Economic Costs and Benefits of Raise the Age Legislation in Missouri

Report prepared by

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Executive Summary

The problem of juvenile crime, punishment, and rehabilitation is a complicated question. It is well known that juveniles do not have the same patterns of thought, self-control, and emotional maturity that adults have. When this is combined with the fact that juveniles that commit crimes have a greater chance of being successfully rehabilitated into productive members of society than adults who commit crimes, the answer to the question grows in importance. To this end, currently 45 states have limited the ability of persons under the age of 18 to be committed to adult prisons for their crimes. This legislation is colloquially known as 'Raise the Age'. It should be noted that Raise the Age legislation does ***not*** prohibit juveniles from being committed to the adult penal system for punishment—especially for particularly heinous crimes such as murder and rape. It simply legislates that the juvenile justice system be allowed to adjudicate their cases. This study examines the economic costs and benefits of the proposed Raise the Age legislation in Missouri.

Missouri data on currently confined persons who were sent to the adult penal system at age 17 was studied. In addition to this, changes in the costs to both the Division of Youth Services and the Department of Corrections was examined. If a 17-year-old is sent to the adult penal system, then taxpayers are forced to pay for their housing, food, medical care, etc. If the same 17-year-old person is sent to a juvenile facility, then taxpayers must still pay for their housing, food, medical care, etc. The only change has been in which government department, corrections or social services, is overseeing the 17-year-old.

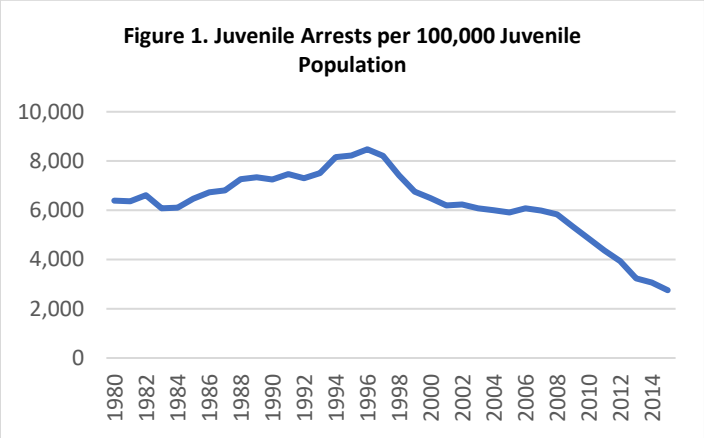
Since there is a greater reliance and stress on rehabilitative services in the juvenile system versus the adult system, the initial per-person per-year costs might be slightly higher. Some evidence in a Missouri Fiscal Note indicates that the roughly 339 additional 17-year-old youths that would be transferred yearly from the adult system to the juvenile system might place an annual burden of $6.715 million per year on the state budget. It should be noted that this amount is roughly equal to 0.02% of the state's annual budget. However, in all likelihood this reported net burden amount is actually smaller since the actual time that 17-year-olds spend in prisons is longer (and thus the Department of Corrections' cost savings are higher) than was estimated in the Missouri Fiscal Note. In this case, there is a net burden on the state budget of only $2.432 million or 0.008% of the state's annual budget.

Nevertheless, there are other costs and benefits that must be considered. When a 17-year-old is sent to prison, their wages and employment prospects are greatly reduced upon their release. This can be for several reasons. Employers might be less willing to hire ex-convicts over persons who have not been incarcerated due to a 'stigma' effect. However, there are other reasons for this reduced earnings potential that are more concrete. Spending time in prison lowers a person's 'human capital' in the form of work experience, soft skills, interpersonal relationships, and the like. This reduction in human capital from being in prison is both large in size and long-lasting. On the other hand, the reduction in human capital from being transferred to a juvenile facility is not as severe or long lasting. When one accounts for the reduced earnings, and subsequent reduced tax revenue to the state, from putting 17-year-olds into adult prisons compared to juvenile facilities, the cost-benefit calculus to the state changes from a net cost to a

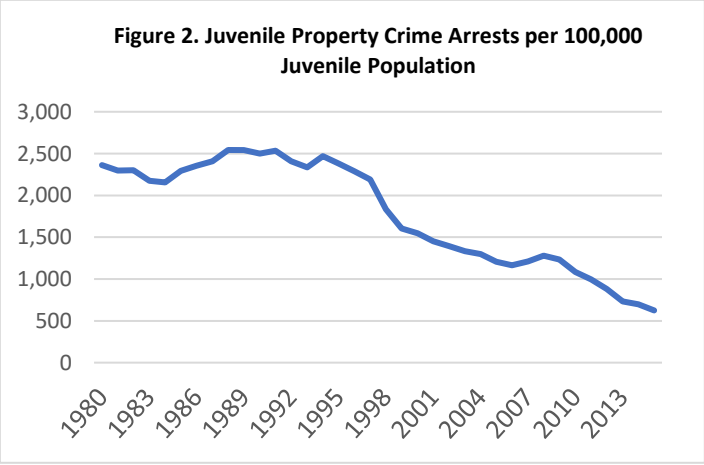
net benefit. Since these higher future incomes and taxes occur over time, it can take several years before these higher future taxes overcome the higher costs of juvenile facilities. But these higher current juvenile facility costs are overcome as the size of the population that was sent to the juvenile facilities in the past, and who are now working, grows in size. This net benefit in additional tax revenue changes and grows in size from year to year. For the first ten years, tax revenues would grow at a compound average annual rate of over 22%.

Introduction

Beginning in the decade of the 1980's and continuing until the late 1990's juvenile (ages 10-17) arrest rates began to take an alarming trend upward.[1] Figures 1 through 3 show these trends for all juvenile arrests, property crimes, and violent crimes. For example, in 1980 there were less than 6,400 juvenile arrests for every 100,000 juveniles—but by 1996 this had peaked at nearly 8,500 arrests, or an increase of 33%. before beginning to decline to 2,751 in 2015. Similarly, juvenile arrests for property crimes peaked in 1988 at 2,543 per 100,000 juvenile population while juvenile arrests for violent crimes increased 68% between 1980 and 1994.



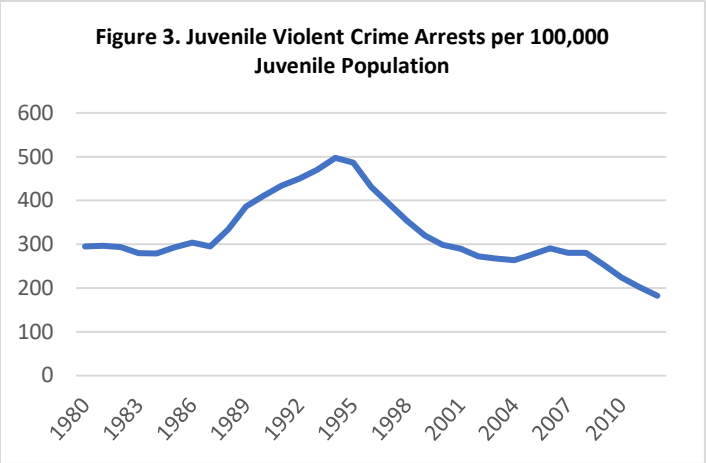
There was much hand-wringing among policy makers, politicians, and other community leaders as to both the cause and solution to these increases in crime rate among juveniles. Some leaders blamed increases in illicit drug distribution, availability, and use. Other leaders claimed these changes were due to lax gun laws, the breakdown of traditional family units, or the spread of poverty—especially within urban core areas. The problem of youth crime was such a problem that these youths were often referred to as 'superpredators' in speeches and the popular press.

