economic damage reform would have reduced this amount by almost $150 million.

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Gaming and Socioeconomic Indicators: Evidence from the States

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Introduction

Corporate casino gaming has had a presence in the United States ever since Nevada opened its first casino in 1931. Since then, 21 states have legalized gambling, including land-based, riverboat or racetrack gaming. Pennsylvania legalized casino slot machines in 2004, and added gaming tables in 2010. Garrett (2004) lists possible positive effects of legalized gambling including increased employment, economic growth, increased tourism, and increased local retail sales. Brome (2006) suggests possible negative and offsetting effects including cannibalization of existing local sales, increased crime, increased social problems associated with gambling addictions, as well as moral and religious considerations.

In this paper, we look at economic and social measures including unemployment rates, per-capita income, crime rates, and gaming revenues. We look at fifty states over eleven years and compare these economic and social measures from states and years in which gambling was legal to states and years in which gambling was not. Table 2 summarizes the dates for which we have gaming data.[45] The American Gaming Association tracks revenues for racetrack casinos (called, "racinos") separately from revenues for land-based, dockside, and riverboat gaming (collectively called, "casinos").[46] In the following analyses, we divide the states into four categories. Because we have data on the states over time, we have multiple observations for each state. Our categories are shown in Table 1.

[45] Some states allowed gambling prior to 1999, though our data set only goes back as far as 1999. Blank cells indicate that the indicated gambling is not legal in the state.
[46] 2009 State of the States: The AGA Survey of Casino Entertainment, American Gaming Association.

Table 2. Gaming Categories

Category	Description	Number of States	Number of Observations
No Gaming	All gambling is prohibited.	11	89
State Only Gaming	The state has a state-sponsored lottery. Private gaming is illegal.	24	271
State or Private Gaming	The state has either a state-sponsored lottery, or private gaming, or both.	39	461
State and Private Gaming	The state has both a state-sponsored lottery and private gaming.	13	168

Table 3. Summary of Gaming Data[a]

State	State Lottery	Racino Gaming[b]	Casino Gaming[b]	State	State Lottery	Racino Gaming[b]	Casino Gaming[b]
Alabama				Montana	1999-2009		
Alaska				Nebraska	1999-2009		
Arizona	1999-2009			Nevada			1999-2009
Arkansas[c]				New Hamp.	1999-2009		
California	1999-2009			New Jersey	1999-2009		1999-2009
Colorado	1999-2009		1999-2009	New Mex.	1999-2009	1999-2009	
Connecticut	1999-2009			New York	1999-2009	2004-2009	
Delaware	1999-2009	1999-2009		N. Carolina	2006-2009		
Florida	1999-2009	2006-2009		N. Dakota	2004-2009		
Georgia	1999-2009			Ohio	1999-2009		
Hawaii				Oklahoma	2003-2009	2005-2009	
Idaho	1999-2009			Oregon	1999-2009		
Illinois	1999-2009		1999-2009	Penns.	1999-2009	2006-2009	2007-2009
Indiana	1999-2009		1999-2009	Rhode Isl.	1999-2009	1999-2009	
Iowa	1999-2009	1999-2009	1999-2009	S. Carolina	2002-2009		
Kansas	1999-2009		2009	S. Dakota	1999-2009		1999-2009
Kentucky	1999-2009			Tennessee	2003-2009		
Louisiana	1999-2009	1999-2009	1999-2009	Texas	1999-2009		
Maine	1999-2009	2005-2009		Utah			
Maryland	1999-2009			Vermont	1999-2009		
Mass.	1999-2009			Virginia	1999-2009		
Michigan	1999-2009		1999-2009	Washington	1999-2009		
Minnesota	1999-2009			W. Virginia	1999-2009	1999-2009	
Mississippi			1999-2009	Wisconsin	1999-2009		
Missouri	1999-2009		1999-2009	Wyoming			

[a]Blank cells indicate that the indicated gaming is prohibited in the state.
[b]Racinos are racetrack casinos. Casinos include land-based gambling, riverboat gambling, and dockside gambling.
[c]Arkansas instituted a state lottery in 2009. Data is not readily available.

State and Local Tax Revenue per Capita

Twenty-two states use lotteries to fund public education. Revenues from Arizona's lottery go toward the general fund. Other states earmark their lottery revenues for specific uses. For example, Indiana's lottery revenue is used to support state pensions. Colorado's goes toward the purchase and protection of public lands, and Wisconsin's is used for property tax relief. Pennsylvania use lottery revenues to fund the Department of Aging and other programs for senior citizens. An important question is to what extent a state lottery affects state and local tax revenues. We compare per-capita state and local tax revenue (adjusted for inflation) for states and years with state lotteries to those with no gaming. The average per-capita state and local tax revenue was approximately $3,100 in states and years with no gaming and ranged from approximately $3,800 to $3,900 in states and years with gaming.[47] No-gaming states collected significantly less revenue than did each category of gaming states.[48] The differences among the three categories of gaming states are insignificant.[49] These results appear in Figure 1.

[47] All figures are in 2009 dollars unless otherwise indicated.
[48] In each case, the difference was significant with a p-value less than 0.005.
[49] The p-value for the one-way ANOVA is 0.082.

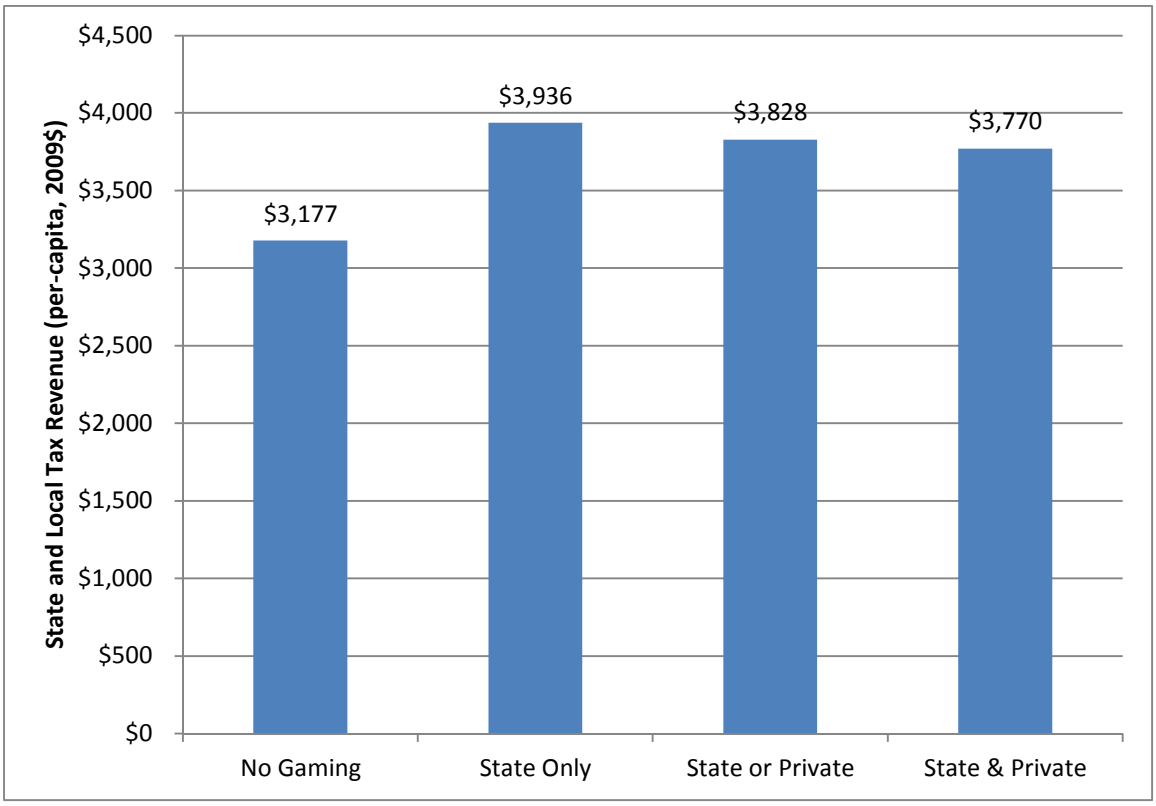

Figure 17. States and years with no gaming exhibit significantly lower per-capita state and local tax revenues than do states and years with gaming (50 states, 1999-2008).[50]

