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# ALLEVIATING ECONOMIC INEFFICIENCIES IN PRISON LABOR PROGRAMS

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## 1 Introduction

Prison labor programs have long been a controversial topic in United States policy. While these programs offer a wide array of theoretical benefits such as helping prison inmates financially readjust to society upon release, defraying taxpayer costs of maintaining the prison system, and providing private companies with an expanded supply of labor, they also carry several hidden but significant drawbacks. In particular, introducing prison labor into the workforce can result in tradeoffs against the standard labor force population, in which private corporations favor making lucrative contracts with prisons over hiring regular workers, in a process referred to as insourcing. Insourcing benefits corporations at the expense of the employed and unemployed members of the labor force as labor opportunities are diverted into prisons, where standard minimum wage laws generally do not apply. The goal of this paper is to present the economic inefficiencies of insourcing as a tangible and pressing issue, all while navigating towards a solution that reforms insourcing to preserve its benefits towards prisoners, private companies, and society as a whole while mitigating its economic burden on communities and ex-inmates.

The structure of this paper will be as follows. Section 2 describes the history of United States prison labor programs, which will provide context for the present-day system along with the recurrent problems it faces. Section 3 will analyze the benefits and harms of the current system, highlighting key areas of concern and specifying what criteria an effective solution should meet. Section 4 will outline a model for performing cost/benefit analysis and propose a solution based on the model. Section 5 concludes, noting our current data limitations and future direction.

## **2 Background**

### **2.1 Historical Overview**

Modern industrialized prison labor in the U.S. dates back to the late 19th century, in which prison convicts were leased to farms, mines, and factories as cheap sources of manual labor. During the Progressive Era of the early 20th century, however, protests from reformists, labor unions, and business groups gradually eliminated the convict leasing system from statewide public policy [11]. Reformists drew comparisons between convict leasing and slavery, observing the squalid conditions and lack of regulations for convict laborers. Free laborers often went on strike, as the introduction of convict labor depressed wages, curtailed union power, and reduced general labor opportunities. Small business owners that could not feasibly employ convicts in a profitable manner expressed concerns over not being able to compete against larger businesses employing convict laborers, who were both paid a much smaller amount and unable to strike. Widespread moral and economic opposition to early prison labor programs resulted in the passage of the 1929 Hawes-Cooper Act, which placed severe restrictions on both the sale and interstate movement of prison-made goods, effectively removing any significant detrimental effects of prison labor on the free market [8]. In place of leasing, in 1934, the Roosevelt administration implemented the Federal Prison Industries, a government-run prison labor program aimed to reduce idleness in prisons while ensuring that prison labor could not compete with free market labor. This initiative kept prisoners strictly within the boundaries of providing services in the public sector for nearly a half-century.

### **2.2 Prison Industries Enhancement Act**

The effective re-entrance of prison labor into the private sector took place in 1979 upon the passage of the Prison Industries Enhancement Act (PIE), which enabled state-run prison systems to legally contract with private firms. These contracts involved either the hiring of convicts by private firms or the purchase of goods and services produced in prisons. Prisoners received a small percentage of their actual salaries while the remaining income would be used to finance incarceration costs and victim compensation funds. According to the Bureau of Justice Assistance (BJA), prisoners working under PIE contracts have raised a total of roughly \$500 million in taxes, restitution, prison operating costs, and family support from 1979 to 2018 [13].

The PIE adopted several measures to ensure that prison labor would not negatively disrupt the external labor market. First, it mandated that private firms pay wages “at a rate not less than paid for similar work in the same locality’s private sector.” Second, it capped wage deductions from prison inmates at 80 percent [7]. Third, it required that prison institutions acquire “written proof of consultation with organized labor and local private industry,” although third parties did not necessarily hold veto power over contracts being considered.