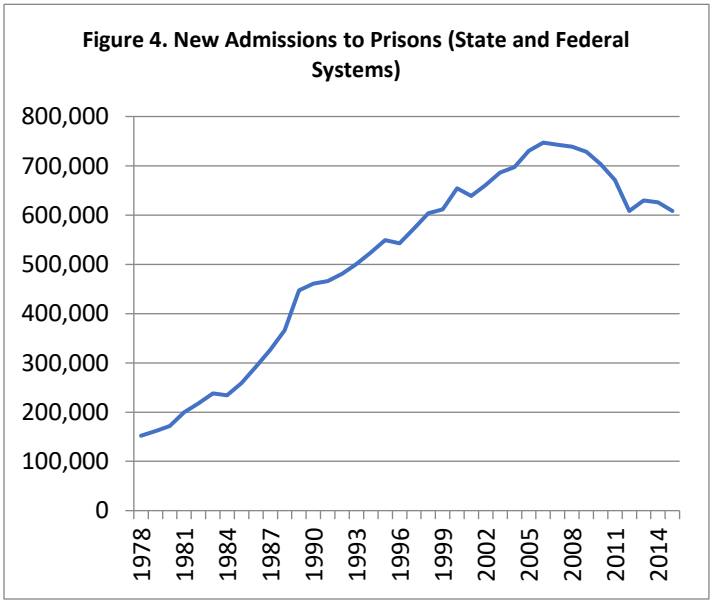


Interestingly enough, these increases in crime rates for both adults and juveniles were occurring despite a large increase in the prison population. Figures 4 and 5 show new admissions to the federal and state prison system and the total population within the federal and

[1] OJJDP Statistical Briefing Book.

state prison system from 1978 to 2015.[2] As one can see, there has been a dramatic increase in the number of people admitted to prison that has only recently begun to decline. In 2006, nearly 750,000 people in the US were admitted to state and local prisons—more than the population of the city of Seattle in 2016. Or to put it another way, the number of new people entering the prison population in 2006 was roughly equal to the population of *both* Kansas City and St. Louis in 2016.

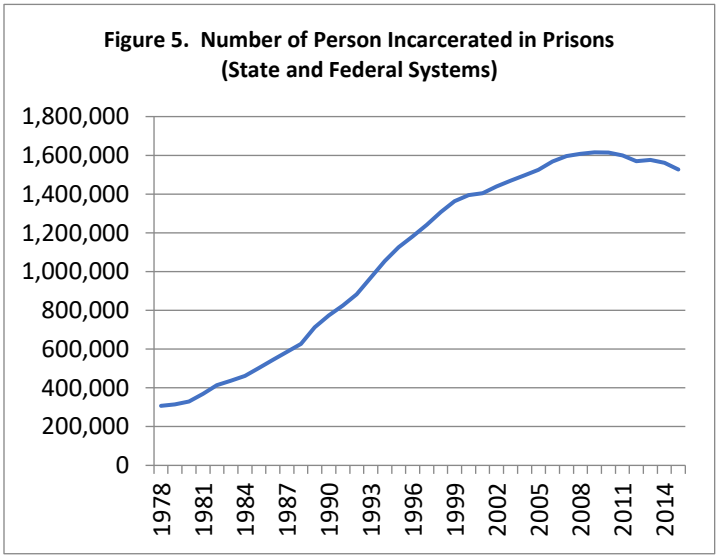




These high admission rates to prison have resulted in a current prison population that currently sits at just over 1.5 million people—roughly equal to the population of Idaho. Note that these numbers include only people in the prison system—the city/county jail population is not included in these statistics. Western, Klyekamp, and Rosenfeld (2006) suggest that part of this increase in crime in the 1980s was due to decreases in economic opportunity among youth and young adults—specifically, black males. Structural changes in the economic system of stable and well-paying opportunities for employment, especially for lower educated males, lead to an increase in these citizens turning to crime. Freeman (1992) indirectly supports this by stating, '...all else the same, the incapacitation of so many criminals should have greatly reduced the crime rate. That it did not implies a substantial increase in criminal behavior on the part of the noninstitutionalized population'.[3]

[2] Carson, E. Ann, and Mulako-Wangota, Joseph. Bureau of Justice Statistics.
[3] Freeman (1992). Pg. 203.

Since peaking in the late 80's and 90's arrests for juveniles have been declining. This decline has been across both violent and property crimes as well as all other crimes. Since their peak, total juvenile arrests are down nearly 70% while property crime arrests are down 75% and violent crime arrest have declined 63%. The reasons for these declines in criminal behavior among youth are multifaceted and still not entirely understood. Reyes (2007) suggested that environmental policies that reduced lead exposure in children was responsible for up to 57% of the decline in crime since lead exposure is known to increase violent behavior. Others, like Levitt (2004), hypothesized that increased policing and the receding crack epidemic might be responsible.[4] Whatever the cause, the decline in crime among juveniles has been welcome news.



Interestingly enough, there are still issues at play when juveniles are arrested. Primary among these are whether the juvenile should remain in juvenile court or should they be tried as an adult. Past studies have shown that juveniles who are transferred to adult court systems often receive longer sentences than juveniles who were tried in juvenile courts for the same crime (Fritsch, Caeti, and Hemmens, 1996). Furthermore, Freeman (1992) finds that youths that were incarcerated were less likely to hold jobs a decade later than youths that did not face incarceration. This decline in work was in terms of both employment and the number of hours worked. Youths who had been jailed had a 20% lower chance of being employed in the future and those that were employed worked 25 to 30% fewer hours compared to youths who had not committed a crime. Among youths that were on probation, the decline in work hours was approximately 10 to 15%—smaller than the impact from prison, but still a significant amount. Interestingly, youth who were convicted of a crime but did not go to jail or have probation had

[4] One of the more interesting explanations that Levitt proposes is the increase in legally available abortions in the 1970s which served to decrease the number of unwanted births and hence 'criminal youth' in the late 1990s. For obvious reasons, this explanation has generated much controversy and debate within the economic, sociological, and criminology literature.

nearly identical chances of being employed in the future as youth who had not committed a crime. Studies like these should give legislators, judges, prosecutors, and other stakeholders pause when determining punishment for youth. Choices today can have serious implications for the future outcomes of today's youth.

Youth Crime in Missouri

There is a saying in the popular lexicon that 'one really learns how to become a criminal in prison'. To this end, the first juvenile court system in the US was set up in Chicago in 1899 because it was recognized that youth offenders differ from adult offenders in fundamental ways. Among these ways are the ideas that youth can still be 'molded' into future productive citizens—i.e., it's not too late to alter the course of their life. Similarly, by placing youth offenders in prisons with adults, it is thought that the youth might begin associations with hardened criminals. These associations would increase the probability of recidivism of today's youth when they become adults. Finally, youth tend to lack the maturity, self-control, and foresight that their decisions might have on others and on themselves. In other words, juvenile court systems were set up to recognize that youth might not be fully cognizant, and thus not fully accountable, for their actions.