The comparison in Figure 1 is does not account for state revenues due to gaming. The amount that state lotteries collect in revenues minus the amount that they pay out in winnings counts as income for the state, but is not classified as a tax.[51] Similarly, many states require private gaming companies to submit "disbursements" to the state. The disbursements constitute a share of net gaming revenues and are also not classified as a tax. Adding these figures to the state and local tax revenue numbers in Figure 1 yields the numbers represented by the red

[50] Data source: State and Local Tax Burdens, Tax Foundation. Tax data for 2009 is not available.
[51] See Federal, State, and Local Governments: Government Finance and Employment Classification Manual, Description of Tax Categories, U.S. Census Bureau.

bars in Figure 2. Again, tax revenue for no gaming states is significantly less than for each of the categories of gaming states.[52] The differences among the three categories of states are insignificant.[53] Figures 1 and 2 together suggest that gaming is associated with higher state and local tax revenues, even putting aside the lottery revenue and gaming distributions. If the relationship is causal, the causality could be argued to go in either direction. It may be the case that gambling generates positive revenues for states, or it may be the case that states that spend more have greater incentive to permit gambling.

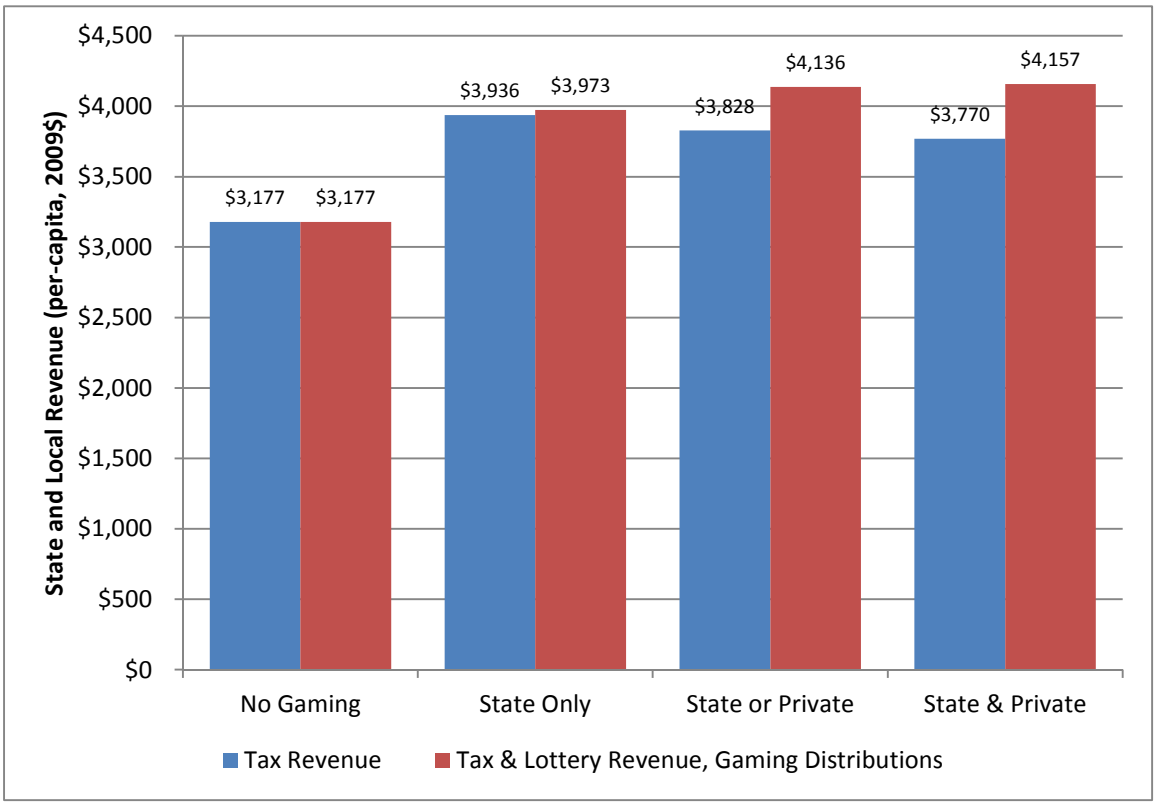

Figure 18. State and local tax revenues plus lottery revenues plus private gaming distributions are less for states and years with no gaming than for each of the three categories of gaming states (50 states, 1999-2008).[54]

[52] Each difference is significant with a p-value less than 0.005.
[53] The p-value for the one-way ANOVA is 0.066.
[54] Data source: State lottery revenue data come from the various state lottery authorities. Gaming distribution data come from the American Gaming Association State of the State surveys.

Gambling and State Economies

A pro-gaming argument advanced by states is that the industry provides employment opportunities that would not otherwise exist. Opponents claim that gaming merely transfers jobs by competing with and thereby reducing jobs at existing businesses. Figure 3 shows the average unemployment rate among states and years in which gaming is prohibited and states and years in which gaming is legalized (or state sponsored). We obtain ambiguous results. We find no statistically significant difference in the average unemployment rates when comparing no gaming to state-only gaming, but find significant differences when comparing no gaming to state or private gaming, and no gaming to state and private gaming.[55] Further, we find no difference in average unemployment rates among the three categories of gaming states. In Figure 3, the first two bars are statistically identical, the last three bars are (mutually) statistically identical, but the first bar is significantly different from the third and fourth bars. That is, states with no gaming had lower unemployment rates than states with private casinos.

[55] The significance levels $p = 0.14$, $p = 0.03$, and $p = 0.04$, respectively.