Despite these measures, the new system of cooperation between state prisons and private firms drew ire from many laborers and business managers in the free market, with many of their concerns echoing those from several decades prior. Although these prison labor programs operated on a much more controlled scope in a manner that, per the BJA, would not displace employed laborers in the free market, their adverse economic effects could still be observed via the considerable profits going to firms that hired prison inmates as well as the perceived reduction in job opportunities in

the free labor market. Meanwhile, proponents of the PIE contracting system argued that inmates stood to benefit greatly from learning and improving their skills rather than become idle, and private companies could practice insourcing as a favorable alternative to seeking cheap labor abroad or reducing their labor supply.

### **2.3 Further Privatization and Deregulation**

The passage of the PIE set the legal precedent for the overarching trend of deregulation in the prison industry. During the War on Drugs era of the 1970s and 1980s, the prison system saw a wave of deregulation in oversight for prison labor programs, which resulted in the disappearance of severe restrictions on capitalizing from prison-made goods and services. The emergence of privately-run prisons further accelerated this trend. The 1980s saw the formation of a pair of private for-profit companies, Corrections Corporation of America (CCA, now CoreCivic) and Wackenhut Corrections Corporation (WCC, now GEO Group), both of which won contracts with state and local governments to establish a vast network of prison facilities and detention centers across the country. Alongside smaller private prison firms, these corporations took charge of roughly 10% of the incarcerated population. Despite this small percentage, private prisons became characterized by their much more expansive prison labor programs compared to tightly regulated state-operated prisons.

With exact details and statistics regarding prison labor largely shielded from public scrutiny, labor programs in both public and private prisons have stirred controversy following reports of prisoners often being paid extremely low wages, ranging from receiving no income to \$1.15/hour [19]. Beyond moral criticisms regarding these exploitative prison labor practices, the same concerns as those with the PIE contracting system were amplified in the setting of deregulated private prisons, as the wages being paid were certainly incomparable to minimum wage rates, even when considering systematic wage deductions.

## **3 Economic Analysis of the Prison Labor Industry**

Given the context of the prison-industrial complex within the United States, we now address the social costs of the system. We seek to understand the tradeoff between benefits garnered, particularly by corporations and prisons, and economic loss on the part of communities, inmates, and the general public, addressing concerns raised by previous economic studies. This analysis is then used to provide the framework for regulatory solutions aimed at increasing social utility and equity, highlight a novel metric for determining relative loss to prisoners within this ecosystem, and create a model of bidding for prison labor contracts.

### **3.1 Perceived Necessity of Prison Labor**

We first consider the factors within the American prison systems over the past few decades that can be seen as reasons for prisoners to work and output goods that can then be sold to recoup losses. In particular, since 1990, the inmate population in state and federal prisons has skyrocketed from approximately 600,000 to 1.5 million [2]. Adding in statistics for private prisons, this number is estimated to have been just under 2 million in 2001, nearly 20 years ago

[19]. This represents a 5% yearly increase in the number of prisoners, compared to a 1% yearly national population growth in the time period.

While this doesn't indicate a need for prison labor by itself, the rise in population has occurred alongside an increase in the cost of incarceration. Currently, it costs more than \$31,000 annually to incarcerate an individual, which government agencies seek to offset in part by putting prisoners to work. From 1990 to 1996, these expenditures faced by corrections departments increased by 11% annually [14], outpacing growth in actual prison population.

Finally, prison labor is sometimes presented as not just a necessity, but also a positive contribution within the U.S. labor market. In particular, the prison-industrial complex is used to offset the effects of immigration reform with respect to the southern border. Here, the federal government encourages farmers to fill the labor void created by deportation of seasonal migrant workers by utilizing the local prison population [5].

### **3.2 Benefits to Inmates**

According to their supporters, prison labor programs provide economic benefits not only for governments and industry, but also for the prison workers themselves. They claim these programs can reduce prison idleness, an unattractive alternative to working, and allow for prisoners to focus on developing their skills. In addition, local prison agencies that have established specific structured training and work programs have noted more altruistic purposes to prison labor, including the provision of employment training in order to increase inmate marketability [22] and prepare prisoners for the "real-world job market" [12] through continuous exposure. In essence, proponents of such programs propose that prison labor is a mechanism that effectively increases the market value of inmates by providing them with skills that are transferable to industry upon release.