Nevertheless, there is a general perception in some legislative and societal circles that juvenile criminals are treated too leniently. The thought here is that if society treats juveniles as adults there will be an overall reduction in juvenile crime as other juveniles see harsh punishments meted out towards their peers. This is called the general deterrent effect. Secondly, it is thought that treating a juvenile as adult in the criminal court system will lead to reductions or elimination of future criminal activity by that particular youth. This is called the specific deterrent effect. However, there is little evidence for the validity of the general deterrent effect on the general population of youth vis-à-vis the transfer of youth offenders to the adult criminal court system—in fact, these policies may have actually backfired and increased youth offending (Singer 1996; Singer and McDowall, 1988; Jensen and Metsger, 1994).

There is also little evidence for the specific deterrent effect of transferring youth to adult courts. Adult prisons tend to 'train rather than deter' youth to become criminals. When this is combined with the superior efficaciousness of treatment services in youth centers versus adult prisons, it appears that it is more desirable for youth offenders to remain in the juvenile system

(Podkopacz and Feld, 1996). Bishop, et. al, (1996) and Fagan (1995) also found little evidence of the specific deterrent effect of transferring youth to adult criminal systems.

In Missouri, as in other states, the court system is set up into two distinct groups—an adult system and a juvenile system. Currently, persons over the age of 18 are considered adults and are placed into the adult system whereby, if convicted, they could receive probation, fines, and/or time incarcerated depending upon the severity of their crime. Persons under the age of 18 are in the juvenile system, but can be transferred to the adult system depending upon certain factors such as the severity of the crime and the youth's past criminal history. However, in 5 states, Georgia, Missouri, Texas, Michigan, and Wisconsin, this juvenile/adult line is drawn at age 16.

Recidivism among youth

A characteristic of persons, adult and juvenile, who are punished for the crimes that they have committed is the tendency to return to criminal activity when they are released. The problem of recidivism is an important one for criminologists and sociologists to understand. Currently in the adult justice system, approximately 77% of released prisoners will reoffend within 5 years (Durose, Cooper, and Snyder, 2016). The fact that 3/4th of released prisoners will reoffend is problematic since most, about 95%, of prisoners will be rereleased into the general public at some point in time. This means that prisons are, with a high degree of certainty, releasing persons who will commit future crimes.

There has been a great deal of study about the factors that lead to recidivism among prisoners. Schmidt and Witte (1989) examined the problem of recidivism using a 'split population' survival time model. Survival models are statistical techniques used to understand the expected duration of time that will elapse until an event occurs. These events could be time to failure in a mechanical system, what percentage of the population of bacteria will survive past a certain time, etc. Included with survival models is determining particular circumstances or characteristics that increase or decrease the probability of survival. Schmidt and Witte found that recidivism rates are initially high in the 20 months or so right after one's release from prison. The recidivism rate though begins to fall dramatically and steadily as the time after release increases. There are many factors that alter the probability that someone will recidivate. These factors include time served, age at release, number of prior convictions, race and gender

characteristics, and crime characteristics such as distinctions between property and violent crimes. They found that as the number of priors and the time served in prison increased, there was an increased probability of recidivism. As age increased, there was a decreased probability of recidivism. This should not be surprising as there is a lot of evidence that people commit fewer crimes as they get older (Carvalho and Bierens, 2002; Carvalho 2002). Other factors such as employment services for released prisoners also reduced recidivism (Carvalho and Bierens, 2002; Carvalho, 2002; Carvalho and Bierens, 2007).

What are the factors then that contribute to recidivism in youth? Here it is important to distinguish between two different sets of youth: youth who are sent to adult prisons and youth treated in different types of youth programs. An examination of youths from the 1980s who had committed murder or manslaughter and were sent to adult prisons had a recidivism rate of 60%. This is important when one considers that 2/3 of the youth who had been sentenced to prison were eventually released (Heide, et. al., 2001). Not surprisingly, Onifae, et. al. (2008) found that youth at high risk were more likely to re-offend than low risk youth. Youth were rated as high, medium, and low risk based upon a variety of factors such as the number of prior contacts with law enforcement, gender, education, and substance abuse.

Minor, et. al. (2008) found that it is rare for youth recidivism to be as high as adult recidivism. They examined Kentucky youth who were placed into youth correctional facilities and found that the largest predictors of recidivism were gender, whether the youth had a familial history of abandonment, and if the youth were violent. However, Kovacevic, et. al. (2015) found that factors such as one's peers had a much larger effect on whether a youth placed in a juvenile treatment facility would recidivate. Interestingly enough, the recidivism rate of the youth Kovacevic studied was only 15%.

Understanding some of the previously mentioned risk factors of recidivism is important. If the criminal justice system can identify certain factors that will lead released youth and adults to future criminal activity, then the justice system can respond accordingly. Researchers have identified two categories of risk factors (Andrews and Bonta, 1994). These factors are static and dynamic. Static factors include aspects that help to predict recidivism such as age, previous convictions, gender. These factors are static because they are immutable—offenders cannot change certain aspects about their past. The other factors are dynamic such as values, antisocial

cognitions, and behaviors. Since offenders cannot change their past, they can only change their future, there should be renewed focus on altering the dynamic risk factors (Andrews and Bonta, 1994; Gendreau, et. al., 1996). Edens (2007) finds agreement with this assessment when it comes to youth—past factors are less important in predicting future recidivism then the psychopathic nature of the individual which can be identified through different means.

What then of recidivism among youth transferred to the adult criminal system? Past research has found that youth transferred to the adult system will recidivate at higher rates than youth placed in youth rehabilitation centers (Bishop et. al., 1996; Fagan 1995; Podkopacz and Feld, 1996). On average, these studies found that youth transferred to the adult system were between 40 to 60% more likely to recidivate than youth who remained in the juvenile system. However, it is possible with these past studies that these rates are higher due to selection bias—in other words, the adult criminal system is receiving youth who are 'really bad' whereas the juvenile system is receiving youth who are 'not all that bad'. To understand if this was true, Myers (2003) conducted a study that eliminated the selection bias that can be inherent in the criminal justice system. He found that youth transferred to the adult system were more likely to recidivate then youth placed in juvenile rehabilitation but that this result might not be statistically significant. Winner, et. al. (1997) also found through a long term study that, overall, youth transferred to adult court systems were more likely to reoffend by about 22% then those who had not been transferred to the adult system.

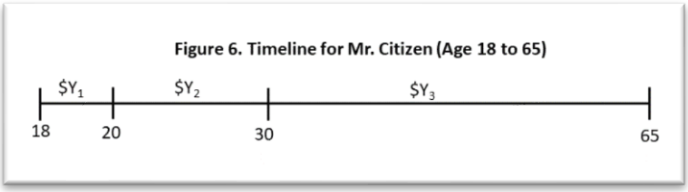
Illustrating the Costs, Benefits, and Economic Impacts of Prison

