

## JOBS, NEWS AND REOFFENDING AFTER INCARCERATION\*

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We study how local labour market conditions and information about job availability affect recidivism after incarceration. We exploit daily variations in the quality of the labour market at the time of release from prison. We combine individual-level administrative data on former inmates in France to county-level daily data on new job vacancies, and on newspaper coverage of job creation and destruction. Our analysis provides two new findings. First, media coverage of job creation reduces recidivism, suggesting that policies promoting access to information about employment opportunities can contribute to reducing recidivism. Second, we show that there is heterogeneity in what kinds of jobs affect recidivism: in France, former inmates do not respond to overall job creation, but better opportunities in manufacturing jobs at release reduce recidivism rates.

Theoretically, labour markets are considered to be an important determinant of crime. The standard economic model of criminal behaviour (Becker, 1968; Ehrlich, 1973) implies that potential offenders should decrease criminal activities when they face an increase in job availability. All else equal, the opportunity cost of time spent both in criminal activity and in prison if apprehended and convicted rises when labour market conditions improve.<sup>1</sup> However, for this prediction to hold, potential offenders would have to respond to variations in incentives created by changing labour market conditions. Although intuitive, this may not be a relevant margin for people who are most likely to offend, and in particular for people who are just released from prison. People entering prison tend to not have been employed in the formal sector (Western and Pettit, 2005; Loeffler, 2013; Looney and Turner, 2018), and, post-release, they might be screened out by employers in legal labour markets (Kling, 2006; Agan and Starr, 2018; Minor *et al.*, 2018), or they may be opting for informal jobs (Western *et al.*, 2015). They may also lack relevant human capital or information about job availability, or incarceration could have increased the returns to crime beyond that of any legally accessible job. Understanding how former inmates' recidivism responds to factors that might affect their probability of finding a job, such as knowledge about

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The authors were granted an exemption to publish their data because access to the data is restricted. However, the authors provided a simulated or synthetic dataset that allowed the Journal to run their codes. The synthetic/simulated data and codes are available on the Journal website. They were checked for their ability to generate all tables and figures in the paper, but the synthetic/simulated data are not designed to reproduce the same results.

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<sup>1</sup> Job-search models of labour markets and crime also predict, from another angle, that more job opportunities for individuals just released from prison would reduce recidivism (Engelhardt, 2010).

job availability or types of jobs most likely to affect recidivism, is crucial when exploring how economic levers can be used to design effective crime control policies. In this paper, we ask how job availability and information about employment opportunities affect reoffending.

We focus on the relevant but overlooked role that local labour markets, and in particular information about job availability, play in reoffending. This exercise poses empirical challenges, due to confounding factors correlated with both labour markets and offending. For example, people with better jobs might elect to move out of higher crime areas, leading to a non-causal correlation between offending and lower job availability. We address these major identification challenges by using granular data on releases from prison and on job availability, and exploiting daily variations in labour markets upon release from prison.

We combine three administrative data sources. The first source is administrative data on all inmates released from France in 2009–10, provided by the French Ministry of Justice. The second source is high-frequency administrative data on new job vacancies in French firms provided by the French agency for employment (*Pôle emploi*—hereafter, PE). Finally, we use daily, county-level data on media coverage of labour markets. These data, collected by a private firm, include newspaper and internet coverage of job openings and downsizing. For each former inmate, we construct two indexes to capture the quality of the labour market in their county (*département*)<sup>2</sup> of residence, in the 30 days following their release from prison: the number of PE job vacancies; and the number of news stories on job openings and job cuts. Our identification strategy exploits daily variations in the number of available jobs and in the flow of information about job openings and closings within counties. The high frequency of our data coupled with spatial variation allows us to control both for fixed and time-dependent unobserved heterogeneity. We exploit ‘as good as random’ variations in the daily news coverage of job creation and destruction, and in exact timing of release from prison, to identify the effect of news about jobs on recidivism. In our main analyses, we define recidivism as re-entering prison within six months of one’s release.

First, we find no effect of general local labour market conditions on recidivism. However, relevant labour markets do affect recidivism: an increase in manufacturing jobs in one’s county of residence just after release from prison is correlated with less recidivism. Furthermore, conditional on existing job vacancies, media coverage of job creation affects former inmates’ propensity to reoffend. Holding constant the number of jobs, former inmates are less likely to recidivate when there is more media coverage of available jobs. Conversely, an increase in the number of news stories on job cuts does not affect the probability of reoffending. We provide evidence consistent with the interpretation that media coverage of job creation provides useful information to former inmates in search of legitimate employment opportunities. First, news about job creation covered in the 30 days before an inmate’s release does not reduce recidivism. Moreover, news published in online-only sources (such as professional websites), which are less popular than newspaper websites, have no effect on the probability of reoffending. Finally, when we isolate news stories about firms releasing vacancies through PE, we find that these affect recidivism, even after controlling for vacancies. In these circumstances, the news stories likely provide new information relative to the vacancies. While we cannot directly measure inmates’ employment, we provide some suggestive evidence that our effects are mediated by better employment perspectives. Indeed, among people who are reincarcerated, those released from prison when there was more coverage of job creation were more likely to report having a job. In terms of policy relevance,

<sup>2</sup> There are 96 *départements* in mainland France and Corsica; our analysis focus on these units thus overseas departments (in the Caribbean and Pacific).

our work is helpful both in documenting spillovers of job creation policies and, more directly, for our understanding of how policies increasing jobs opportunities help to reduce reoffending.

We are able to focus directly on labour market conditions by using high-frequency data. We are able to capture appropriate measure of relevant labour market conditions—daily job openings, and daily media coverage of jobs—instead of aggregate job vacancies, or overall unemployment rate. By contrast, prior studies have looked at the aggregate relation between labour market conditions and crime to test the theoretical prediction of a positive relation between unemployment or wages and crime (Raphael and Winter-Ebmer, 2001; Gould *et al.*, 2002; Machin and Meghir, 2004; Oster and Agell, 2007; Lin, 2008; Fougere *et al.*, 2009). These papers address the main identification issues by resorting to instrumental variable estimates and find an increase in property crimes with higher unemployment. The structure of our data allows us to achieve identification of the effect of local labour market conditions in a relatively parsimonious way with respect to these studies. Moreover, our news-stories data allow us to bring in a new dimension to the analysis by providing evidence of the effects of information about labour market conditions.