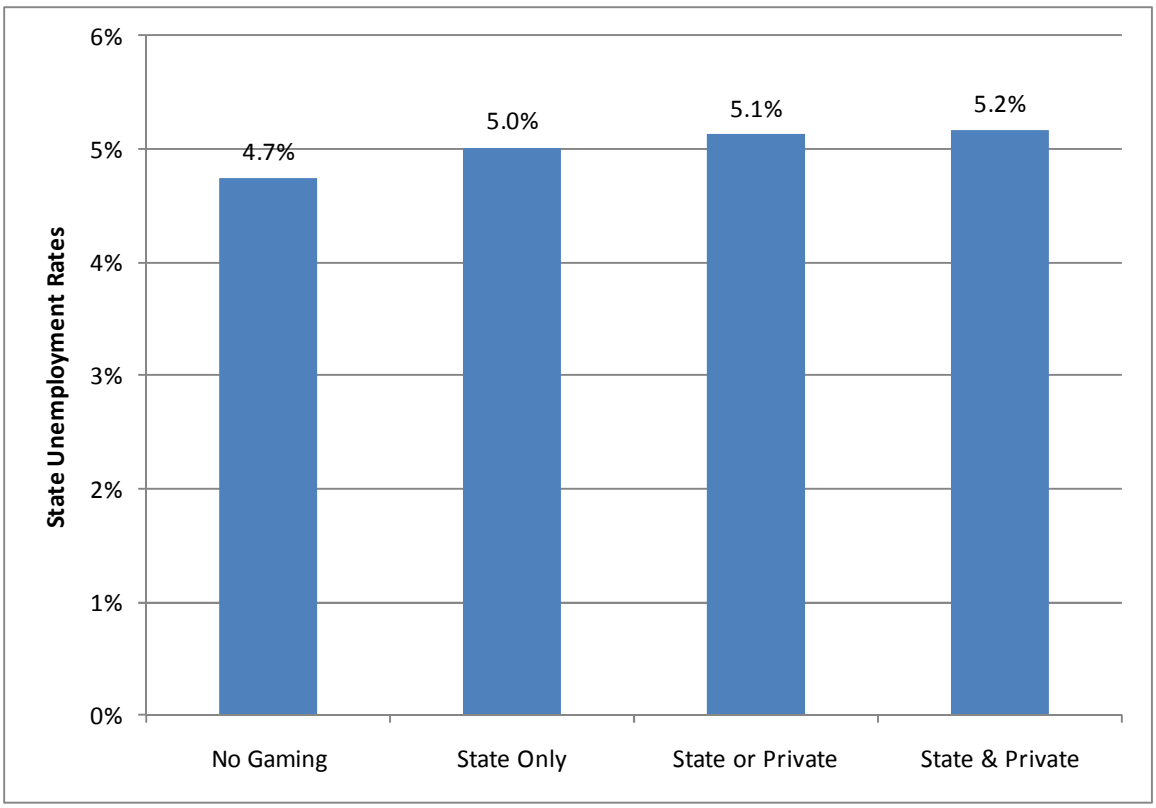

Figure 19. The unemployment rate is greater among some of categories of states that allow gaming versus the no gaming states, but does not vary significantly among states that allow different forms of gaming (50 states, 1999-2009).[56]

One possible explanation for these ambiguous results is that there is some third factor that is influencing both unemployment and the propensity for a state to permit gambling. For example, religious factors in Utah both drive people to be less dependent on the state (which results in a tendency toward lower unemployment) and to disapprove of gambling. What is clear is that there is no conclusive evidence here that gambling is associated with increased unemployment rates.

[56] Data source: US Bureau of the Census.

Per-capita income is significantly higher in gaming states than in non-gaming states, and the differences in incomes among the gaming states are insignificant.[57] These results are consistent with the results in Figures 1 and 2, which show higher per-capita tax revenues for the gaming states. The data do not shed light on the question of causality, however. If there is a causal relationship between gaming and per-capita income, it could be the case that the gaming industry contributes to a higher average income, or it could be the case that populations with higher average incomes demand gaming. Given that there are only eleven no-gaming states, it is possible that the results are driven, at least in part, by differences in state fiscal policies and other economic circumstances. For example, Alaska, one of the no-gaming states, has the second lowest tax revenue among the fifty states because of its oil revenues. Similarly, Mississippi, also a no-gaming state, has the lowest tax revenue among the fifty states but has historically also been among the poorest of the states.

[57] The differences for no-gaming states versus state only gaming ($p = 0.00$), no-gaming versus state or private gaming ($p = 0.00$), and no-gaming versus state and private gaming ($p = 0.00$) are all significant. The p-value for the one-way ANOVA comparison of gaming states is 0.154.

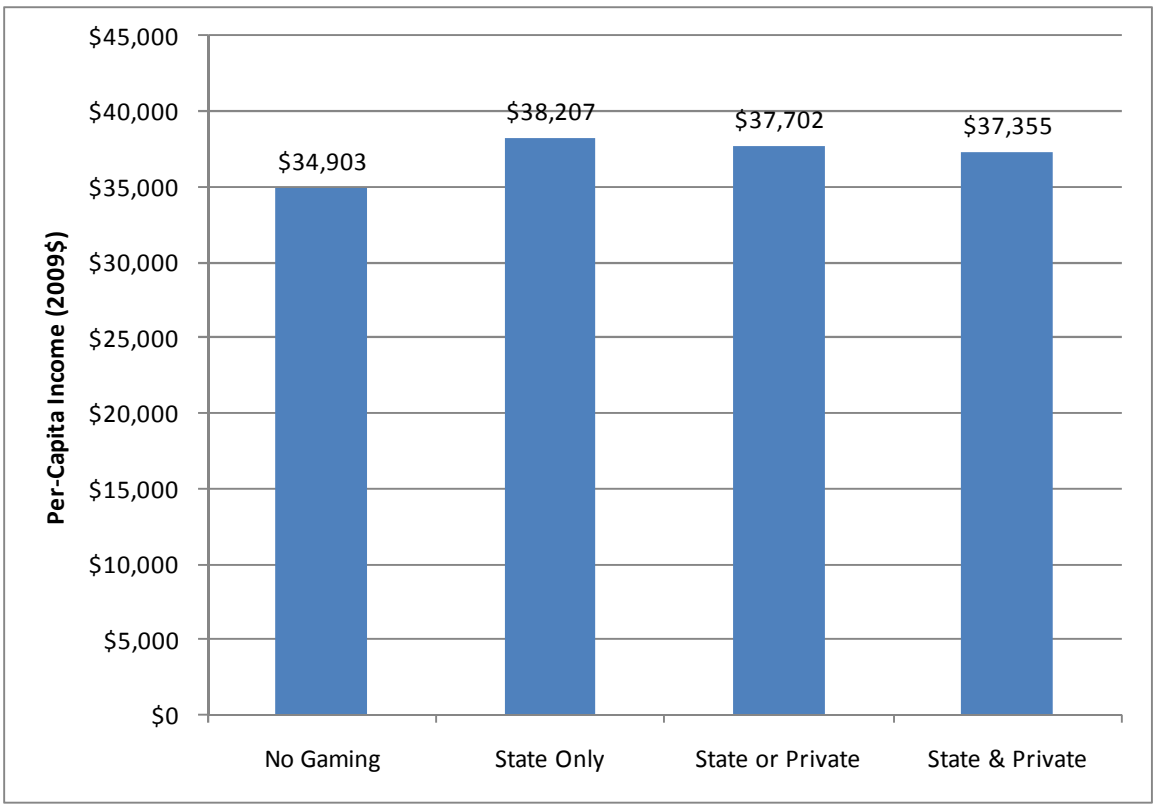

Figure 20. Adjusted for inflation, per-capita income is significantly higher in gaming states than in no-gaming states (50 states, 1999-2009).[58]

In addition to economic concerns, gambling opponents claim that gambling is associated with an increase in the crime rate. Evidence suggests (Figure 5) that there is no significant difference in violent crime rates for no-gaming versus each of the categories of gaming states.[59] However, there does appear to be a significant difference in violent crime rates among the categories of gaming states. The average

[58] Data source: US Bureau of Labor Statistics.

[59] The differences for no-gaming states versus state only gaming ($p = 0.40$), no-gaming versus state or private gaming ($p = 0.90$), and no-gaming versus state and private gaming ($p = 0.22$) are all insignificant.

violent crime rate for states with both state lotteries and private gaming is significantly greater than for states with state lotteries only.[60]