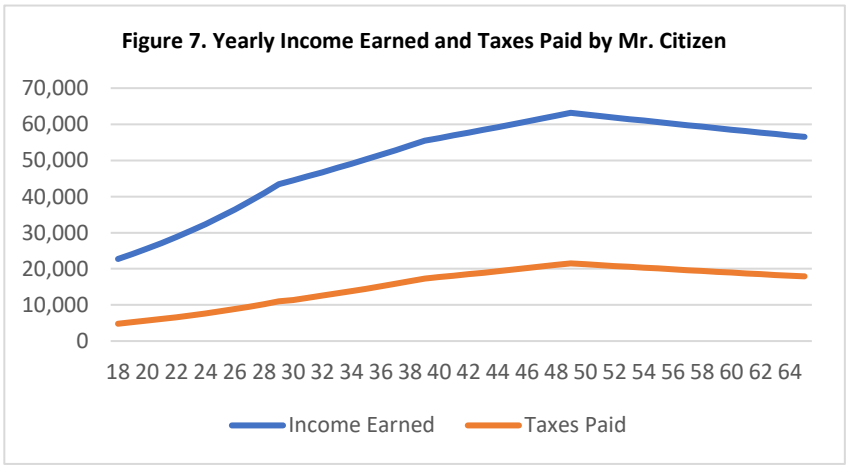
There are many costs and benefits to be considered with the punishment of criminal behavior. Consider the base case of Mr. Citizen. He is a single male who collects the median weekly wage for a male at each age bracket that corresponds to his own age.[5] Mr. Citizen begins work at age 18 and works until age 65—for a total of 47 years. His income is a function of both the number of hours he works per year and the wage rate at which he works. For example, during this time frame, Mr. Citizen earns Y_1 dollars from age 18 to 20, Y_2 dollars from age 20 to 30, and Y_3 dollars from age 30 till retirement at age 65. Mr. Citizen's wage differs from year to

[5] Source: Bureau of Labor Statistics, Median Usual Weekly Earnings of Full-time wage and salary workers, 3rd quarter of 2017, https://www.bls.gov/news.release/wkyeng.t03.htm

year as does his hours worked. The product of his wage and his hours worked is his income. For most people, income increases from the beginning of one's work life up until the late 40s/early 50s. After this point, people's yearly income tends to decline due to reductions in the number of hours worked.

Figures 6 and 7 outline a timeline of Mr. Citizen's earnings during the 3-time periods and his age-earnings profile. For example, for Mr. Citizen, Y_1 is equal to $72,400, Y_2 is equal to $312,000, and Y_3 is equal to $2,047,000. This means that Mr. Citizen earns $2.432 million over his lifetime. Accounting for the current tax rates and standard deductions at both the federal and state levels for Missouri, we find that Mr. Citizen pays $117,600 in income taxes to the state of Missouri and $410,824 in income taxes to the federal government over his life. Given the current rate of taxation for Medicare and Social Security, Mr. Citizen also pays $186,000 in FICA taxes. Finally, taking the average amount persons spend on retail goods and services, we see that Mr. Citizen paid $27,100 in sales taxes on his retail purchases using his after-tax income.[6] In short, Mr. Citizen pays $741,622 in taxes over the course of his lifetime on his $2.432 million in income.





[6] In order to calculate the average amount of after tax income spent on taxable retail sales, data on total personal disposable income for the state of Missouri from the Bureau of Economic Analysis was combined with data on retail sales from the Missouri Department of Revenue. In 2016, total personal income in Missouri was $261.547 billion and total disposable (i.e. after tax) income was $232.029 billion. In 2016, Missouri had $86.762 billion in taxable sales. This means that, on average, people are spending 37.39% of their disposable income on taxable retail sales. See https://bea.gov/iTable/iTable.cfm?reqid=70&step=1&isuri=1&acrdn=6#reqid=70&step=1&isuri=1 and http://dor.mo.gov/publicreports/ for the corresponding data. *Note: Only the state level retail tax rate (4.225%) was used in this analysis. County and city additional sales tax rates on top of the state rate are ignored. Property and other excise taxes were also ignored. Therefore, this estimate of taxes paid is conservative.*

Now consider the case of Mr. Criminal. Mr. Criminal begins working at age 18, but commits a crime at age 20. Mr. Criminal is sentenced to 10 years in prison and is released at age 30. Mr. Criminal does not commit any other crimes for the rest of his life such that he does not recidivate. We can represent Mr. Criminal's time line in figure 8. Mr. Criminal earns identical income, Y_1, to Mr. Citizen between age 18 to 20. However, since Mr. Criminal is incarcerated between ages 20 to 30, there is no income earned such that Y_2 for Mr. Criminal is equal to zero. In addition, during this time-frame, Mr. Criminal incurs a cost to the taxpayers of C_1 dollars to house, feed, clothe, provide medical care, etc. while Mr. Criminal is in prison.

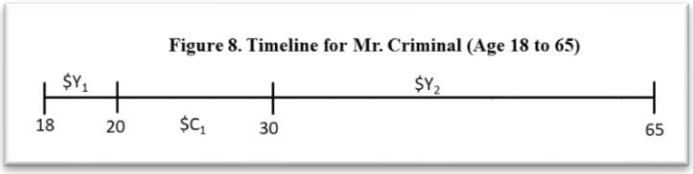


Figure 8. Timeline for Mr. Criminal (Age 18 to 65)

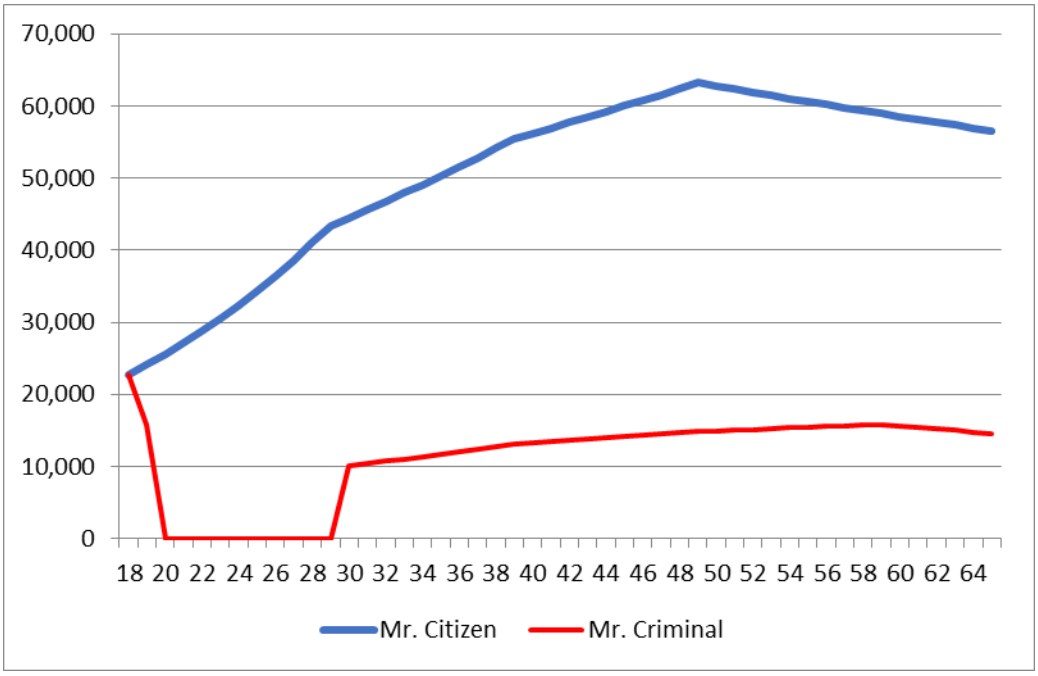
Upon his release, Mr. Criminal seeks employment. However, Mr. Criminal's Y_3 will be smaller in amount than Mr. Citizen's Y_3. This is for two reasons. The first is that it will be harder for Mr. Criminal to find employment (Schmitt and Warner, 2010). These decreases in employment can be substantial—on the order of 15 to 30 percent relative to citizens who were not incarcerated (Freeman, 1992). Prison has the effect of eroding what is commonly called 'human capital'. This shows up in many ways such as a loss of 'soft skills', on-the-job training, work experience, etc. and he is more likely to be out of the labor force all together compared to the median Mr. Citizen. Furthermore, if Mr. Criminal does find employment, he will, on average, work fewer hours than Mr. Citizen. These negative employment effects occur regardless of how long Mr. Criminal is incarcerated or at what age he is released.