Only a few papers focus on the effect of labour market conditions on former inmates or specifically of individuals at higher risk of offending (for a recent review, see Doleac, 2018). Summer jobs for at-risk youth have been shown to reduce violence and victimisation (Heller, 2014; Gelber *et al.*, 2016), and targeted job opportunities for former inmates reduce recidivism in the short run (Redcross *et al.*, 2011; Cook *et al.*, 2015). We know very little about whether and how these findings carry over to a broader population of adults; moreover, we know very little about how they carry over to those who are more involved in the criminal justice system. A few recent papers examine the relation between labour market opportunities and recidivism for adults. Schnepel (2018) uses data on former inmates released from California prisons and examines the effects of variations in local unskilled job opportunities, finding that better job opportunities in high-paying, low-skilled industries are associated with lower recidivism. In another study based in California, Raphael and Weiman (2007) find moderate effects of county unemployment rates on the likelihood that paroled offenders will return to custody. Yang (2017) uses quarterly and county-level data from the USA to study the effect of employment and wages on recidivism, and finds a negative relation between local labour market conditions and recidivism. Finally, Agan and Makowsky (2018) find that minimum wage increases in the USA lower the probability of ex-prisoners' reincarceration.

The main contribution of our study is that it is the first work documenting the effects of media coverage of job market conditions on recidivism, through the use of a unique data set that captures day and location-specific news stories about job creation and destruction. While in the French context, our results provide some insight about the relevance of information about opportunities on legal markets for former inmates, shedding new light on the mechanisms driving the previously documented effect of labour market conditions on recidivism. Indeed, previous studies could not rule out the hypothesis that recidivism decreases when the economy improves because friends and family of offenders are more likely to be employed and provide support to former inmates. By documenting that recidivism responds to news about job creation from just after the release date, but not to news on jobs created just before, our results suggest that the job market affects offenders themselves.<sup>3</sup>

The second important contribution is that our paper is, to the best of our knowledge, the first focusing on the impact of local labour market conditions on reoffending outside the USA by

<sup>3</sup> We are grateful to an anonymous referee for bringing this to our attention.

providing evidence on a large European country. Because incarceration rates are uniquely high in the USA, it is likely that the marginal person released from prison in the USA is very different from the marginal person released from prison in continental European countries or the UK. It may be difficult to generalise results found in recent papers suggesting a protective effect of good local labour markets outside the USA. While legitimate labour opportunities are effective on the relatively less crime-prone former inmates released from US facilities, they might not be effective on European inmates who have relatively more severe criminal histories (Buonanno and Raphael, 2013). In our study, we recover results similar to the US case for inmates with shorter sentences and stronger links to legitimate labour markets before incarceration: an increase in available jobs in some sectors reduces reoffending. Conversely, for inmates who spend longer times in prison, a simple increase in job availability does not affect recidivism; media coverage about job availability may be key to reduce reoffending. These inmates are likely to have weaker connections to networks providing access to legal job opportunities and hence higher job search costs. Media coverage about future job openings can provide crucial information about available jobs that would be hard to access otherwise.

The rest of our paper is organised as follows. Section 1 presents institutions and data; Section 2 presents our empirical strategy; Section 3 presents the effect of labour markets, captured by official statistics on recidivism; Section 4 documents the importance of information on labour markets; and Section 5 concludes.

## 1. Institutions and Data

### 1.1. *Incarceration in France*

As of January 2013, there were 66,572 inmates in France, amounting to an incarceration rate of about 110/100,000.<sup>4</sup> While smaller than that of the USA, which was around 910/100,000 in 2014 (Glaze and Kazble, 2014), this incarceration rate is close to the median for Europe. Sentences in France tend to be short: 36% of sentences are shorter than one year and 66% are shorter than three years. A corollary of this is that there is a high turnover rate in French prisons. There were 87,958 releases from prison in 2012. Of inmates, 51% released respectively had spent less than six months in custody, and 91% had spent less than one year in custody.<sup>5</sup> Most people released from prison in France are comparable, in terms of length of incarceration, to people released from jails in the USA.

There are different kinds of detention facilities in France. ‘Maison d’arrêt’ (101 facilities) are for pretrial detention and sentences less than one year. Post-sentencing, inmates either serve their time in a low-security ‘centre de détention’ (62 facilities), or a high-security ‘maison centrale’ (11 facilities). Inmates have access to work and training. Out of the 82,000 persons incarcerated in 2010, 24,000 worked at least one hour and 23,900 benefited from some training while in prison, but only 4,400 were enrolled in degree-bearing courses; 18,000 persons benefited from job search assistance, but only 5,400 found employment or training before release.<sup>6</sup> Information about job opportunities may be hard to come across while in prison, since internet access is forbidden. Cell

<sup>4</sup> Statistics on French and European incarceration can be found at [http://www.justice.gouv.fr/art\\_pix/Chiffres\\_cles\\_2013.opt.pdf](http://www.justice.gouv.fr/art_pix/Chiffres_cles_2013.opt.pdf).

<sup>5</sup> All figures in this paragraph are calculated by the authors using official statistics on overall outcomes of trials from the Ministry of Justice (Ministère de la Justice, 2012, pp. 211–17).

<sup>6</sup> Figures in this paragraph reflect official statistics from 1 January 2011. Source: [http://www.justice.gouv.fr/art\\_pix/chiffres\\_cles.2011.pdf](http://www.justice.gouv.fr/art_pix/chiffres_cles.2011.pdf).

phones could be smuggled into jails, but our data is from 2009–10 when smartphones were not widely used in France. In 2008, only 12% of people used their smartphones to go on the Internet, compared to 40% of people in 2012. So, while some people might have had internet access while in prison in 2010, this was plausibly a rare occurrence.<sup>7</sup> Newspapers are available in prison but mainly through prison libraries, which are generally accessible in lieu of outdoor activities.

Most inmates in France are released without supervision. In order to obtain sentence adjustments such as parole, electronic monitoring or access to a halfway house, prisoners must explain their post-release plan to a judge, who assesses their ability to reintegrate.<sup>8</sup> In 2009, there were 84,442 releases, out of which 7,871 were paroles (9%), 6,038 were electronic monitoring (7%) and 5,472 were to halfway houses (6%). The remaining 77% of inmates were released without supervision.<sup>9</sup>

Relevant to our study of jobs and recidivism, criminal background checks are generally illegal for employment purposes in France. Convicted people are barred from fewer professions than in the USA. However, they are barred from nearly all public-sector jobs, which represent roughly 20% of France's labour force.<sup>10</sup> Criminal records can also be checked for sensitive jobs (for instance, law enforcement, or working with children or the elderly). There are also no rules barring convicted people from living anywhere. They may have restraining orders, but most former inmates can return to live where they were prior to incarceration.

In the remainder of this section, we present our different data sources. Online Appendix A also presents a summary on data availability.