Beyond claims of increasing market value and teaching skills, which we will analyze later, we note that these specialized work programs themselves comprise only a minuscule proportion of the overall prison-labor architecture. At a federal level, directives such as the Prison Industry Enhancement Certification Program (PIECP), which provides minimal labor and wage protections, only employs 5,000 total inmates. Low participation rates persist even at the state level. In Colorado, the department of corrections includes a branch called the Colorado Correctional Industries (CCI), responsible for prison work programs for inmates. In 2015, only 1,800 CCI prisoners were given the opportunity to participate in industrial labor, a mere 5% of the 35,000 total inmates [22]. Similarly, the Michigan State Industries (MSI), an analogue to CCI, employs 500 prisoners, which makes up an even smaller 1.75% of inmate population.

### **3.3 Labor Market Outcomes**

Although agencies claim that prison labor teaches transferable skills, most institutions, in pursuit of profit, eschew any semblance of inmate development entirely. For example, some Department of Corrections affiliated industries, including furniture manufacturing, simply buy and resell at a profit, utilizing inmates to repackage and transport items but avoiding the actual creation of any new goods [3]. Moreover, even in less-desirable and dangerous positions, such

as wildfire fighting, prison crews are used on the periphery, never garnering "on-the-job" experience that could help with future employment [4].

Statistics on the post-incarceration impact of prison labor programs, however, indicate some level of correlation between participation and a lower rate of recidivism [22]. However, we theorize that this is due to selection bias within the population of inmates—since most prison-industry programs, like the aforementioned CCI and MSI, require that participants have a GED, and those who have a GED in general are shown to also have lower recidivism rates [22]. Thus, we suspect the correlation isn't specific to the actual programs themselves. Our hypothesis is supported by a study that shows the rates between prison-labor participants and non-participants were identical when controlling for differences in characteristics associated with recidivism, the rates between prison-labor participants and non-participants were identical [10].

We also note that the structure of prison labor programs inherently detaches most prisoners from improving their welfare significantly after release. This situation is due to an ongoing shift of the U.S. market from a manufacturing to a service-based industry. In general, globalization, technology, and immigration have reduced the number of blue-collar jobs needed, so even if prisoners are leaving their sentences with specialized, job-specific skills, these characteristics are no longer selected for. In actuality, the claim that working while in prison improves market outcomes directly has been shown to be the opposite of reality [21]—incarceration tends to decrease available productive capital. We theorize this occurs because prisoners are removed from the open market, which decreases their potential for job training, and their social contacts are eroded while incarcerated, which reduces chances of obtaining employment.

Armed with this data, we posit that incarceration as a whole, when effective labor programs aren't implemented, creates a negative feedback cycle within the economy that perpetuates misconceptions in true and perceived unemployment. Specifically, we believe that when considering short-term outcomes, incarceration directly removes working-aged individuals from the labor force, which causes actual measures of unemployment to drop. Then, when these individuals are reintroduced to society, they lack the skills to participate in the labor force, thus reducing their job prospects and, when they drop out of searching, leading to a lower perceived unemployment rate.

### **3.4 Post-Incarceration Utility**

When modeling the economic impact of prison labor programs, it is crucial to understand the factors that most influence market outcomes for former inmates. Specifically, we aim to create an additional metric that can be applied towards our bidding model in order to weigh the utility gain of participants when considering the allocation of prison-labor contracts.

This approach is motivated by studies that indicate that, within the first year after an inmate was released, their median reported yearly earnings were \$10,090, far lower than other earners similar brackets, with 45% of former inmates reporting no earnings at all [6]. Moreover, studies have shown that within the labor market, former prisoners inherently face some of the harshest discrimination relative to others with similar backgrounds, noting that the average inmate earns \$ 179,000 less by the age of 48 with respect to someone with the same skillset that had not been incarcerated [9].