Secondly, there is evidence that Mr. Criminal will not experience the gains in wages, and hence income, that Mr. Citizen receives. Empirical evidence shows that Mr. Criminal will suffer from a permanent decrease in his wage. Western, et. al. (2001) estimates this at between 10 to 30 percent of what would have been earned. However, other research shows that not only is there an earnings penalty, but that the penalty grows over time (Pettit and Lyons, 2009). This could be because released prisoners do not experience the normal increase in wages that occurs over the course of one's life (Pettit and Lyons, 2009; Western, 2002). Once again, these decreases in wages and stagnation in wage growth occurs regardless of what age Mr. Criminal is released from prison or for how long he was incarcerated for.

Figure 9 compares the age-earning profile for Mr. Citizen and Mr. Criminal. The 10-year cost of prison is estimated from the 2017 fiscal year per diem cost of housing a prisoner in Missouri—which currently stands at $57.25 and is known to grow and a compound average annual rate of 3.02%.[7] Over a ten-year time period, housing Mr. Criminal in prison will cost taxpayers $239,846. This is not the only cost though because Mr. Criminal will earn significantly less over the course of his life—and hence will pay significantly less in taxes. Recall that earlier research indicated that offenders released from prison would see reductions both in employment opportunities and hours worked as well as wages. Employment and wages might be reduced between 15 to 30% and wage growth over time could be reduced to zero for life. For comparison purposes to Mr. Citizen, it is assumed that Mr. Criminal faces a 20% reduction in employment, i.e., hours worked, and faces a 20% reduction in his hourly wage. In order to maintain a conservative estimate of the negative effect of his incarceration of society, it is instead assumed that wages for Mr. Criminal grow at half the rate that the general population sees over the course of their life rather than a rate of zero. Under this model, Mr. Criminal only earns $812,421 over the course of his life and pays federal and state taxes of $167,032. In short, the government has missed out on a potential $574,590 in taxes. When this is added to the ten-year cost of incarcerating Mr. Criminal that taxpayers already spent, we have a total loss to society and the government of $814,436.

[7] Data on the per diem cost of housing offenders in prison was from the 2016 Missouri Department of Corrections Annual Report https://doc.mo.gov/Documents/publications/AR2016.pdf. Data from past reports was used to calculate the growth rate in these per diem costs. The per diem cost of a prisoner in Missouri in fiscal year 2017 was $57.25 of which $16.67 represents food, health care, and other operational expenses. It can be important to distinguish between the 'average costs' and the 'marginal costs' of housing a prisoner. The marginal costs are the additional costs that are placed upon the criminal justice system and includes the inmate's food, medical care, etc. Part of the average costs include the costs of administration, building the prison itself, fringe benefits for staff, and the like—which are to a degree incurred regardless of the number of inmates in the prison. To illustrate the problem, consider a prison built at a cost of $1 million that can house 100 inmates for one year after which time the prison will become obsolete and all prisoners will be released. Also consider that it costs $20 a day to feed an inmate. If the prison is at its capacity of 100 prisoners, then the cost of building the prison has a daily cost of $27.40 per prisoner (1,000,000 divided by 100 divided by 365). When the $20 per day to feed the inmate is included we get a total daily cost of $47.40 per inmate. If, however, the prison is only at 50% capacity, then the government is incurring an average cost of $54.79 per prisoner per day (1 million divided by 50 divided by 365) to house the prisoners. With the additional $20 per day cost of food, we have a total daily cost of $74.79 per inmate. Now consider the cost when prisoner number 51 shows up to the prison. Since there is already excess capacity, there is no need to build a new prison and therefore no additional costs in this respect. (In fact, the additional prisoner lowers the average daily per inmate cost of building the prison to $53.72). There is only the additional cost of feeding the 51st prisoner—$20 per day. Therefore, one can ask how much does it cost taxpayers per day to incarcerate the 51st prisoner—is it $20 or $73.72? Both answers could be correct depending upon one's frame of reference.

Figure 9. Age-Earnings Profiles Compared (Mr. Citizen and Mr. Criminal)

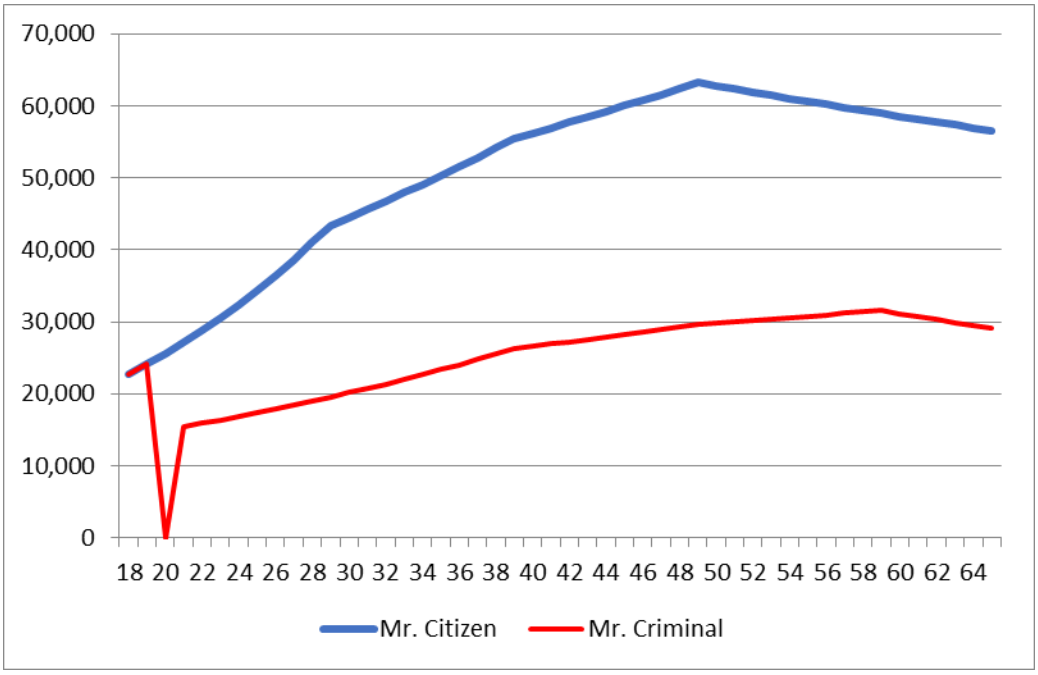


The differences between incomes earned by Mr. Citizen and Mr. Criminal are very dramatic. In fact, the numbers are so dramatic, that it is necessary to ask the simplifying question: If Mr. Criminal was in prison a shorter time, how much would the cost to society be? Figure 10 compares the age-earnings profile of Mr. Citizen with Mr. Criminal when he has only been to prison for one year. Mr. Criminal (1 year) has higher lifetime earnings than his 10-year counterpart, but these earnings are still dramatically reduced when compared to Mr. Citizen. Over the course of his working career, he only earns $1,202,527 and pays just $250,791 in taxes. In short, society has missed out on $490,831 in taxes. When combined with the $20,896 used to house Mr. Criminal (1 year), we tally that society has lost $511,727.