## 1.2. *Individual Incarceration Records*

France has a centralised prison system. The French Department of Prisons Administration (DAP) runs all prisons and jails. We obtained an administrative data set on all inmates in French prisons in 2008–10. A penal file is created upon each inmate's incarceration and updated throughout the incarceration period. The file contains penal and socio-demographic data, and information on transfers within and across prisons, disciplinary incidents, and sentence reductions. All of these data populate the National Inmate File and the Numeric File of Management of Inmates under Custody File,<sup>11</sup> which are centralised in the DAP. These files are maintained for internal accountability and security purposes, and the French Ministry of Justice uses them for statistical purposes. The DAP generously provided administrative data on all inmates incarcerated in France between 1 February 2009 and 31 January 2011.

The data contain information on gender, date of birth, nationality, place of birth, place of residency, marital status, number of children, educational attainment, job status (all of which are reported by the inmates themselves, and reflect their situation upon incarceration), offences leading to incarceration, length of sentence for each offence, date of trial, type of prison, date of release and sentence reductions. Each individual can be tracked over time with a unique encrypted

<sup>7</sup> Source: [http://www.insee.fr/fr/themes/document.asp?reg\\_id=0&ref\\_id=ip1452](http://www.insee.fr/fr/themes/document.asp?reg_id=0&ref_id=ip1452).

<sup>8</sup> The full list of elements that a judge considers are: whether a defendant has a job or a training lined up; whether they are 'essential to their family life' (i.e., are primary caregivers to children); whether they need medical treatment; whether they can contribute to repaying their victims; or whether they have other 'serious reintegration plans'. <https://www.service-public.fr/particuliers/vosdroits/F32562>.

<sup>9</sup> Calculated by the authors using official statistics on overall outcomes of trials from the Ministry of Justice (Ministère de la Justice, 2012, pp. 217, 221, 223).

<sup>10</sup> The list of jobs for which one must have a clear criminal background can be found here: [http://www.cidj.com/sites/default/files/liste\\_des\\_metiers\\_pouvant\\_donner\\_lieu\\_a\\_la\\_consultation\\_directe\\_du\\_b2.pdf](http://www.cidj.com/sites/default/files/liste_des_metiers_pouvant_donner_lieu_a_la_consultation_directe_du_b2.pdf).

<sup>11</sup> Fichier National des Détenus, FND, and Gestion Informatisée des Détenus en Etablissement, GIDE.

Table 1. *Summary Statistics on Releases from Prison and Job Availability.*

		Mean	SD
Offender characteristics (N = 99,151)	Socio-demographics		
	Female	0.04	0.20
	French	0.86	0.35
	Married	0.31	0.46
	Has children	0.42	0.49
	Had a job when incarcerated	0.61	0.49
	High school	0.10	0.30
	Middle school	0.38	0.49
	Technical education	0.32	0.47
	No school	0.09	0.29
	Age upon release	32.3	10.9
	Offending		
	Theft	0.36	0.48
	Drugs	0.22	0.41
	DUI	0.28	0.45
	Violent crimes	0.35	0.48
	Parole	0.07	0.26
	Short-term prison	0.68	0.47
	Recidivated within six months	0.06	0.23
	Incarceration length	213.4	349.6
Labour market characteristics	Number of jobs created per month (PE)	2,188	1,841
	Number of positive newspaper stories per month	1.37	2.06
	Number of negative newspaper stories per month	1.68	1.98
	Number of positive online-only stories per month	1.20	1.91
	Number of negative online-only stories per month	0.23	0.62

*Notes:* These summary statistics on offenders represent people released from prison between 1 February 2009 and 31 July 2010. The summary statistics on number of newspaper stories represent the same period, while figures on number of jobs created exclude the month of July 2010, when data were not available (see Online Appendix A.1). Our measure of news stories do not include public-sector jobs, which are not available to former inmates in France.

*Source.* Authors' calculations based on prison records, provided by the French Direction of Prison Administration, employment data collected from PE, and news data collected from the Observatoire de l'Investissement.

identifier.<sup>12</sup> Our outcome of interest is recidivism, which is measured as a person reappearing in the prison data set six months after having been released from prison.<sup>13</sup> In order to have a six-month observation window for all people released from prison, our main observation sample is people released from prison between 1 February 2009 and 31 July 2010.

Table 1 presents descriptive statistics on our sample. Of people released from prison, 96% are male, 86% are French and they are on average 32 years old upon release. Relevant to our study, 39% did not report having a job before entering prison, demonstrating thin ties with the official labour market. Most defendants have low levels of educational attainment (38% have a middle school degree, and 10% have no schooling at all). The most frequent offences are theft (36%), violent crimes (35%), driving under influence DUI (28%) and drug offences (22%); 7% of defendants were released on parole; 6% had returned to prison in the following six months.

<sup>12</sup> These are unique identifiers, based on first name, last name and date of birth. For confidentiality purposes, the encrypting was done at the Ministry of Justice.

<sup>13</sup> While our data do not allow us to observe all new sentences, incarceration is the most frequent sentence for people who were released from prison in the past. Kensey and Benaouda (2011) find that 59% of people released from prison have a new conviction within five years, and 46% have a new prison sentence; so, three-quarters of convictions after release from prison are new prison sentences. Furthermore, in the first year after release from prison, the reincarceration rate and the reconviction rates are quite similar, suggesting that most sentences early on are prison sentences. This could be because the kinds of offences for which people are sentenced early on are easier to observe, and so could be more likely to lead to immediate proceedings, which in turn carry higher chances of incarceration.



### 1.3. Labour Market Data

#### 1.3.1. Job vacancies

The French governmental agency for employment, PE, operates all unemployment policies. It registers unemployed people, manages unemployment benefits and provides job search assistance. It registers about one-third of job vacancies in France. Note that economic activities are not equally covered by PE: 39.5% of hiring in manufacturing jobs have been advertised by PE while there are 34.5% in retail, 31.4% in agriculture, 21.1% in services and only 15% in construction (Skandalis, 2017). These vacancies are publicly available on the PE website, and anyone can apply for the position, with or without formal registration as a job seeker.

We obtained data on the number of vacancies published per county and per day on the PE website in 2009 and 2010. During those years, soon after the economic crisis, the national unemployment rate fluctuated between 9.2% and 9.5%. For context, the unemployment rate fluctuated between 7.1% and 10.4% in France between 2000 and 2016. For 2010, we obtained more detailed data on vacancies per type of job. Since we have data until 31 January 2011, we can construct recidivism six months after release from prison for inmates released before 31 July 2010. In our main sample, we focus on February 2009–July 2010. On average, 55 vacancies are published each day, with large variations across counties—on average six per day in the smallest county and 248 per day in Paris, and across days—there are almost no vacancies published during the weekend.

We use this data set to create our main measure of local labour market conditions. For each day and county (*département*) in France, we compute the number of job openings published on the PE website within the next 30 days. By matching this information to each person's release date, we thus obtain a measure of labour market conditions in the former inmate's county of residence, for the first 30 days after release from prison. This measure varies from 0 to 13,315 with an average of 2,188 (Table 1).