Finally, we also note that in many states, parole regulations allow former inmates who are not capable of obtaining employment to be re-incarcerated [9].

Given these considerations, we aim in section 4.4.1 to create a measure of relative utility gap for inmates based on their post-prison employment, wages, and potential recidivism, that can then be used to assess bidding for prison contracts relative to their vocational/skill-developing contents.

### **3.5 The Business of Prison Labor**

Within recent years, the overall prison industry has consistently been one of the fastest-growing fields within the U.S. [16]. In this categorization are private, for-profit, prisons and the wealth generated by subcontracting labor from the private industry to both private and public jails. However, even when considering just profits from prison labor, we find that the field is extremely lucrative, with annual revenue in 2013 estimated around \$2 billion [5].

We note that this trend in private industry infiltration is marked by the aforementioned Prison Industries Enhancement Act in 1995. Before the passage of PIE, although contracting to prisons was still legal in some scenarios, the inmates had rights to the state minimum wage [1], which served to lower the profit gap and thus drive industry towards minimum-wage, non prison laborers and cheaper offshore ones.

Moreover, in recent years, there has been greater political pressure on large corporations to bring back capital and industry to the United States, which has led some companies to consider prison labor.

However, the remarriage of industry and correctional facilities has actually led to a drop in real wages for inmates. Because of the deductions that PIE allows, businesses tend to garnish a significant portion of workers' wages, leading to average inmate pay in private prisons to be \$1.02 an hour, contrasted with an average between \$0.93 and 4.73 for state facilities. On an even starker scale, private enterprises contracting to prisons pay a daily average of, \$0.16 on the lower end.

### **3.6 Business-Induced Cost Incurred By Communities**

One of the most commonly proposed reasons for restricting prison labor programs is its unknown impact on the prevailing economies of local communities. Based on the sparse data available, however, we posit that utilization of prison-labor has a non-deterministic impact on the local market that varies on a case-by-case basis.

Specifically, we note scenarios where corporations do indeed transfer jobs from the free market into the prison market, such as Lockhart closing its Austin plant in 1993, laying off 130 workers earning \$10 an hour, and moving manufacturing to a prison 30 miles away and recycling plants in South Carolina firing workers who sorted trash in lieu of unpaid inmate labor [9].

On the other hand, in a case study of the Michigan prison system, it was found that the expansion of prisons and labor programs has led to job creation within the prison-oversight market, wherein the removal of working people due to incarceration was somewhat offset by the creation of supervisory roles. This is seen in the Ionia prisons in Michigan,

which employ over 1,500 guards and other workers for a prison population of only 5,000 [12]. Thus, in some scenarios, it is also possible that prison systems as a whole act to create jobs on a market adjacent to the ones that may be impacted by businesses.

The economic impact of employing prisoners within the public labor force, however, goes beyond direct local repercussions. In particular, when considering our model on the allocation of prison contracts to companies, we note the importance of determining how businesses who get these contracts, which inherently come with lower costs within the supply chain and thus a comparative advantage in the market, should compete with those who don't. Thus, because we can't directly control the market interactions between corporations, our model instead factors in the relative market distortion due to the relatedness of different markets.

### **3.7 Social Costs Incurred By Communities**

Incarceration of working-age people removes over \$300 billion in surplus GDP [17], which directly lowers the productivity and economic outcomes of the respective communities. Moreover, based on the general demographics of the incarcerated population, including geography, this burden is concentrated in a few communities with a disproportionately high levels of incarceration [17].

Specifically, we note that a large number of communities that are impacted by incarceration tend to be urban. When inmates, both with and without prison-labor experience, are released en masse into these dense, geographically concentrated environments, their communities, which tend to already be struggling with higher rates of poverty and a lack of job opportunities, are put under even greater strain.