The costs and benefits discussed in the illustration were calculated using actual data. Note that it was assumed that there was no recidivism among Mr. Criminal. Since a large percentage of released offenders do indeed end up reoffending, the actual incarceration costs and loss of potential wages, and the tax dollars derived from the potential wages, would be higher. Most offenders who reoffend do so rather quickly. The rate of recidivism spikes within the first year of release and slowly begins to diminish over time—therefore, it can be difficult to determine an actual recidivism 'rate'. Studies that follow released prisoners for one year will

find a different rate of recidivism than studies that follow released prisoners for 3 years, 5 years, or 10 years.

Figure 10. Age-Earnings Profile (Mr. Citizen and Mr. Criminal [1 year])



Furthermore, there is an equivalency here that is important to note. Recall that we are looking at the median individual for 47 different years—ages 18 to 65. In other words, we have 47 different yearly observations on 1 median-type individual. This is equivalent to having a one-year observation on 47 different median-type individuals who range in age from 18 to 65. Doing this we see that we can tally the lifetime earnings of 1 Mr. Citizen over 47 different years, $2.432 million; or the total earnings in any particular year of 47 differently aged Mr. Citizens—the earnings in 2017 of 1 eighteen-year-old, the earnings in 2017 of 1 nineteen-year-old, the earnings in 2017 of 1 twenty-year-old, etc. The earnings in 2017 of these 47 differently aged citizens would tally to $2.432 million.

Economic Costs and Benefits for Missouri

A similar methodology used for the previous illustration was used to examine the costs and benefits of the Raise the Age legislation. The report has already discussed some of the probabilities of recidivism among youth sent to prison versus youth sent to juvenile rehabilitation

centers or other youth programs. To understand the costs associated with both outcomes, prison and rehabilitation, it is necessary to examine some of the data associated with each program.

Data on the projected costs of the Raise the Age program was examined from the Fiscal Note produced on January 27, 2017 by the Committee on Legislative Research Oversight (2017).[8] They estimate that there will be a net cost to the state of $31 million over the next 3 fiscal years with a yearly cost of $6.7 million when the program is fully implemented in 2024. There are activities that will incur costs to the state. These activities include construction costs for new facilities, renovation costs for existing facilities, staffing costs, case management costs, and other equipment and expenses. These costs are calculated to run $48.4 million over the next 3 fiscal years and to then have a yearly cost of $20.7 million thereafter once the new facilities are up and running. These additional costs to the state are based upon the assumption that there will be approximately 339 new 17year-old youth remanded to the custody of the Division of Youth Services per year. In fiscal year 2016, the Division of Youth Services had 73 new seventeen year olds committed to the system.

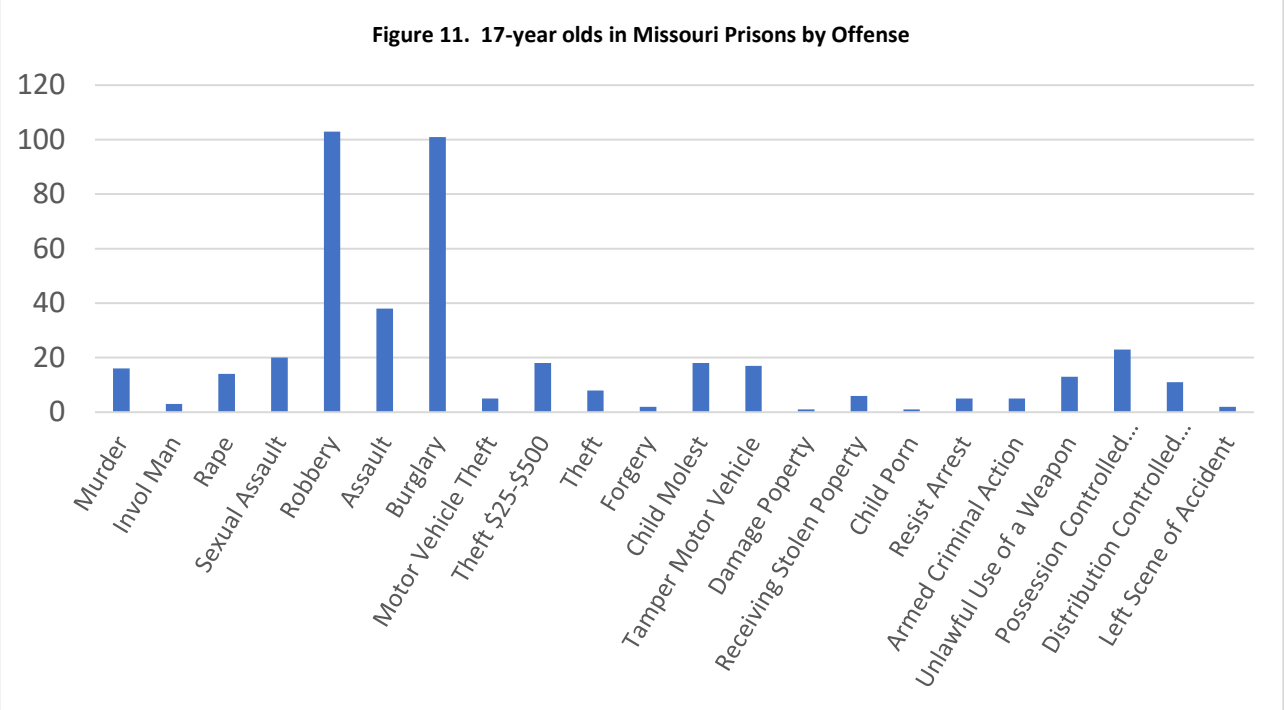
The higher costs faced by youth division services for housing additional juveniles per year is largely offset by the lower costs that the Department of Corrections faces for incarcerating these youths. For example, the Fiscal Note (2017) assumes that per year there will be 306 fewer offenders under the age of 18 in Missouri prisons due to the Raise the Age legislation. They further assume that they were sentenced to 6.5 years on average of which they would be expected to serve 2.7 years. Some of the released offenders would reoffend and be placed back in prison to serve additional years. These reductions in the number of youths placed into the adult system was estimated to save the state $17.51 million over the next 3 fiscal years. Once full implementation occurs, the savings to the state are $14,014,623 per fiscal year.

However, there is reason to believe that these savings to the state from not transferring juveniles to the adult system might be larger. Data on the number of 17-year-old youth currently in the Department of Corrections was examined. The data included 17 year-olds admitted to prison over the past 5 years and outlined their sentence length, date of offense, current age, and minimum eligibility date for release. Of the 430 prisoners examined, 2 had life sentences

[8]The Fiscal Note can be found here - http://www.moga.mo.gov/OverSight/Over20171//fispdf/0187-01N.ORG.pdf

without the possibility of parole. Of the remaining 428 prisoners, they were sentenced to an average of 7.3 years which is a longer time period than the assumption listed in the Fiscal Note.

Prisoners were grouped according to their most serious offence which is illustrated in Figure 11. Examining the data in Figure 11 shows that there is a wide range of offense that have



been committed by 17-year-olds. Of particular note is the number of 17-year-old murders. There is a total of 16 of them and they have received an average sentence of 19 years (excluding those with life without parole). Fascinatingly is the number of 17-year-olds in prison for stealing between $25 to $500—this count is at 18 and they are facing an average sentence of 5.4 years—only 1.4 years shorter than the average sentence for assault.