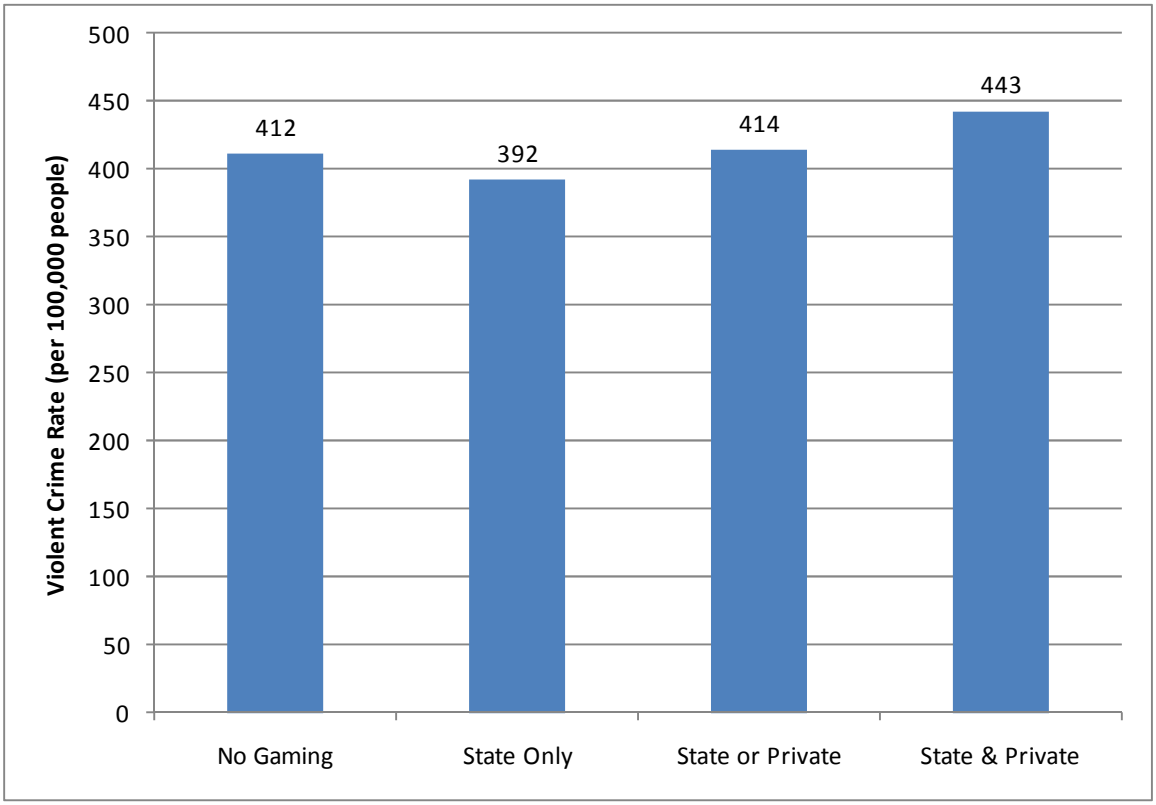

Figure 21. The average violent crime rate is greater for states that have state and private gaming than for states that have state lotteries only (50 states, 1999-2009).[61]

The average incidence of non-violent crime, however, is significantly higher for states with no gaming than for each of the categories of gaming states (Figure 6).[62] Further, the differences in non-average violent crime rates among the categories of

[60] The difference is significant at p = 0.01.
[61] Violent crime includes forcible rape, murder, robbery, and assault. Data source: Bureau of Justice Statistics.
[62] The difference for no-gaming states versus each of the categories of gaming states is significant at p = 0.00.

gaming states are significant.[63] States with progressively more legalized gaming have, on average, progressively lower non-violent crime rates.

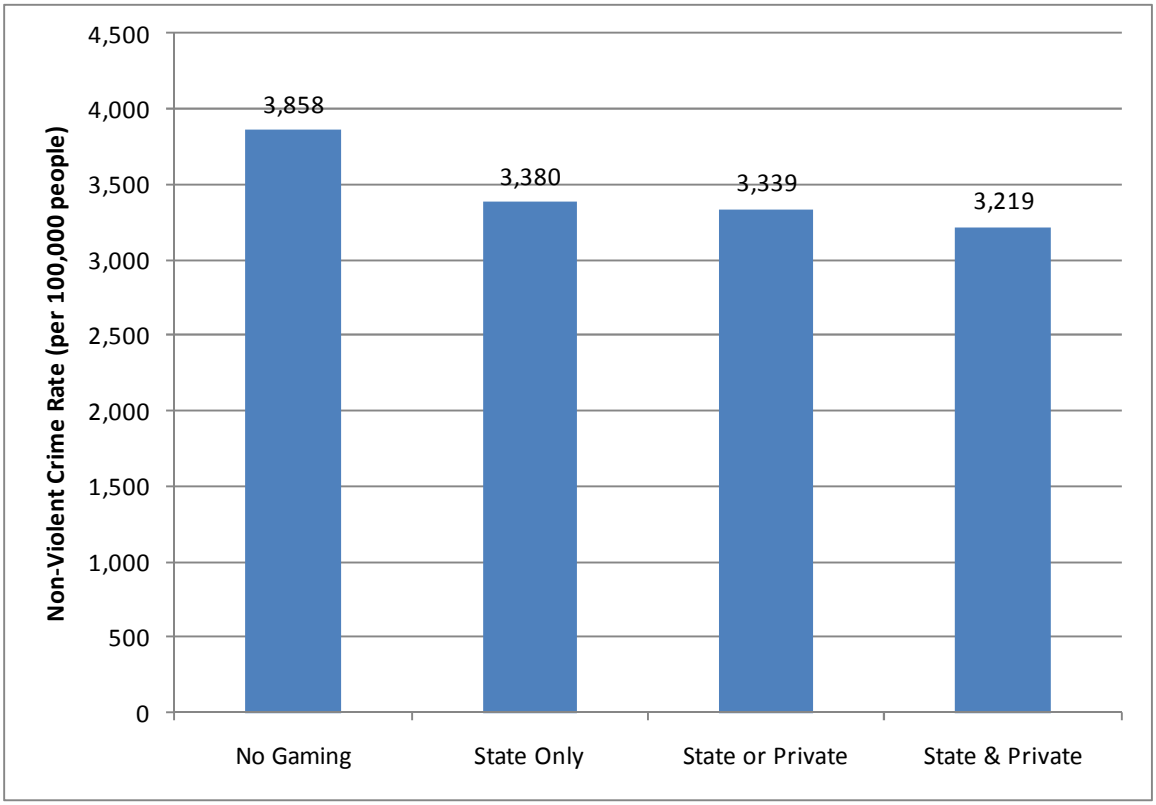

Figure 22. The average non-violent crime rate is greater for states that have no gaming than for each of the categories of gaming states (50 states, 1999-2009).[64]

Conclusion

Proponents of gaming claim that the legalization of gaming creates jobs and increases tax revenues, while having little detrimental effect on crime. Some proponents go so far as to argue that legalization of gaming reduces crime rates by allowing people to pursue this leisure activity in "aboveground" markets.

[63] The p-value for the one-way ANOVA comparison of gaming states is 0.046.
[64] Non-violent crime includes burglary, larceny, and motor vehicle theft. Data source: Bureau of Justice Statistics.

Opponents claim that the legalization of gaming merely shifts jobs to gaming from other sectors, has little or no effect on tax revenues, and increases crime by encouraging illegal activities that are, historically, associated with gambling.

We look at the fifty states over a ten-year period and compare socioeconomic measures for the states across categories of gaming: no-gaming, state lotteries only, state lotteries or private gaming, and state lotteries and private gaming. We find that state and local tax revenue is higher among gaming states than among no gaming states, but that there is no significant difference in state and local tax revenues among the categories of gaming states. Interestingly, we find that gaming revenue adds significantly to tax revenues for states that allow private gaming, but not for states that have state sponsored gaming only. We find ambiguous results with respect to the relationship between gaming and unemployment rates, but we do find that per-capita income is significantly higher in gaming states than in no gaming states. The higher per-capita income is consistent with the higher state and local tax revenues and is consistent with increased economic activity due to pent up demand for an otherwise forbidden activity being expressed.

With respect to crime, we find that the incidence of violent crime is lowest among states with state lotteries only, and higher among states with no gaming and with private gaming. This result may be consistent with opponents' claim that gambling brings with it related crimes. However, as violent crimes tend to be crimes of passion, it is possible that what we are observing is due to a third variable effect. The incidence of non-violent crime—crimes more likely to be associated with

gambling—tends to be lower among states that have legalized gaming. This suggests that, by bringing gaming into the legal and above-ground economy, related crimes are discouraged because the gaming market is comprised of people who are, on average, less likely to break the law, and firms that are now catering to a more law-abiding clientele.