Given these considerations, we note that with appropriate data, the model could consider the relative growth of employment opportunities in high and low incarceration areas (a split that, as mentioned above, tends to be urban/suburban). Moreover, in order to explain the counter-intuitive finding that county unemployment rates have a negative correlation with the time it takes to find a job upon release from prison [14], we posit that the major social cost that prison labor extols on a community is the reduction in job opportunities and prospective wages of workers who haven't completed high school (and don't have a GED). This is due to our analysis in section 3.3 that the impact these programs have on the labor market is more due to their self-selecting nature with regards to qualified candidates.

### **3.8 Circumvention of Prison Labor Laws**

Beyond the social gains and losses delineated above, the interactions between players in the current game of prison labor also reveals insights that will inform both our regulatory suggestions and model parameters. If we consider PIECP, a program that enables corporations to sell goods made in prisons across state lines, we find companies regularly exploiting loopholes within the legislation to circumvent wage and local impact quotas. Specifically, some companies partition a project into production of intermediary pieces (for which inmates are paid extremely low wages) and final assembly (which earns a much smaller subset of inmates PICEP mandated wages) [5]. Moreover, companies also utilize a system of "trainees," who are used in a certain task for as long as they can be paid non-PICEP wages, then

made into a "trainee" for another task. The ability of companies to utilize these loopholes also has an economic impact on local communities. This occurs when corporations circumvent consulting with local businesses, causing potential interference with employment of free-labor in the non-prison ecosystem.

With these considerations, we note that in order to effectively reduce the inefficiencies caused by prison-labor programs, our model must encapsulate some form of allocating contracts that considers not only a company's impact on its laborers but also the effect of employing prison labor on local employment and market conditions.

## **4 Proposed Solution**

In this section, we will prescribe a set of regulations along with an overarching bidding mechanism for contracting prison labor to private companies in a manner that attempts to alleviate the economic inefficiencies identified in the previous section. We will analyze the strengths and limitations of our plan and suggest a model that, given real-world data, can generate accurate feedback of the performance of our solution.

In Section 3, we observed that while prison labor programs provide marginal benefits for inmates via on-the-job training and preventing idleness, the subcontractor firms remain the primary benefactor, as they almost always are able to pay below-market wages by insourcing jobs, empirically preferring this option to hiring free laborers. This system creates inefficiencies similar to those arising from oversubsidization. Meanwhile, free laborers in the open market become more prone to the dual possibility of unemployment and wage stagnation due to the increased labor supply. Any satisfactory solution must both preserve the prison labor system for its benefits to inmates and firms while making the labor market more equitable for both inmates, free-market laborers, and smaller businesses.

### **4.1 Preliminary Regulations**

First, we propose a set of regulations in order to fine-tune the environment of the prison labor market. We mandate that all potential inmate laborers must provide signed consent for their participation in the prison labor market. This provides legal insurance and prevents over-saturation of the prison labor supply, preventing the undesirable transfer of even more market power over to private firms. In addition, inmate training programs for the job positions they have been contracted to fill are to be subsidized using government funds on a need-based scale, with more subsidies being granted to firms with smaller capacities and resources. This levels the playing field for smaller businesses who often are unable to bear the brunt of initial costs for training inmates and makes their participation in the prison labor system much more viable. Finally, we mandate full transparency of inmate wages for both state-operated and privately operated prisons, to be documented in government records. This serves to both protect inmates from being underpaid in the private sector and develop a reasonable picture for the market-clearing price of prison labor.



## **4.2 Bidding System**

To award contracts, we specify that local and state prisons are to use a public second-price sealed bid auction system, which will be accessible to companies certified to handle prison labor contracts. We divide the overall prison labor market into a few broad categories such as manufacturing/factory jobs, services, and various trades. Each of these categories will hold separate auctions, with inmate laborers indicating preference for their area of expertise or the area for which they are interested in developing skills. This division carries the purpose of utilizing inmates' pre-existing skills as well as protecting smaller firms against not being able to outbid larger firms from different sectors. However, the number of categories cannot be too large, since an ample amount of firms within a given bidding category is necessary to ensure a healthy amount of bidding competition and prevent collusion.