Recall that the Fiscal Memo predicted cost savings to the Department of Corrections of roughly $14 million per year based upon the assumption of 17-year-olds only serving 2.7 years—or 4.3 years if you count the total years served by released prisoners who are forced to serve more time for violating parole. The actual amount of cost savings in all likelihood is significantly higher if we use the data on the 430 youths who entered prison at age 17. Calculating a prisoner's age at the time they are first eligible for release results in an average age of 36.6 for murder, 29.3 years of age for sexual assault, 26.3 years of age for rape, 26 years of

age for robbery, and 22.2 years of age for manslaughter.[9] Excluding these crimes and examining the rest as a group, we see that the 17-year-olds admitted to the prison system will be on average 23.2 years old when they are minimally eligible for release. If they are admitted to the prison system when they are 17, then they will have spent between 6.2 to 5.2 years within the adult prison system.[10] This time frame of 5.2 years is 21% longer than was assumed under the fiscal note—or an additional costs savings of $3.258 million per fiscal year. Therefore, the fiscal year savings to the Department of Corrections will be $17.273 million per year and not $14 million. These higher costs savings from reduced prison costs that offset the higher cost for the juvenile facilities reduces the yearly net loss from $6.715 million to only $3.457 million.

However, these are not the only costs. If the 17-year-olds are transferred to the adult court system and placed into prison, the state will have the future costs of lower tax revenues from the released offender due to his lower income (Aizer and Doyle, 2015). There is a high probability that these lower tax revenues will be present for the reminder of the youth's life. Recall from the illustrative example that the level of employment, wages, and the growth rate of wages was reduced for ex-convicts. Now apply this model to the 306 seventeen-year-olds who will be released from prison and an average age of 23. Since they have been in prison from age 17 to age 23 they have very little, if any, work experience in the legitimate labor market. Assuming that they face the same constraints as in the illustrative example, and that they don't recidivate, these 306 prisoners will earn a collective $305.63 million in wages over the course of their lifetime and will pay a total of $62.251 million in taxes.

Now assume that these 306 seventeen-year-olds are transferred to the juvenile court system and remain there till age 21. Upon their release they begin to find employment. However, they do not find employment and receive wages at the levels that Mr. Citizen receives. There is little scholarly research on the long run effects of juvenile confinement, with no adult prison time, on a person's employment and wages—but it does appear that the effect is not as

[9] This report assumes that 17-year-olds who commit the violent crimes of murder, manslaughter, rape, sexual assault, and robbery will be transferred to the adult court system regardless of whether Raise the Age legislation is passed or not. Therefore, they are excluded from any further analysis of cost savings.

[10] The data of the 430 prisoners had birth date information and dated information on the offense, but no data on the date of first entry into the penal system. If the person entered on their 17th birthday, then they would spend on average 6.2 years in the penal system. If they entered closer to their 18th birthday, then they would have spent 5.2 years in the system. To maintain a conservative estimate of the cost savings, the 5.2-year time frame is used for further analysis.

negative as prison's impact (Aizer and Doyle, 2015; Hjalmarsson, 2008; Bernburg and Krohn, 2003). Some research, using long term longitudinal surveys, shows that persons who have never been incarcerated had higher wages then persons who were incarcerated and that these wage differentials were occurring *before* the person had actually been incarcerated—indicating that the person who was eventually going to be incarcerated had poorer employment prospects before they even committed a crime (Western 2002; Apel and Sweeten, 2010). To maintain the conservative nature of this analysis, it is assumed that wages from juveniles sent to the juvenile facilities grows at the same rate as they did for those juveniles incarcerated in adult prison in this study. It is also assumed that their wage and employment prospects are reduced relative to Mr. Citizen, but not as much as they are relative to juveniles sent to adult prisons. Under these assumptions, these juveniles earn lifetime income of $503.944 million and pay $114.222 million in lifetime taxes. This is an increase to the state of $51.971 million more in taxes than it would have received had these youths been sent to adult prison.[11]

In all likelihood though, this tax differential is larger. Recall that we have assumed that recidivism among both of these cohorts—seventeen-year-olds sent to prison and sent to juvenile facilities—is equal to zero. In reality this is not the case. Additional recidivism will result in a break in income for the individual and taxes for the state. It will also result in higher expenses for the state when the person is returned to prison. Recidivism rates among youth who are sent to adult prisons and are released as adults can be as high as 67% whereas the recidivism rate for 17-year-old as outlined in the annual report of the Missouri Division of Youth Services is 15%.[12] This means that sending 17-year-olds to adult penal systems almost guarantees that future taxpayers will be forced to pay additional future taxes to house the offender. This probability of

[11] These dollar amounts are estimates are for a cohort over the course of their life. If this group of 306 juveniles was a one-time only and one-year only event, then these increased earnings and additional taxes to the state would be spread out over the entire course of their life. Imagine that these 306 youths are born in the year 2000, commit a crime and are sent to a juvenile facility in 2017, are released in 2021, and begin working. Then in the year 2040, there will be 306 forty-year-olds who will be out in society who were once housed in juvenile detention rather than adult prison. However, if one assumes as per the Fiscal Note does, that there is a brand new yearly cohort of 306 youths every year who are kept in the juvenile system rather than the adult penal system, than in the year 2040, there will be 306 forty-year-olds, 306 thirty-nine-year-olds, 306 thirty-eight-year-olds, 306 thirty-seven-year-olds, etc. in society. Recall that these wage and tax estimates are for the median person over the course of their 47-year working life. Therefore, there is equivalence between looking at one person from age 18 to 65 (47 years) and looking at 47 different people at each different age between 18 to 65 (47 different median people) in one year.

[12] For recidivism rates among released adults, see https://www.nij.gov/topics/corrections/recidivism/Pages/welcome.aspx. The 2016 annual report of the Division of Youth Services is available at https://dss.mo.gov/re/pdf/dys/youth-services-annual-report-fy16.pdf

additional taxes to house the offender in the future is reduced if the 17-year-old is subjected to the juvenile justice system.

The increase in taxes based upon earnings on a yearly basis from having 17-year-old transferred juvenile court over adult court is larger than the net cost to the state as outlined in the Fiscal Note. Recall that the Fiscal Note shows a yearly ongoing net loss to the state of $6.7 million per year in 2024. This report has shown that the size of that net loss is probably smaller in nature and closer to $3.457 million due to longer time that 17-year-olds actually spend in adult prisons. If we include the gains to the state, in terms of higher potential tax revenues from higher earnings from these youths relative to youths who were sent to adult prison, we see that there is a yearly benefit to the state of $48.514 million—although it would take some time for these benefits to be fully realized. This is because it takes time for the new yearly cohort to gain enough size to have this large of an effect.

We can illustrate this effect in Table 1. Here we see that there is a new cohort of 17-year-olds coming into the juvenile system every year. For example, in the year 2017, 306 new youths come into the system. In the year 2018, a new group of 306 youths come into the system, but the group that entered in 2017 is now 18 years old. In 2019, another new group of 306 youths come in so that the group that entered in 2017 is now 19 years old, the group that entered in 2018 is now 18 years old, etc. By the year, 2024, there is a total population of 2,448 individuals of which 306 are aged 24, 306 are aged 23, 306 are aged 22, etc. If we examine the total earnings and taxes paid for each of these years we can see some striking numbers.