The effect of each additional vacancy depends on the size of the labour market. Even if our identification strategy includes county fixed effect, the identifying variations will be larger in large counties. In order to avoid this phenomenon, we standardise the number of vacancies within county in our main regressions.<sup>14</sup> By doing so, we make sure to compare similar dynamics within each county. In an alternative specification to account for differences in labour market sizes, we also look at the effect of number of jobs per 1,000 inhabitants in each county.

#### 1.3.2. Media coverage of labour markets

Our final data source compiles publicly accessible online information on news stories about job openings and cuts. We provide more details on how this data was collected in Online Appendix A.2, and present an overview here. The data were collected for commercial purposes by a private firm, the Observatoire de l'Investissement. It assembles information from about 4,000 internet sources, which include local newspapers (43%), national newspapers and websites covering news on labour markets. Note that this data source does not contain actual job postings or classified ads. Instead, it contains news articles on economic events like plant closures or openings.

<sup>14</sup> In practice, for each day, we compute the following variable:

$$Vacancies_{ct}^{norm} = \frac{Vacancies_{ct} - Mean(Vacancies_c)}{SD(Vacancies_c)}$$

where  $Vacancies_{ct}$  is the number of vacancies in the 30 days following  $t$  in county  $c$ .

This data has one observation per mention of a job-related news story. Online Appendix A.2, Figure B1 shows examples of what news stories captured in our data look like. The Observatoire de l'Investissement classified each news story as being a positive or a negative news story; this classification was not done by us. 'Positive news stories' cover plant openings or increases in the number of perspective employees. 'Negative news stories' cover plant closures or downsizing. For simplicity, we refer jointly to positive and negative coverage as 'news stories about jobs'. We use these data set to create our measures of news about local labour market conditions. For each day and each county (*département*), we build measures of the number of news stories on job creation and cuts that appeared on any source listed in the data set in the following 30 days. By matching on release date and county of residence, we obtain a measure of news coverage of job openings and cuts that occur in the county each former inmate lived in, for the first 30 days after their release from prison. Our main measure excludes news on public-sector jobs, since, as mentioned earlier, former offenders are not allowed to hold civil servant positions.<sup>15</sup>

We distinguish between two types of sources: newspaper websites and online-only sources. The latter mainly capture trade websites, and they are less widely accessed than newspapers, as suggested by Google search trends (see Online Appendix A.2, Figure B2). While news published on online-only professional website can be a proxy for the local job labour conditions, since they have low audiences, it is less likely that they would change former inmates' knowledge or perception of labour market conditions. In our analyses of the effect of information, we mainly focus on news covered by newspapers' websites.

We present descriptive statistics of the news in the last four rows of Table 1. There are, on average, 1.37 positive news stories and 1.68 negative news stories in newspapers' websites per county in a 30-day time window. There are fewer stories on job creation and job cuts in online-only news sources, with, on average, 1.2 news stories on job creation and only 0.23 news stories on job cuts per county in a 30-day window. We do not standardise this variable by county. News stories on job creation and destruction capture information that former inmates may have access to. As opposed to job vacancies, information is a non-rival good. Regardless of the size of the labour market, all former inmates can have equal access to this information.

## 2. Empirical Strategy

We start our analysis by focusing on the effect of job vacancies on recidivism. Our analysis is informative about how offenders respond to local employment conditions. To estimate the effect of local labour market conditions on recidivism of French former inmates, we first estimate the following linear regression model:

$$Y_{icd} = A_c + B_d + \gamma X_{icd} + \beta_V \text{Vacancies}_{cd}^{\text{norm}} + \varepsilon_{icd}. \quad (1)$$

Where  $Y_{icd}$  is an indicator of recidivism within six months after release (for individual  $i$ , released on day  $d$ , and living in a county  $c$  before incarceration),<sup>16</sup>  $\text{Vacancies}_{cd}^{\text{norm}}$ , is a forward-looking variable: capturing the normalised volume of vacancies in the 30 days after day  $d$  in

<sup>15</sup> Public sector represents 2.2% of the 22,545 news stories. While we know who the employer is (and so we can easily identify public-sector jobs), we do not have information on the position within the firm. For example, we cannot determine if a news story at Google is about cleaning crew jobs, or a software engineer jobs.

<sup>16</sup> We hypothesise that the relevant labour market is the labour market in the county that an inmate reported living in upon incarceration. One may wonder how mobility could affect our estimates. First, note that among inmates who were incarcerated twice and so for whom we have two home addresses, 90% reported living in the same county both times, indicating that mobility is not frequent among people released from prison in France. Second, even if former inmates



county  $c$ .  $X_{icd}$  controls for individual characteristics; and  $A_c$  and  $B_d$  are a set of county and day fixed effects respectively. Unless otherwise specified, standard errors are clustered at the county level. The individual-level characteristics that we control for are: age, gender, nationality (French or other), place of birth (France or other), type of release (probation or unsupervised), dummies for reporting being married and for reporting having children, type of offence, sentence length, type of prison of release (short term or long term) and education (no degree, high school degree, professional school degree, higher degree).

To estimate the effect of media coverage of labour market conditions on recidivism of French former inmates, we estimate the following linear regression model:

$$Y_{icd} = A_c + B_d + \gamma X_{icd} + \beta_V \text{Vacancies}_{cd}^{norm} + \beta_1 \text{Job}_{cd}^+ + \beta_2 \text{Job}_{cd}^- \varepsilon_{icd}. \quad (2)$$

Equation (2) has the same structure of equation (1). We add two new variables.  $\text{Job}_{cd}^+$  and  $\text{Job}_{cd}^-$  respectively capture the number of news stories on job creation and on job cuts covered in the county of residence of a former inmate in the 30 days following her release from incarceration. In our main analyses, we focus on stories from newspaper websites, which have a broader audience than online-only websites. For both job vacancies and news, we focus on the 30 days immediately following one's release from prison (defined as 'month of release'). We focus on the period immediately following incarceration for two reasons. First, the first few weeks have been shown to be crucial in terms of successfully transitioning out of prison (Munyo and Rossi, 2015).<sup>17</sup> Second, access to information is limited in French penal facilities. As specified above, there is no internet connection and limited access to newspapers. The main source of information is national TV channels, which likely do not have a lot of information about local labour market conditions.