In the next section, we critically analyze the potential improvements, disadvantages, and limitations of our proposed bidding system.

## **4.3 Analysis**

The second-price sealed bid setting is known to be strategy-proof and incentive-compatible, meaning that truthful bidding is a dominant strategy. Assuming no collusion, this system would maximize the public revenue to be gained from prison labor contracts as well as reveal the actual private valuation of the labor capital in prisons. Compared to the status quo, private firms would have to pay an amount closer to the actual value they place on prison labor, increasing efficiency and bringing direct benefits to prison laborers (who receive higher wages, more suitable jobs, and the ability to give consent). Using this mechanism, free-market laborers also stand to benefit, since private firms will no longer be able to exercise their market power in the prison labor industry and exploit prison laborers for artificially low wages.

### **4.3.1 Effects on the Prison Labor Market**

We observed above that prison laborers stand to benefit from higher wages and more suitable job opportunities in our proposed system. Recall that the overall goal of any solution should be to ensure that prison laborers can receive sufficiently high wages and express willingness to engage in labor programs. While we can rely on the auction system to raise the selling price of contracts and thereby increase inmate wages, it remains to be asked whether prisons can register enough inmates in the prison labor force such that the auction supply is sufficiently abundant for the additional small firms expected to participate in these auctions. One common practice used to motivate inmate participation in prison labor programs is the reduction of prison sentences. While this is empirically effective, a possibility for abusive legal practices arises if courts hand down longer and/or harsher sentences to coerce inmates into joining the prison labor force. Vigilant and comprehensive oversight would be required to prevent these potential abuses.

### **4.3.2 Effects on the Free Labor Market**

Despite our proposal having to potentially expand the prison labor market, the newfound competitiveness of inmate wages should increase the relative viability of free-market labor for large firms, making free-market laborers better off

in terms of wages and employment opportunities. In regards to smaller firms that gain newfound access to the prison labor market via training program subsidies, they would still hire primarily from the free labor market, as outbidding larger firms and investing in inmate workers represent considerable enough burdens to offset the lower wages they would have to pay. As a result, small firms will gain a wider access of opportunities that do not involve outsourcing or cutting costs, while workers in the free market will become more competitive against prison laborers as prison labor wages increase.

### **4.3.3 Effects on Government and Society**

There are a few factors external to the labor markets that remain to be considered. Overall, an expanded prison labor market with more participating firms can result in more inmates receiving job training and experience, which can contribute to long-term decreases in recidivism rates, as described in Section 3. Inmates with training and experience would have an easier time reintegrating into general society and become more likely to find employment. As for public funds, the government would be expected to be paid a larger amount per contract due to a strategy-proof bidding system, and these funds can be used to offset the additional costs of implementing training programs for inmates. While the exact logistics would have to be worked out, training programs remain a fruitful investment nonetheless. Lastly, the regulations that we propose can lead to greater oversight of both the public and private prison industry, both of which are currently fraught with controversies in regards to labor insourcing. With greater transparency comes greater accountability, and in the long term, our proposed solution can mitigate the possibility of the prison system being exploited for cheap labor.

## **4.4 Modeling Heuristics**

Given our bidding system for prison contracts, we now aim to make the setup more responsive to some of the previously proposed inequities, particularly with regards to individuals' expected post-incarceration utility and local impact. While the regulatory solutions proposed in section 4.1 aim to address these issues, they require changes in underlying laws, the feasibility of which is uncertain in longer timeframes. Therefore, we provide an explicit metric for determination of costs incurred by ex-prisoners and a model for considering the impact businesses that contract with prisons can have on the economies of local communities.