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The Effects of Trade in Pennsylvania

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Trade vs. Protectionism

Historically, the protectionist claim that an increased trade costs American jobs has been based largely on observation bias: It is easier to identify jobs that are lost due to increased foreign competition with American companies than it is to identify jobs that are gained due to increased American competition with foreign companies. While increased trade does indeed cost some domestic jobs, evidence continues to mount that the number of jobs gained from trade exceeds the number of jobs lost. In response, protectionists claim that trade is causing high-paying domestic jobs to be replaced with low-paying domestic jobs, the net result being an increase in the number of domestic jobs but an overall decrease in domestic earnings.

Trade in Pennsylvania

How trade affects Pennsylvania's economy is important not just for Pennsylvania, but for Pennsylvania's trading partners. Were it a country, Pennsylvania would rank as the world's 23rd largest economy, placing it at roughly the size of Saudi Arabia.

Enactment of the North American Free Trade Agreement (NAFTA) in 1994 increased concerns that the U.S. would experience downward pressure on real wages among unskilled labor, and a decline in the number of middle and lower income jobs (Bhagwati, 1994). More than 30% of Pennsylvania's exports over the past two decades have gone to NAFTA countries. Before NAFTA's enactment, Pennsylvania's trade to Canada and Mexico averaged 37.7% of total trade (between 1990 and 1993). After implementing the trade agreement, the average rose to 40.1%

(between 1994 and 2009). Overall, Pennsylvania's trade averages around 3% of the United States total trade; therefore, the increase in the average trade to Canada and Mexico is a result of shifting trade patterns. In addition to the growth in exports to Canada and Mexico, changes in the twelve job industries also appeared since the enactment of NAFTA. The manufacturing industry was Pennsylvania's leading sector before the agreement for free trade.

Bradley (2002) examined distorted trade patterns in Pennsylvania and concluded that Pennsylvania suffered a net job loss in the year NAFTA went into effect, and has lost more than 100,000 jobs in the manufacturing industry since NAFTA's inception. Examining data for Pennsylvania in the two years following NAFTA, Rothstein and Scott (1997) conclude that Pennsylvania lost almost 19,000 jobs and experienced a 0.2% decline in the real wage rate.

Trade vs. Employment

The argument that increased trade is associated with higher unemployment is fueled by the observation that American industries (steel, automobile, and textiles are the oft-cited examples) shed jobs when they are forced to compete with imports. This protectionist argument is bolstered by the conventional wisdom that the U.S. manufacturing industry has been in steady decline, and that the manufacturing industry is somehow more important to our economic well-being than are, for example, the technology or service industries. Indeed, the data appear at first to bear this out. Figure 2 shows the fraction of the U.S. labor force employed in service and manufacturing industries. In 1950, 30% of the American labor force worked in the

manufacturing industries while almost twice that number worked in services industries. By 2008, the number of Americans employed in manufacturing industries had fallen to less than 10% of the labor force, while the number employed in service industries had rose to 75% of the labor force.

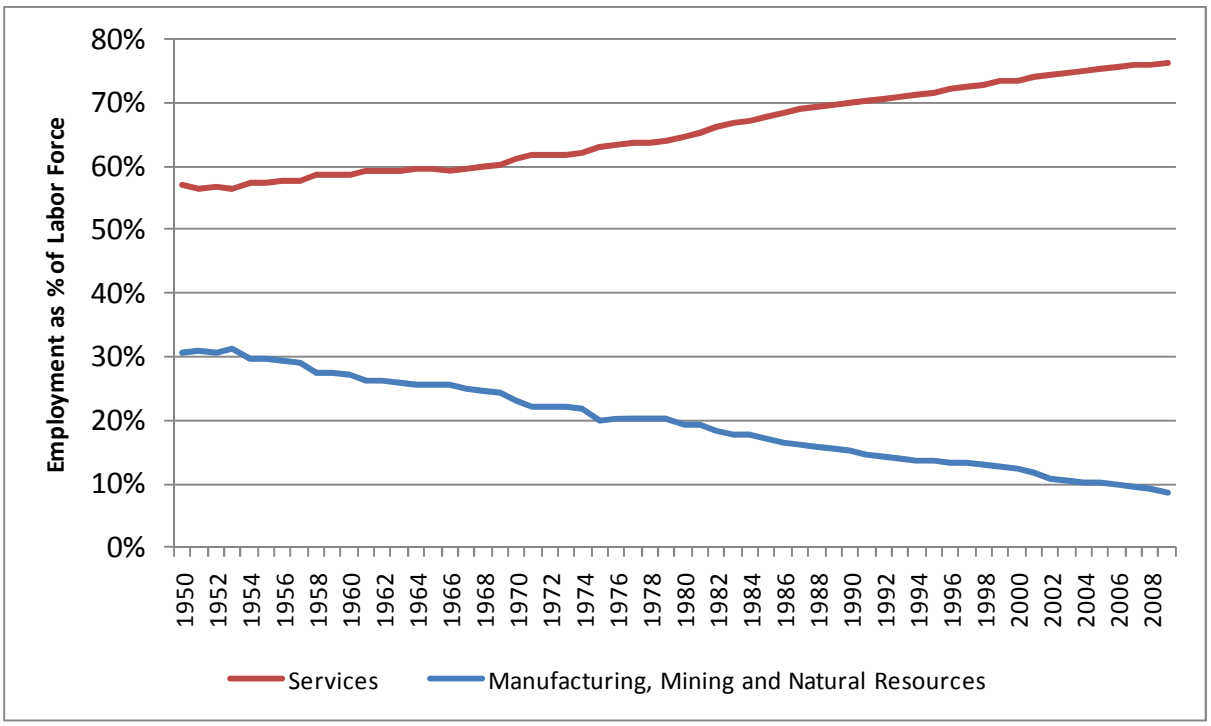

Figure 23. Fraction of the U.S. labor force employed in services industries and in manufacturing industries (1950-2008).[65]

However, an industry's strength should not be measured by the number of people the industry employs. For instance, the U.S. agricultural industry—an industry that feeds all Americans and much of the rest of the world while employing less than 1% of the U.S. labor force—would be considered far weaker today than in the 1700s when more than half of Americans were farmers. The strength of U.S. agriculture is evidenced precisely in that it is able to feed so many while consuming so few labor-hours. Where have those labor-hours gone? Following the protectionist

[65] Source: Bureau of Labor Statistics.

argument, we would expect to be hip deep in unemployed farmers. Some of those unemployed farmers, and almost all of their children, went on to become doctors, lawyers, teachers, architects, and computer programmers. Because the U.S. agricultural industry is so strong, farms don't need as much labor as they did in the past. That labor is now freed up to move into industries that have a greater need for labor—service industries.

The history of farming is also the history of U.S. manufacturing. American manufacturing has not been in decline—it has been growing and prospering. Figure 3 shows the production indices for U.S. manufacturing industries over time. In 2008, American manufacturers produced almost seven times the output that they produced in 1950. This feat is even more impressive when, looking back to Figure 2, we see that they did this using one-third of the labor they used in 1950. In other words, Americans working in manufacturing industries today are almost twenty-one times as productive as Americans who worked in manufacturing in 1950.