We use *daily* variations in labour market conditions, so our identification hypothesis is that, conditional on fixed county heterogeneity and common daily shocks, variations for these measures are not correlated with individual-level heterogeneity and other county-level confounding factors that may be correlated with labour market conditions. Since the exact date of release is 'as good as random' given trial-specific timing, our identification hypothesis concerning individual-level confounding factors seems plausible. To further support this hypothesis, Table 2 presents the correlation between offender characteristics and our two main economic variables. In the last column, the variable of interest is predicted recidivism, which we compute using all baseline observables, and which allows us to look at the relation between a summary of observables and recidivism. Each panel represents independent regressions—panel A is for official vacancies, and panel B is for news on jobs.<sup>18</sup> Our estimations include day and county fixed effects. For most covariates, differences across the board are not statistically significant, and when significant, the differences in point estimates are small in both magnitude and %. Importantly, columns 1 and 2 show that it does not seem like releases are correlated with job market conditions: neither the number of releases from prison by day and county (column 1), nor the likelihood of getting parole (column 2) are robustly correlated with labour market conditions. Likewise, having a job pre-prison (column 5) is not correlated with labour market conditions. Some variables are correlated with labour market conditions; for example, age at release and violent crimes are correlated with

were to move, this would result in an attenuation bias of our estimates, and so our estimates would be lower bound of the true effect of local labour markets on recidivism.

<sup>17</sup> In France, 34% of ex-offenders have been reconvicted within three years after trial. Among them, 8% are reconvicted during the first month (based on authors' calculations).

<sup>18</sup> In Online Appendix Table C1, we present additional results when using official vacancies in the manufacturing sector.

Table 2. *Characteristics of Defendants Released from Prison, by Labour Market Characteristics.*

	Prison characteristics			Socio-demographic characteristics					Offence					
	Number released (1)	Parole (2)	Short-term prison (3)	Sentence length (4)	Had a job pre-prison (5)	Female (6)	Age at release (7)	Married (8)	Has children (9)	Theft (10)	Drugs (11)	DUI (12)	Violent crimes (13)	Predicted recidivism (14)
Panel A: Number of jobs created (PE)														
Number of jobs created	-0.0252 (0.0171)	-0.001 (0.002)	0.002 (0.003)	-0.892 (2.070)	-0.003 (0.003)	-0.001 (0.001)	-0.010 (0.056)	0.003 (0.002)	0.002 (0.003)	0.002 (0.003)	-0.004* (0.002)	0.004* (0.002)	0.003 (0.003)	0.000 (0.000)
Observations	28,097	88,186	88,186	88,186	88,184	88,186	88,159	88,186	88,107	84,864	84,864	84,864	84,864	84,352
Outcome mean	3.139	0.0723	0.682	213.2	0.616	0.0438	32.31	0.308	0.414	0.355	0.215	0.278	0.346	0.0580
Panel B: Newspaper coverage														
Positive news stories	-0.00920 (0.00735)	-0.000 (0.000)	-0.000 (0.001)	-0.144 (0.424)	0.002* (0.001)	0.000 (0.000)	0.039*** (0.011)	-0.000 (0.001)	0.000 (0.001)	-0.001 (0.001)	-0.000 (0.001)	0.001 (0.000)	0.002** (0.001)	-0.000*** (0.000)
Negative news stories	0.00699 (0.0107)	0.001 (0.000)	0.000 (0.002)	-0.038 (0.766)	0.000 (0.001)	-0.000 (0.000)	-0.028 (0.024)	-0.001* (0.001)	-0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	-0.000 (0.001)	0.000 (0.000)
Observations	28,097	88,186	88,186	88,186	88,184	88,186	88,159	88,186	88,107	84,864	84,864	84,864	84,864	84,352
Outcome mean	3.139	0.0723	0.682	213.2	0.616	0.0438	32.31	0.308	0.414	0.355	0.215	0.278	0.346	0.0580

*Notes:* The dependent variable of each regression is specified in the column header. Each panel represents a separate set of regressions. We regress each dependent variable on the following measures of the labour market, 30 days after one's release from prison: number of PE openings (normalised at the county level), for panel A; and number of positive and negative newspaper stories for panel B. These regressions also include county and day fixed effects. SE are clustered at the county level.

*Source:* Authors' calculations based on prison records, provided by the French Direction of Prison administration, employment data collected from PE, and news data collected from the Observatoire de l'Investissement. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

more positive newspaper coverage. However, in these cases, the point estimates are small and column 14 shows that predicted recidivism is not meaningfully correlated with the employment measures. Overall, this suggests that within day and county, former inmates' characteristics are not correlated with job opportunities.

Given the data-generating process underlying our measures of the media coverage of job creation or destruction, we argue that it is unlikely that it would be correlated with determinants of recidivism. First, the amount of space dedicated to economic news is partly determined by the way journals prioritise information. International affairs, politics, sports and arts are also covered, and variations in newsworthiness of these topics leaves more or less space to economic news. Thus, media coverage of job creation or destruction likely varies daily for reasons unrelated to the underlying evolution of the job market. An extensive analysis of those dynamics is beyond the scope of this paper, but several examples of this are provided in the literature (see for example Durante and Zhuravskaya, 2018). Second, news on job creation and destruction only captures a very small subsample of all economic events. In 2009–10, PE released more than 4800,000 vacancies. Not only are there many more jobs created than news stories on jobs, but the newspaper space dedicated to labour markets must also cover strategic changes, changes in prices, stock market fluctuations, etc. In this context, news on job creation or job destruction only capture a very small proportion of job creation, generating important randomness in terms of timing. When job creation in one county is covered it necessarily means that other events occurring in the same county or elsewhere are not covered because of space constraint.

While media coverage of the job market could be largely independent from the evolution of vacancies, it may still pick up some relevant unobserved variation. In order to address this concern, in Subsection 4.2, we not only look at the effects of media coverage after release but also to media coverage of job creation that appeared just before release from prison. While the possible correlation between underlying job market conditions of the two measures (news just before and just after release) is plausibly the same, only information from just after the release is available to former inmates. As we'll discuss later on, the results of the test are reassuring, pointing to an effect of news just after release but not before.

### 3. Effect of Job Vacancies on Recidivism

#### 3.1. *Main Results*

Table 3 reports the effect of overall economic conditions on recidivism. Column 1 presents the effect of new job vacancies collected and released by PE in one's county of residence, in the 30 days after release from prison. Column 2 presents the effect of vacancies when controlling for defendant characteristics. General labour markets as measured by changes in job vacancies in one's county of residence do not seem to affect recidivism. The coefficients are small and statistically non-significant. In column 3, we present the correlation between recidivism and economic conditions as measured by unemployment levels. As with job vacancies, the coefficient is small and insignificant.