Table 1. Cohort Size and Total Population Over Time

Age / Year	17	18	19	20	21	22	23	24	Total Population
2017	306								306
2018	306	306							612
2019	306	306	306						918
2020	306	306	306	306					1,224
2021	306	306	306	306	306				1,530
2022	306	306	306	306	306	306			1,836
2023	306	306	306	306	306	306	306		2,142
2024	306	306	306	306	306	306	306	306	2,448

Let us first examine the earnings of Mr. Citizens over time. With a yearly cohort of 306 new 17-year-olds, we can see that there is a substantial increase in total earnings over time. In the year 2017, none of the 17-year-olds are employed and thus total income is equal to 0. By the year 2024, there is a total population of 2,448 individuals such that total wages earned by all of the different working cohorts is $58.5 million. These 2,448 individuals are paying over $13.3 million in taxes to both the federal and state government. These numbers are illustrated in Tables 2 and 3. Table 4 breaks out Mr. Citizens' total taxes paid to the state of Missouri in income and sales taxes in each of the different years. In 2018, only 306 18-year-olds are working and they pay a total of $324,000 in taxes. By 2024, total tax collection has grown to $2.974 million.

Table 2. 306 Yearly Cohort Earnings Over Time for Mr. Citizen (in thds of $)

Age / Year	17	18	19	20	21	22	23	24	Total Income
2017	0								0
2018	0	6,954							6,954
2019	0	6,954	7,378						14,332
2020	0	6,954	7,378	7,829					22,161
2021	0	6,954	7,378	7,829	8,308				30,469
2022	0	6,954	7,378	7,829	8,308	8,815			39,284
2023	0	6,954	7,378	7,829	8,308	8,815	9,347		48,631
2024	0	6,954	7,378	7,829	8,308	8,815	9,347	9,912	58,543

Table 3. 306 Yearly Cohort Total Taxes Paid by Mr. Citizen (in thds of $)

Age / Year	17	18	19	20	21	22	23	24	Total Taxes
2017	0								0
2018	0	1,467							1,467
2019	0	1,467	1,594						3,061
2020	0	1,467	1,594	1,728					4,790
2021	0	1,467	1,594	1,728	1,871				6,660
2022	0	1,467	1,594	1,728	1,871	2,022			8,682
2023	0	1,467	1,594	1,728	1,871	2,022	2,180		10,863
2024	0	1,467	1,594	1,728	1,871	2,022	2,180	2,348	13,211

Table 4. 306 Yearly Cohort Total Missouri Taxes Paid by Mr. Citizen (in thds of $)

Age / Year	17	18	19	20	21	22	23	24	Total Taxes
2017	0								0
2018	0	324							324
2019	0	324	355						679
2020	0	324	355	387					1,066
2021	0	324	355	387	421				1,487
2022	0	324	355	387	421	457			1,944
2023	0	324	355	387	421	457	495		2,439
2024	0	324	355	387	421	457	495	535	2,974

We continue this analysis with the 306 seventeen-year-olds who are sent to prison. Recall that this cohort is not expected to be released until age 23. Further recall that they are also expected to have lower wages and to actually work fewer hours over the course of their life. Tables 5 and 6 illustrate the total income earned by this group as well as their total income and sales taxes paid to the state of Missouri. By the year 2024, this population group of 2,448 is only earning $9 million a year—15% of the total earnings by the 2,448-person population group of median non-incarcerated earners. Total taxes paid to the state of Missouri comes in at only $302 thousand dollars—10% of the total taxes paid to the state of Missouri by the population of median non-incarcerated earners.

Table 5. 306 Yearly Cohort Earnings Over Time by Juveniles in Prison (in thds of $)

Age / Year	17	18	19	20	21	22	23	24	Total Income
2017	0								0
2018	0	0							0
2019	0	0	0						0
2020	0	0	0	0					0
2021	0	0	0	0	0				0
2022	0	0	0	0	0	0			0
2023	0	0	0	0	0	0	4,450		4,450
2024	0	0	0	0	0	0	4,450	4,584	9,034

Table 6. 306 Yearly Cohort Total Missouri Taxes Paid by Juveniles in Prison (in thds of $)

Age / Year	17	18	19	20	21	22	23	24	Total Taxes
2017	0								0
2018	0	0							0
2019	0	0	0						0
2020	0	0	0	0					0
2021	0	0	0	0	0				0
2022	0	0	0	0	0	0			0
2023	0	0	0	0	0	0	146		146
2024	0	0	0	0	0	0	146	156	302

Finally, we examine the cohort of juveniles who are not sentenced in adult courts, but sent to juvenile centers. Recall that to ensure we produce a conservative estimate, we assumed that this group would remain within these facilities until the age of 21; therefore, there are no earnings and no taxes paid while they are less than 21 years of age. Also recall that we are assuming that they have reduced earnings and employment opportunities once they leave the juvenile rehabilitation facility. Tables 7 and 8 show their earnings and taxes paid to the state of Missouri so that comparisons can be made to the other two groups: juveniles sent to prison and juveniles who are never incarcerated. Here we see that by the year 2024, this population group is earning $28.152 million in wages and paying $1.322 million in taxes to the state of Missouri—more than 4 times as much as is being collected from the population of 17-year-old who were sent to prison. Continuing this methodology, we can determine the additional tax revenues for the state which is derived from the higher earnings of the increasingly large population of juveniles who were not sent to prison. Once the first cohort of 17-year-olds reaches age 29, the additional tax revenues will be only slightly less than $3.457 million.[13] When the first cohort reaches age 36, the additional tax revenues will be in excess of $6.7 million. Since the population of persons who were not sent to prison grows every year, the annual additional taxes also grows every year. For the first ten years after the first cohort begins to work, this compound average annual growth rate in tax revenue is equal to 22.37% per year.

[13] Recall that it was assumed that these individuals did not begin working till age 21. If they are released from juvenile custody and begin to work earlier than age 21, then this age to reach $3.457 million in additional tax revenue is reduced accordingly.

Table 7. 306 Yearly Cohort Earnings Over Time by Juveniles not in Prison (in thds of $)

Age / Year	17	18	19	20	21	22	23	24	Total Income
2017	0								0
2018	0	0							0
2019	0	0	0						0
2020	0	0	0	0					0
2021	0	0	0	0	6,729				6729
2022	0	0	0	0	6,729	6,931			13660
2023	0	0	0	0	6,729	6,931	7,139		20,799
2024	0	0	0	0	6,729	6,931	7,139	7,353	28,152

Table 8. 306 Yearly Cohort Total Missouri Taxes Paid by Juveniles not in Prison (in thds of $)

Age / Year	17	18	19	20	21	22	23	24	Total Taxes
2017	0								0
2018	0	0							0
2019	0	0	0						0
2020	0	0	0	0					0
2021	0	0	0	0	308				308
2022	0	0	0	0	308	323			631
2023	0	0	0	0	308	323	338		969
2024	0	0	0	0	308	323	338	353	1,322

Conclusions

The problem of crime and how to punish it is a perpetual problem for society. It is generally in society's best interest if crime is punished with the offender freely able to reintegrate into society at the conclusion of their sentence. Unfortunately, prison destroys human capital, interpersonal relationships, coping skills, and the like, making reintegration into society difficult for many people. This failure to reintegrate can lead to a pattern of recidivism and lower earnings for the individual. Subsequently, from society's viewpoint, a person who commits crimes imposes a double burden on taxpayers. It requires higher taxes to pay for the prisons that house the offender. At the same time there is a reduction in the number of tax paying citizens which increases the per-person tax burden on the remaining free citizens for any given level of government spending.

What is true for adults is also true for juveniles. The cohort of 17-year-olds who are placed into the adult penal system will in all likelihood suffer a lifetime of lower wages and

probable recidivism—making them a net burden on taxpayers. If these 17-year-olds were treated in the juvenile system, they have a chance of making a life for themselves and making a positive contribution to society.

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