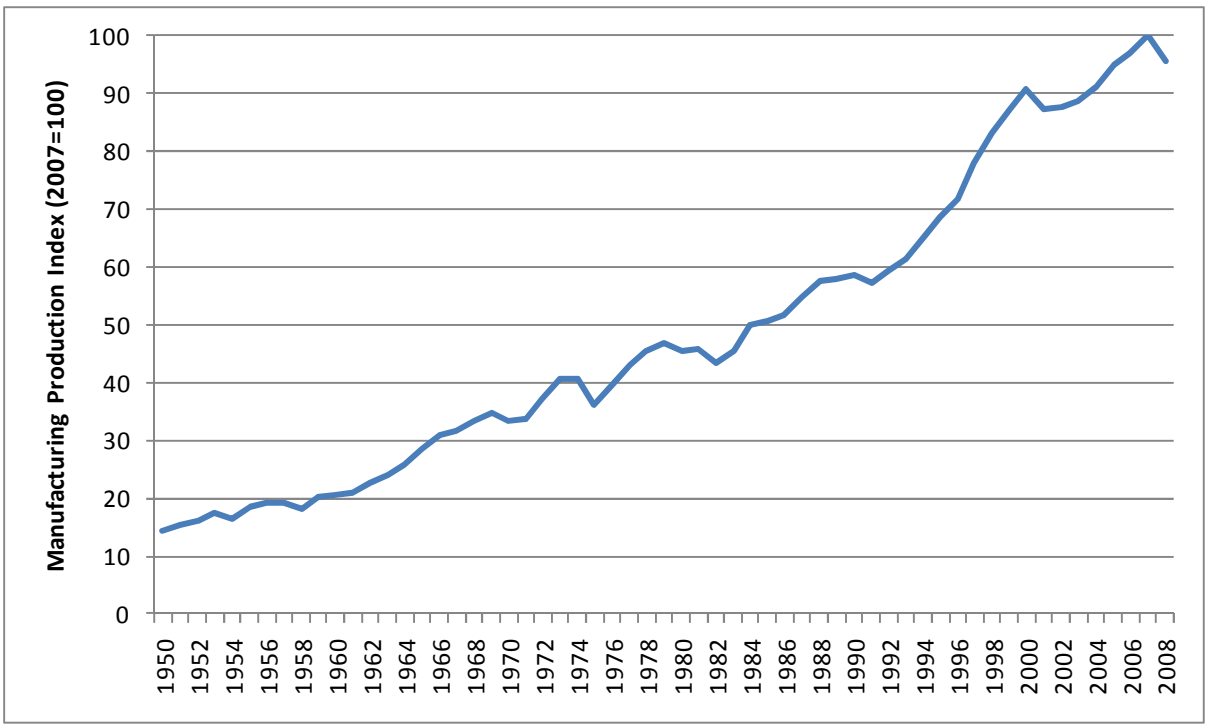

Figure 24. Manufacturing Production Index for the United States (1950-2008).[66]

American manufacturing is not in decline in terms of production. But what of the impact of trade on employment? Figure 4 shows the unemployment rate in the U.S. compared to U.S. trade (exports plus imports) as a fraction of GDP for the years 1975 through 2008. While there are exceptions, on average each three to four percentage point increase in trade is associated with a one percentage point decline in the unemployment rate. Nationwide, periods of higher trade tend to also be periods of low unemployment.

[66] Source: Federal Reserve Board.

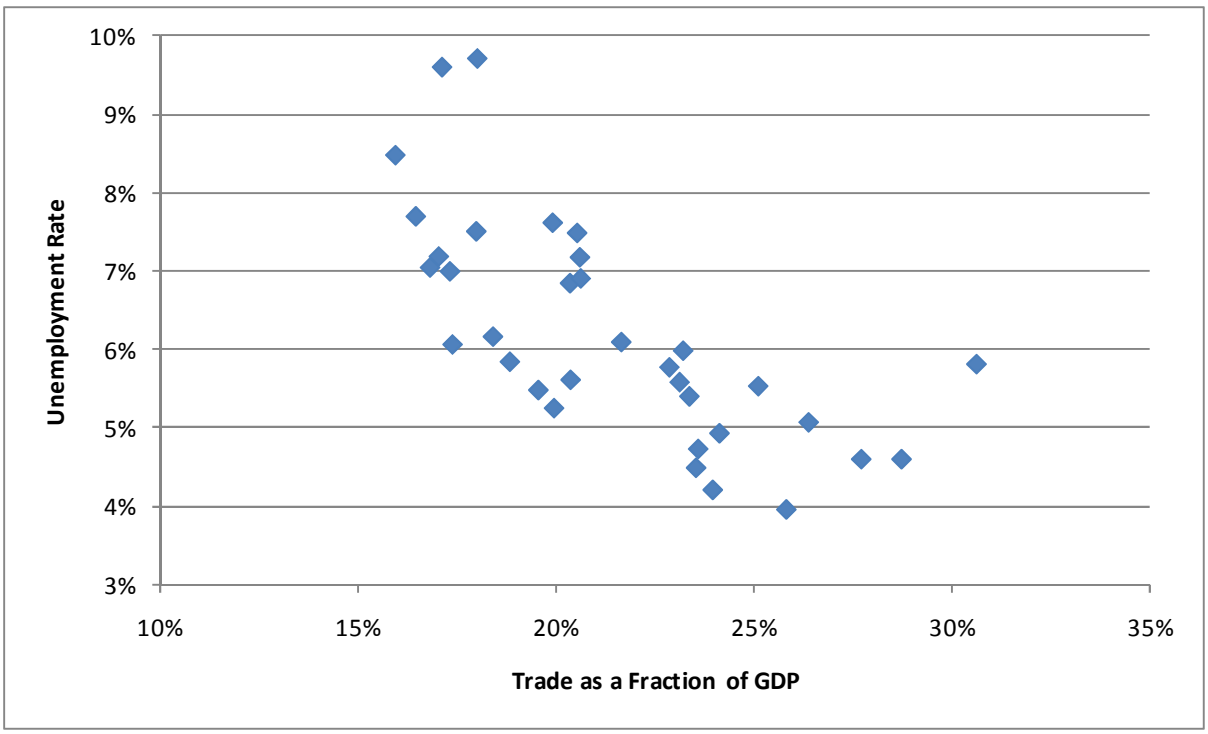

Figure 25. U.S. unemployment rate compared to U.S. trade as a fraction of GDP (1975-2008).[67]

Studying trade at the state level is complicated by the fact that, until very recently, import data recorded the state in which goods entered the country, but not state that was the final destination for the goods. For example, goods that were imported into Pennsylvania, but which arrived in the United States at a port in New York, would not have been recorded as "Pennsylvania imports." For this reason, trade research at the state level largely focuses on export data.

Using Pennsylvania's exports as a proxy for Pennsylvania's trade, over the years 1988 through 2008, Pennsylvania's median trade activity occurred in 2001 when exports constituted 4.3% of the state's economic activity. Figure 1 shows exports as a share of state GDP for each year as compared to the median year.

[67] Source: Bureau of Economic Analysis.