While overall vacancies do not seem to affect recidivism, it is possible that vacancies in some specific employment sectors do. As shown in Table 1, former inmates are often low-skilled, so they may only respond to a subset of jobs. In this case, an aggregate indicator includes job opportunities that are irrelevant for former inmates. In the last column of Table 3 we split job vacancies by sector. We find that an increase in vacancies in the manufacturing sector significantly

Table 3. *Job Creation and Recidivism within Six Months.*

Outcome:	Recidivism, measured as having a new incarceration six months after release from prison	(1)	(2)	(3)	(4)
	Number of jobs created (PE)	0.0006 (0.0012)	0.0006 (0.0012)		
	Unemployment Flow			−0.0004 (0.0018)	
Normalised number of jobs created 30 days after release from prison, in the employment sector of:	Manufacturing				−0.0053*** (0.0019)
	Handling				−0.0023 (0.0016)
	Construction				0.0023 (0.0020)
	Sales				0.0011 (0.0017)
	Services				0.0032* (0.0019)
	Hotels				0.0016 (0.0023)
	Agriculture				−0.0006 (0.0016)
	Other jobs				−0.0009 (0.0014)
	Observations	88,186	84,352	84,352	37,835
	County	X	X	X	X
	Day of release	X	X	X	X
	Defendant observables		X	X	X
	Mean recidivism		0.0573		

*Notes:* Number of jobs created, and unemployment flow are within county, in the 30 days following one's release from prison, and both measures are normalised at the county level. Information on all job types is available from 1 February 2009 to 31 July 2010. Information on industry-specific jobs is only available from November 2010 to April 2010 and in July 2010, so results in column 4 are for that time period. Controls for defendant observables in columns 2–4 are for: age, gender, nationality (French or other), place of birth (France or other), type of release (probation or unsupervised), a dummy for reporting being married, a dummy for reporting having children, type of offence, sentence length, type of prison of release (short term or long term), education (no degree, high school degree, professional school degree, higher degree), day of release and county. All SE are clustered at the county level.

*Source.* Authors' calculations based on prison records, provided by the French Direction of Prison administration, and data collected from PE. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.10$ .

decreases recidivism. A one standard deviation increase in manufacturing job vacancies induces an 0.5 percentage point, or 9.25% reduction in the propensity to recidivate in the first six months following release from incarceration. Vacancies in other sectors have no effect on recidivism.<sup>19</sup>

The magnitude of the effect is similar when measuring the effect of number of jobs per 1,000 inhabitants in each county (Online Appendix A.3, Table C1). Indeed, the standard deviation of the number of manufacturing job per 1,000 inhabitants in a county is equal to 0.16. In our sample, the average recidivism rate is 6%. The regression coefficient on the 'jobs per 1,000 inhabitants' variable is equal to −0.029, which implies that a one standard deviation increase in the number of manufacturing job per 1,000 inhabitants is correlated with a 7.7% decrease in recidivism.

If we do not find a significant effect for vacancies in other sectors, then why do more manufacturing jobs affect recidivism? Several elements help us interpret this finding. First, we note that in our data among people who reported having a job before incarceration, 17% reported

<sup>19</sup> The only exception is the service sector where we observe a positive coefficient mainly driven by property crimes (see Online Appendix Table C4). However, the coefficient is only marginal significantly different from zero and not robust across different specification.

having a job in manufacturing, compared to 4% in services, and 7% in the hotel industry. The only sector that had more workers among inmates is construction (20% reported having a job in construction). However, construction jobs are more likely to be obtained through informal channels than those in manufacturing, and construction vacancies are much less advertised in PE than those in manufacturing as remarked above (Skandalis, 2017). Moreover, those that acquire some work experience during incarceration seem to do it more frequently in the manufacturing sector. We checked the type of job offers in a sample of 29 prisons (over 187) disclosing this information publicly.<sup>20</sup> It appears that prisons offer either jobs related to the prison itself (e.g., preparing/distributing meals, cleaning corridors, washing sheets) or jobs proposed by firms who have an agreement with the Ministry of Justice. Apart from one specific case, all the jobs in the latter category are manufacturing jobs. This suggests that one plausible interpretation of our results is that manufacturing jobs are most relevant, because they are the kind of jobs that former inmates are most likely to have some experience in. A second, complementary explanation, is that manufacturing matters more than general labour market conditions in affecting recidivism because it is a relatively high-paying sector for low-skilled jobs. In this sense our results are consistent with the main findings of Schnepel (2018) that ‘good jobs’ reduce recidivism. Indeed, in France, the average net wage in the industry sector in 2010 was 2,224 euros per month, and 1,908 euros per month for construction (DARES, 2012). We also find that general labour market conditions do not affect recidivism (Table 3), but greater availability of low-skilled jobs is correlated with less recidivism.

### 3.2. *Heterogeneity of the Effect*

In Tables 4a and 4b we explore differential effects. We restrict our main analysis to manufacturing jobs, which, according to results presented in Table 3, are the only jobs that affect recidivism.<sup>21</sup> In Table 4a, we divide the sample by defendant characteristics, and in Table 4b, by type of offence upon recidivism. Column 1 of Table 4a presents the effect of manufacturing jobs for people released from short-term jails, and column 2 is for longer-term prisons. In columns 3 to 6, we split the sample by quartiles of sentence length. The overall picture emerging is that new vacancies in the manufacturing sector have a negative and statistically significant effect on the propensity to reoffend for inmates who spent less time in prison.

Columns 7 and 8 of Table 4a show that formerly employed inmates benefit most from job creation, with a reduced propensity to recidivate when there are more job vacancies 30 days after their release from prison. The last part of the table reports the results for parolees versus non-parolees. Individuals on parole might be more sensitive to job creation since finding a job is often a condition to be granted parole. Conversely, if parolees already have a job lined up, they may respond less to job creation than people who are not on parole. Results reported in the table suggest that the latter is more likely. It is however worth noting that being released on parole is not predicted by the employment opportunities (Table 2) and that the lower significance of estimates for parolees may be driven by the much smaller sample size.

Table 4b presents results by type of offence upon recidivism, and shows that an increase in job vacancies reduces recidivism for all crime categories although the effect is not statistically significant for all crime categories. More precisely, for each crime (property crime, drug offence,

<sup>20</sup> The information is reported in the *Annuaire de la justice* and available online at <http://www.annuaire.justice.gouv.fr/etablissements-penitentiaires-10113/>.

<sup>21</sup> We control for all types of jobs. Online Appendix A.3, Tables C3 and C4 present coefficients on all job types.