### **4.4.1 Metric**

In section 3.4, we discussed some economic indicators for ex-inmates, including median annual earnings and percentage income reporting. We first note that although earnings reporting isn't equivalent to having a job, since people can work for under-the-counter payments, being able to show some steady occupation is necessary for parole and reincarceration in many states. Thus, we will consider percentage reporting to be some constant factor of percentage employment.

Our metric for prisoners then measures a per-inmate loss in utility. We define:

- $w_f$  : the median expected earnings for a non-incarcerated person

- $w_p$  : the median expected earnings for an ex-prisoner
- $P_j$  : the expected probability of obtaining employment within the first year of release
- $l(t)$  : a function on the number of years,  $t$ , spent in prison-labor programs.
- $\{\delta_1, \dots, \delta_3\}$  : coefficients for each of  $w_p, P_j, l(t)$ , which we would determine given data on prison systems, used order to calculate the relative importance of each factor.

Here, we note the ratio of wages,  $\frac{w_p}{w_f}$  to be an important factor in determining relative utility loss. Per prisoner, we then consider their probability of obtaining no wages or being reincarcerated, which leads to no utility gain in the first scenario and a net utility loss in the second, and compare between cohorts of controls (normal people within the bracket) and prisoners (with and without some form of prison-labor participation).

We will discuss data limitations in section 5, but ideally, we would use statistics from federal prison work programs to create three dimensional vectors measuring the number of inmates, time spent in each program per inmate, and job type(s) assigned. We would then label each of these vectors based on post-prison employment for the first year for prisoners in a probation, which is available online. Our function  $l(t)$  would then extrapolate from this data in order to numerically approximate an appropriate ratio of importance for each term.

The way we then look to integrate our metric into the bidding system considered above is to create a notion of 'social credit,' a pseudo-currency allocated to proposals as a method of measuring their ability to increase prisoners' marketability and prospects in the open market. The aim is then to allow companies to bid with some fraction of their proposal's social credit. In this way, jobs that can raise the utility of prisoners are rewarded marginally without costing the purchasing company in actual monetary considerations, which should enable inmate wages to remain constant.

#### 4.4.2 Evaluating Local Impact

As we noted in section 3.6, the local impact of businesses that employ prison labor isn't uniform. Thus, we suggest a general framework that can be utilized to evaluate companies on their proposed prison-labor contracting. Specifically, we envision that when a company bids for prison contracts for a proposal, instead of relying on the company to independent determine excessive local impact, which was often circumvented, as we saw in in 3.8, this general framework can be used to independently assess and weigh local market disturbances.

We posit that in order to determine the local economic effects of utilizing prison labor, we need to consider the relative geography of goods and services produced, their destination, local competition, and secondary input into the community. Specifically, we first note that local industry is not displaced if the encroaching industry (that of the company) doesn't constitute a large market-share within the area. Moreover, if the goods would originally have been produced out of state or internationally anyway, as might be the case when considering large companies, there isn't a negative impact on local labor. In addition, we note that the goods created by the new company could generate input into the local community (through purchases) that represents a surplus value added to the community.

## 5 Future Work

In our paper, we started by considering the possible avenues of economic loss and gain for the parties involved with prison labor. This economic analysis, found in 3, allowed us to elucidate specific market failures and inequities within the current system that we then aimed to rectify by proposing a public second-price sealed bidding model, 4.4, not considered in prior literature. We then augmented the model with more specific measures of economic impact on the part of inmates and communities. Moving forward, in order to turn our proposal into a full-fledged paper, we would require data streams that allow model calibration and validation. Currently, none of the data collections available from the Bureau of Justice Statistics measures any notion of prison employment or public-private partnerships in this field. We have, however, reached out to the Minnesota department of employment and economic development, in order to obtain statistics on unemployment insurance and under-jurisdiction offender data. We thus envision that, once we obtain appropriate data streams, we can then start to empirically test our model in order to make adjustments and consider new methods of improving outcomes.

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