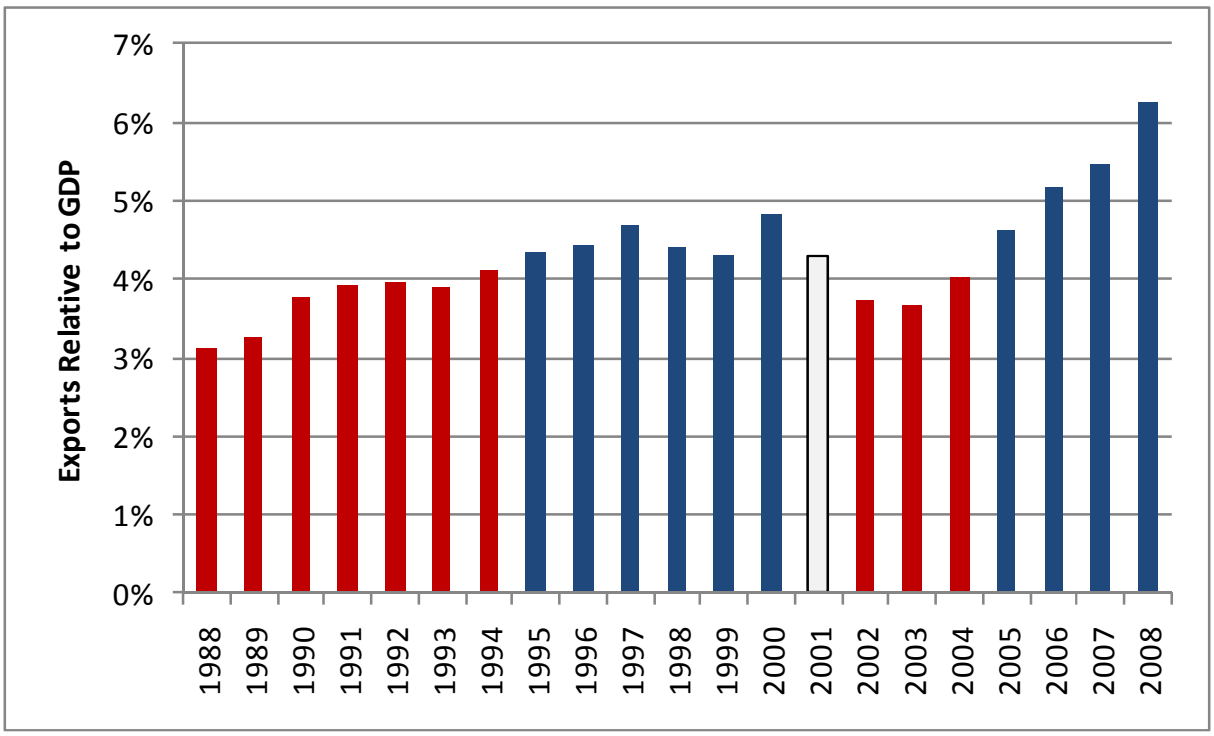

Figure 26. Pennsylvania exports as a fraction of state GDP. Red bars correspond to years in which exports were below the median. Blue bars correspond to years in which exports exceeded the median. Median exports over the period occurred in 2001.[68]

If we assume that the ratio of imports to exports for Pennsylvania matches the ratio of imports to exports for the United States as a whole, we can estimate imports into Pennsylvania and use those figures to estimate Pennsylvania's trade relative to its GDP.

[68] Source: WISER Trade and Bureau of Economic Analysis.

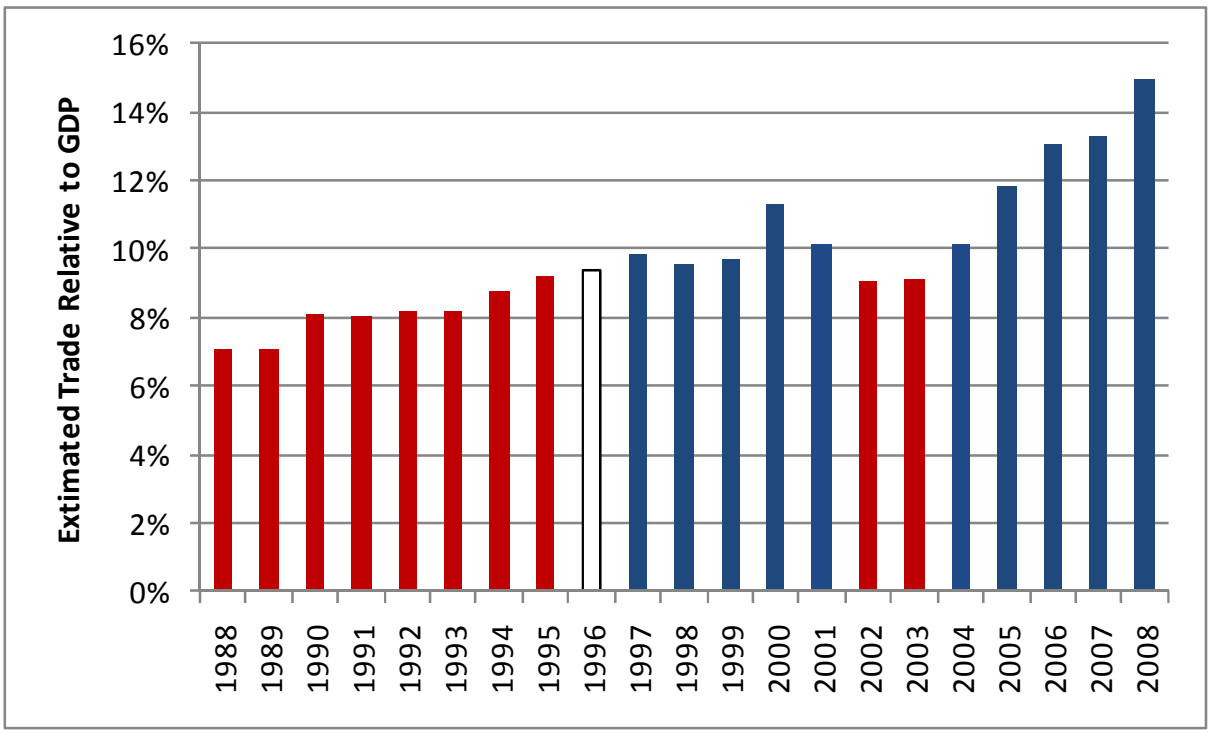

Figure 27. Estimated trade for Pennsylvania as a fraction of state GDP. Red bars correspond to years in which estimated trade was below the median. Blue bars correspond to years in which estimated trade exceeded the median. Median estimated trade over the period occurred in 1996.

The pattern of bars in Figure 5 is not markedly different from the pattern in Figure 4, which indicates that export data are a reasonable proxy for trade data, assuming Pennsylvania's propensity to import versus export is not overly different from that of the country as a whole.

What has happened to Pennsylvania's unemployment rate in times of greater versus lesser trade? During the below median trade years (marked with red bars in Figure 4), Pennsylvania's unemployment rate averaged 6.0%. During the above median trade years (marked with blue bars in Figure 4), Pennsylvania's unemployment rate averaged 4.9%.[69] If we define "low" and "high" trade years using the estimated trade numbers shown in Figure 5, we get almost the same

[69] The difference is statistically significant with p = 0.007.

results: unemployment is 6.0% in the low trade years versus 4.8% in the high trade years.[70] These results are shown in Figure 6. In Figure 3, we saw that, for the country as a whole, each three to four percentage point increase in trade was associated with a one percentage point reduction in the unemployment rate. Pennsylvania's trade during its "high trade" years averaged three percentage points more than its trade during its "low trade" years. Correspondingly, we see in Figure 6 that Pennsylvania's unemployment rate during the high trade years was around one percentage point less than it was during the low trade years.