Table 4a. *Heterogeneity in the Effect of Manufacturing Jobs on Recidivism.*

Outcome:	Recidivism, measured as having a new incarceration six months after release from prison										
	Type of prison of release			Quartile of sentence length				Employment status before incarceration		Type of release from prison	
	Short-term (1)	Long-term (2)		Quartile 1 (3)	Quartile 2 (4)	Quartile 3 (5)	Quartile 4 (6)	Unemployed (7)	Employed (8)	No Parole (9)	Parole (10)
Number of PE	-0.0066*** (0.0021)	-0.0024 (0.0040)		-0.0092** (0.0040)	-0.0010 (0.0036)	-0.0090*** (0.0033)	-0.0026 (0.0045)	-0.0041 (0.0036)	-0.0063*** (0.0022)	-0.0056*** (0.0020)	-0.0023 (0.0066)
Manufacturing jobs											
Observations	25,075	12,760		9577	9001	9372	9885	14,636	23,199	35,054	2781
County	X	X		X	X	X	X	X	X	X	X
Day of release	X	X		X	X	X	X	X	X	X	X
Mean recidivism	0.0586	0.0584		0.0668	0.0480	0.0507	0.0682	0.0745	0.0485	0.0601	0.0380

*Notes:* The measure of 'jobs created in manufacturing' is normalised at the county level. Each regression includes controls for: age, gender, nationality (French or other), place of birth (France or other), type of release (probation or unsupervised), a dummy for reporting being married, a dummy for reporting having children, type of offence, sentence length, type of prison of release (short term or long term), education (no degree, high school degree, professional school degree, higher degree), day of release and county, as well as county-normalised measures of job creation for all job types included in column 4 of Table 3. Information on industry-specific jobs is available from November 2010 to April 2010 and in July 2010. SE are clustered at the county level.

*Source:* Authors' calculations based on prison records, provided by the French Direction of Prison administration, and data collected from PE. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.10$ .



Table 4b. *Heterogeneity in the effect of Manufacturing Jobs on Recidivism (Continued).*

Outcome:	Recidivism by type of offence, measured as having a new incarceration six months after release from prison, for the offence specified in the header			
	Property offence (1)	Drug offence (2)	DUI (3)	Violent crimes (4)
Number of PE Manufacturing jobs	−0.0015 (0.0013)	−0.0010 (0.0008)	−0.0030*** (0.0008)	−0.0040*** (0.0014)
Observations			37,835	
County	X	X	X	X
Day of release	X	X	X	X
Mean recidivism after six months, for each offence	0.0283	0.0119	0.0163	0.0220

*Notes:* The dependent variable is a dummy equal to 1 if the defendant recidivated for the offence specified in the column header. The measure of ‘jobs created in manufacturing’ is normalised at the county level. All regressions include controls for: age, gender, nationality (French or other), place of birth (France or other), type of release (probation or unsupervised), a dummy for reporting being married, a dummy for reporting having children, type of offence, sentence length, type of prison of release (short term or long term), education (no degree, high school degree, professional school degree, higher degree), day of release and county, as well as county-normalised measures of job creation for all job types included in column 4 of Table 3. Information on industry-specific jobs is available from November 2010 to April 2010 and in July 2010. SE are clustered at the county level.

*Source.* Authors’ calculations based on prison records, provided by the French Direction of Prison administration, and data collected from PE. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.10$ .

DUI, violent crime), we compute a dummy equal to one if a defendant was reincarcerated for that offence, which is the outcome variable. While jobs in industry do not influence economic crimes (theft or property crime), they influence recidivism for behavioural crimes, like violent crimes and DUI. This suggests that one of the channels through which better access to employment may influence future behaviour is by affecting one’s engagement in risky behaviours, rather than one’s economic calculus of participation in crime. While this may seem surprising (Aaltonen *et al.*, 2013), it is consistent with several recent papers documenting the relation between economic well-being and violent behaviours. For example, Heller (2014) finds that having a summer job reduces violent crimes, but has no detectable effect on economic crimes. More recently, Rose (2018) finds that lay-offs are correlated with more instances of domestic violence. Our findings, along with these papers, are consistent with the idea that economic conditions can have complex effects on criminal activity. Not only may they lead to economic crimes, as an alternative source of earnings; they may also affect people’s decision-making, for example due to stress or reduced bandwidth because of economic insecurity. Future research could explore these questions more in depth.

#### 4. Media Coverage of Local Labour Market Conditions

In order to better understand how labour markets affect the choice to recidivate, we now turn to one particular element: the job search. Specifically, we study the effect of an indicator carrying useful information in the job search process: news coverage of jobs in the county of residence of a former inmate. We focus on the effect of news in local or national newspapers. The main difference between the measures of vacancies presented above is that this news measure catches the kind of information about local labour market conditions that every former inmate can easily

access online or by reading the press.<sup>22</sup> By contrast, in order to access PE jobs opportunities, former inmates need to sign up at the national employment agency or search for specific job offers. Conditional on the flow of local jobs, this measure catches readily available information about firms that are hiring in former inmates' area of residence. This kind of information might impact former inmates' job search effort both by affecting their beliefs about the probability of finding a job and by directing their search towards firms that could potentially hire them.

Our implicit assumption is that people have beliefs about how likely they are to find a job upon release from prison. In the absence of additional information, they would make the decision to commit a crime based on their beliefs about their likelihood of finding a job. The higher the prospects of finding a job, the lower the likelihood that they would reoffend, due to the increase in opportunity costs of crime. Conversely, the lower the prospects of finding a job, the higher the likelihood that they would reoffend. But beliefs could be shifted by additional information about the labour market, which could be obtained from media coverage of local employment. Depending on offenders' prior employment, different information will matter. If, on average, people released from prison think that their chances of finding a job are low (resp. high), positive (resp. negative) news will matter. Information about the existence of particular jobs also lowers search costs because former inmates can target their search effort to firms with vacancies. Note that this second channel may work even keeping constant the number of actual jobs available. By decreasing search costs, news would affect the propensity to reoffend either if searching for a job prevents individuals from committing a crime (through incapacitation), or if higher search efforts, keeping all else constant, increase the likelihood of actually finding a job.

#### 4.1. *Main Results*

Table 5 reports the main results. Column 1 includes the number of news stories on job creation and cuts in one's county of residence, in the 30 days after release from prison. News stories on job openings have a negative and significant impact on the probability to reoffend within six months after release. News on job cuts has no detectable effect on recidivism. Adding the full set of individual-level observables (column 2) and controlling for the flow of PE job vacancies in the same 30 days after one's release from incarceration (column 3) does not change the magnitude of the coefficients, indirectly confirming that our variables of interest are orthogonal with respect to individual observables.

We then add a further restriction to our main model by including county times calendar month fixed effects (column 4). In this specification, all the identification variation comes from within-month and within-county variation. Because the economic conditions do not evolve so rapidly, this is not a good way to identify the effect of the labour market on recidivism. However, *information* on the labour market depends on the news coverage that varies largely from one day to another. For example, if two persons release in county  $s$  at time  $t$  and  $t + 1$  face the same labour market conditions, the one released at  $t$  could potentially read news published at  $t$  that is not accessible to the other person at  $t + 1$ . The effect of positive news presented in column 4 remains negative and significant.