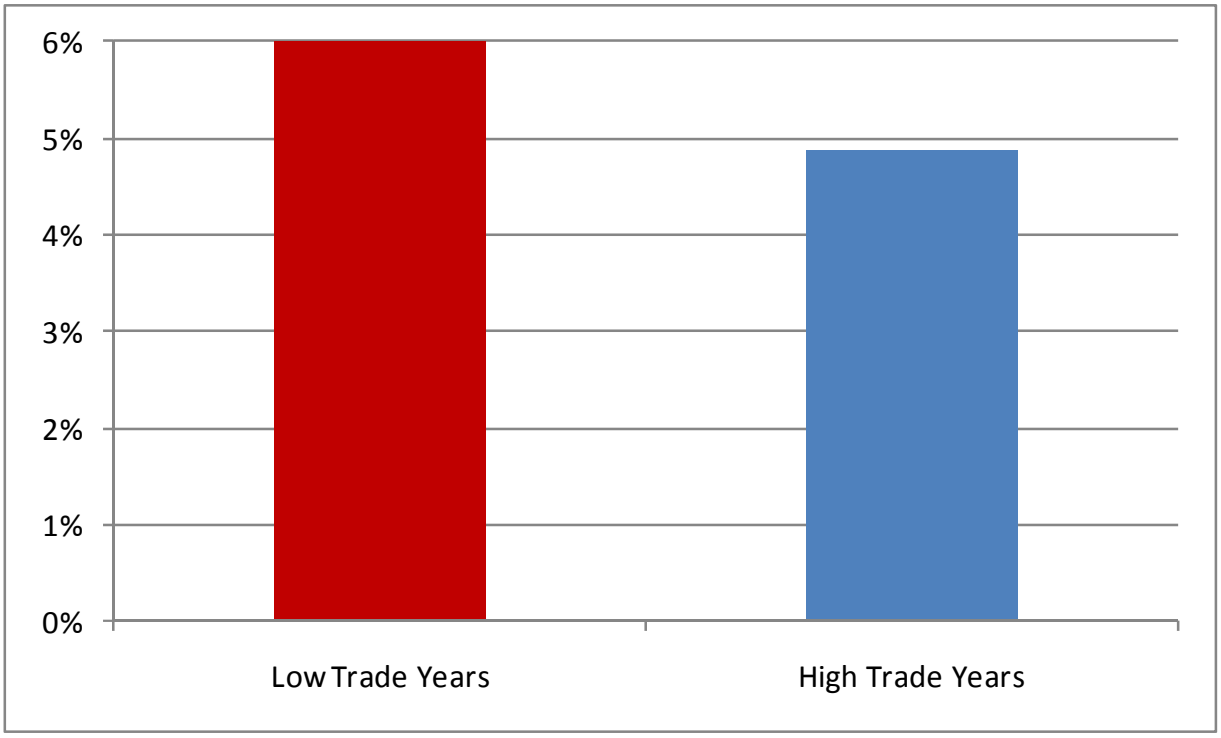

Figure 28. Average of Pennsylvania unemployment rates in below median trade years and above median trade years.

Trade versus Income

Let us address the counter-argument that, though increased trade may be associated with reduced unemployment, increased trade merely causes us to

[70] The difference is significant with p = 0.002.

substitute low-paying jobs for high-paying jobs. Again, distinguishing between low trade years and high trade years, we see a difference in Pennsylvanians' per-capita inflation-adjusted income. In years in which Pennsylvania's exports (relative to GDP) were below the median, per-capita personal income was $33,800 (in 2009 dollars). In years in which exports were above the median, per-capita personal income was 10% higher at $37,300.[71] Defining the low trade versus high trade years based on our estimates for imports shown in Figure 5, we find an even greater difference: $33,200 versus $38,100, or 15% higher incomes during high trade years.[72]

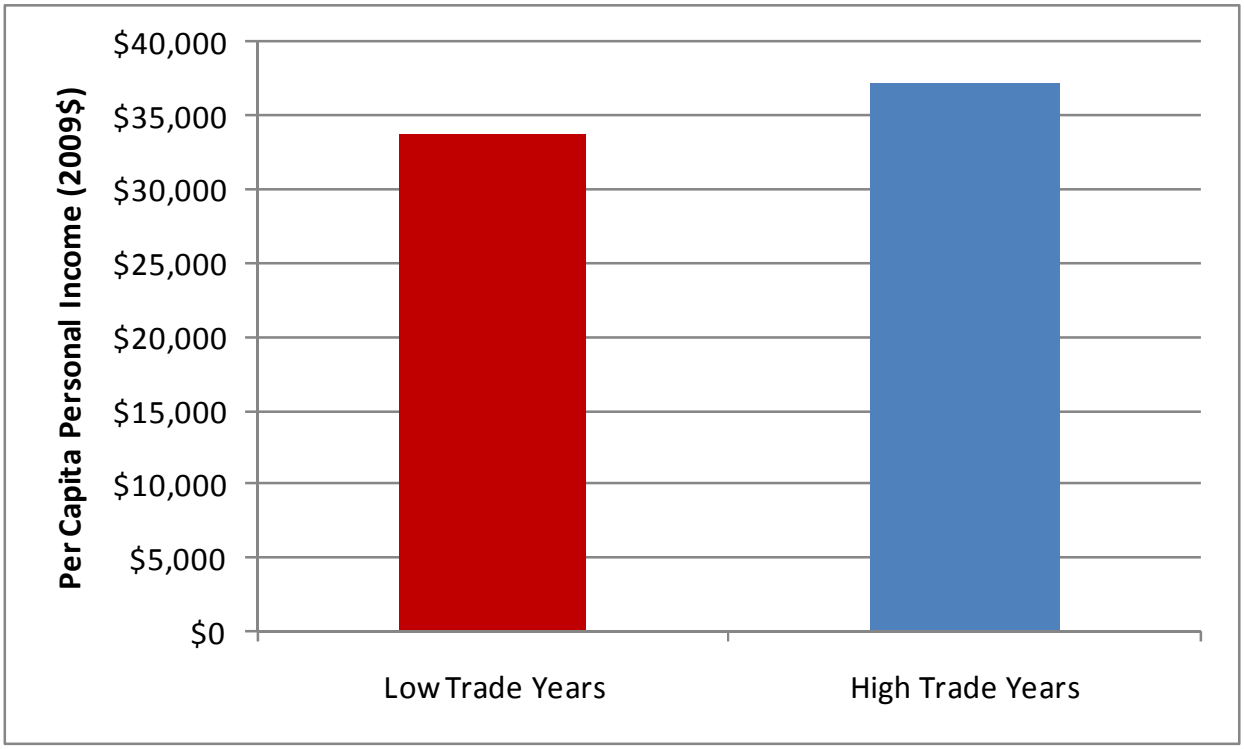

Figure 29. Average per-capita personal income (2009$) for Pennsylvanians in below median export years and above median export years.

These results are consistent with free trade advocates' claim that trade both generates more and higher paying jobs.

[71] The difference is significant with p = 0.015.
[72] The difference is significant with p = 0.000.

Summary

One of the more settled questions in economics is that of the benefits of free trade. Despite significant and persistent evidence to the contrary, doubts persist in some minds as to whether the benefits of trade that are observed at the national level actually filter down to the local level. Images of Detroit laid low by foreign automobile imports or Pittsburgh by steel imports haunt us. The evidence presented here suggests that what economists have observed at the national and international levels is true also at the state level. In Pennsylvania, employment is higher during times of greater trade. The increased jobs are not predominantly low income jobs as Pennsylvanians' incomes are higher during periods of greater trade also.

Detroit and Pittsburgh provide fine examples of the power of trade, though from different perspectives. In the late 1970s, when foreign automobiles threatened Detroit's livelihood, the government responded by imposing tariffs on imported cars and, when that failed to stem Detroit automakers' losses and Chrysler was facing bankruptcy, the government bailed Chrysler out. The tariffs and the bailout merely postponed the inevitable, laying the seeds for Cash for Clunkers and the bailout of GM and Chrysler (again) in 2009. By fighting trade, the government found itself in the position of propping up an industry that could not make efficient use of our country's resources. What politicians saw were the jobs that would be lost if the American automobile industry faltered. What politicians failed to see were the jobs that would have been created had the resources squandered on these failed businesses been shifted to more profitable industries.

Pittsburgh faced its own threat from foreign steel. With the exception of a brief flirtation with steel tariffs, the government largely stayed its hand and allowed the American steel industry to dwindle. Pittsburgh suffered. But, the resources that had gone into steel were diverted into industries in which we were more competitive. Today, Pittsburgh has avoided much of the recessionary pain that his hit the rest of the country because its largest industries—higher education and health care—are the only two industries to see growth through this recession. If steel had not been allowed to die and, in so dying, make room for these stronger industries, Pittsburgh would not be the vibrant city it is today, but the moribund economic stagnation that is Detroit.

Free trade promotes what the economist Joseph Schumpeter called creative destruction. When people are free to buy the best products they can at the lowest prices they can find, regardless of whether those products are produced at home or abroad, weak domestic industries that can no longer create value will be swept away, freeing up domestic resources. Domestic entrepreneurs will gather those valuable domestic resources and create new and strong industries.

The lesson for Pennsylvania is that opening markets to free trade costs us jobs in our less competitive industries, but gains us jobs in our more competitive industries. In sum, trade shifts our job base from unhealthy to healthy industries, leaving us with more jobs, better paying jobs, and an economic base built on more industries more able to survive into the future.

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