Controlling for monthly county-level crime rates or unemployment also does not affect our estimates (columns 5 and 6). While we cannot isolate the mechanisms, one explanation could be

<sup>22</sup> In France, getting access to printed news can come at a low cost. The local news is largely available for free in bars and coffee shops. Readers can easily access it even without buying papers. Furthermore, newspapers' front pages often appear in front of newsagents, tobacconists, bars and cafés.

Table 5. *News Coverage of Jobs and Recidivism.*

Outcome: new incarceration:	Six months after release					12 months after release	
	(1)	(2)	(3)	(4)	(5)	(7)	(8)
Number of positive news stories	-0.00095*** (0.00029)	-0.00080*** (0.00028)	-0.00080*** (0.00028)	-0.00135* (0.00074)	-0.00083*** (0.00028)	-0.00106*** (0.00030)	-0.00164*** (0.00048)
Number of negative news stories	-0.00022 (0.00046)	-0.00010 (0.00047)	-0.00010 (0.00047)	0.00028 (0.00082)	-0.00008 (0.00047)	-0.00002 (0.00050)	-0.00124 (0.00093)
Number of jobs created (PE)			0.00056 (0.00117)	0.00147 (0.00162)	0.00043 (0.00115)	0.00056 (0.00117)	-0.00388** (0.00189)
Average number of jobs						0.00001*** (0.00000)	0.00000 (0.00001)
Per positive news story						0.00000 (0.00000)	0.00001 (0.00001)
Average number of jobs						0.00000 (0.00000)	0.00001 (0.00001)
Per negative news story							
Crime rate					-0.00000 (0.00000)		
Unemployment							
Flow							
Observations	88,186	84,352	84,352	84,352	84,352	84,352	62,338
County	X	X	X	X	X	X	X
Day of release	X	X	X	X	X	X	X
Month × county							
Defendant characteristics		X	X	X	X	X	X
Mean recidivism				0.0585			0.122

*Notes:* News stories, jobs created, unemployment rate and crime rate are within county. The measure for 'number of jobs created' is normalised at the county level. The 'defendant characteristics' controls in columns 2–8 are for: age, gender, nationality (French or other), place of birth (France or other), type of release (probation or unsupervised), a dummy for reporting being married, a dummy for reporting having children, type of offence, sentence length, type of prison of release (short term or long term), education (no degree, high school degree, professional school degree, higher degree), day of release and county. All SE are clustered at the county level.

*Source:* Authors' calculations based on prison records, provided by the French Direction of Prison Administration, data collected from PE, and data collected from the Observatoire de l'Investissement. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.10$ .

that news stories about job creation provide actual information about a sector or area that may be recruiting, whereas news stories on job destruction do not provide leads on how to target one's search. While this may help applicants define what particular firm *not* to apply to, it does not provide extra information.

Column 7 of Table 5 shows that on top of the number of news stories affects recidivism, the number of jobs covered within each story is marginally significantly correlated with recidivism. Importantly, the number of positive news stories remains significantly correlated with less recidivism, even when we control for the average number of jobs per new story. This suggests that information may be especially helpful in pointing people towards sectors or companies in which to look for jobs, in addition to exact information on what jobs are available. Those specifications suggest that the results are mainly driven by the effect of better information coupled with the effect of better labour market conditions.

Lastly, our results are robust to looking at other time windows for recidivism (column 8). More coverage of news on job creation is still correlated with lower recidivism one year after release from prison. However, the % change in recidivism is slightly smaller.<sup>23</sup>

#### 4.2. Discussion and Policy Implications

Results reported in Table 5 suggest that information about available jobs matters. However, it is still possible that our news variables capture aspects of the economic conditions that are both different from the other economic variables and more relevant to the persons released from jail. In order to investigate this question, we ran several additional analyses presented in Table 6.

In column 1 of Table 6, we provide suggestive evidence that more media coverage of jobs actually translates into more employment. Ideally, we would like to have data on former inmates' employment. Unfortunately, these data are unavailable since France strictly regulates merging different administrative data sources. However, inmates report their employment status when they enter into prison. For the subset of inmates who recidivated, we can look at whether they report being employed or not when they re-entered prison. For this group of inmates, we regress a dummy equal to one if a person reported having a job when re-entering prison on news coverage of jobs. We find that each news story increases the likelihood that a person report having a job by 0.5 percentage points, or by 2%. Of course, since we find differences in recidivism rates, the subset of former inmates who re-entered prison are not representative of all former inmates, but because recidivism rates are *lower* for people released in better job market conditions, these results may be an underestimation of how news translates into access to employment. However, these results do suggest that news does improve employment upon release from prison.

Second, if the effect presented in Table 5 is driven by information, the timing of the news is of crucial importance. In the second column of Table 6, we look at the effect of news stories on jobs that appeared 30 days before release from incarceration. Coefficients are positive and only marginally significant. This is very much consistent with the idea that people released from prison may not have seen that news. Conversely, this is not consistent with the idea that news captures a relevant economic dimension. This result also helps understand whether labour market conditions affect former inmates directly, because they look for jobs themselves, or indirectly, because their family members or support network are more likely to be employed and to help financially. The result that news from just before the release date doesn't matter suggests that

<sup>23</sup> We present additional robustness checks in Online Appendix A.3, Table C6, none of which affect our results.

Table 6. *News Coverage of Jobs and Recidivism—Testing Mechanisms.*

Outcome	Had a job if recidivated		New incarceration six months after release from prison				
Sample	Recidivists (1)	Full Sample (2)	Full Sample (3)	Full Sample (4)	Full Sample (5)	Unemployed (6)	Employed (7)
Number of positive news stories	0.00616** (0.00246)	−0.00094*** (0.00030)	−0.00079*** (0.00029)	−0.00079*** (0.00028)		−0.00104** (0.00046)	−0.00062 (0.00039)
Number of negative news stories	0.00048 (0.00429)	−0.00010 (0.00047)	−0.00010 (0.00048)	−0.00015 (0.00046)		−0.00013 (0.00077)	0.00001 (0.00048)
Number of jobs created (PE)	−0.01472 (0.01103)	0.00060 (0.00117)	0.00056 (0.00117)	0.00067 (0.00117)	0.00055 (0.00115)	0.00010 (0.00224)	0.00066 (0.00140)
Positive news, 30 days pre-release		0.00061* (0.00032)					
Negative news, 30 days pre-release		0.00071 (0.00061)					
Positive web news			−0.00004 (0.00046)				
Negative web news			−0.00005 (0.00095)	0.00214 (0.00233)			
Positive news, Public-sector jobs				0.00142 (0.00185)			
Negative news, Public-sector jobs					−0.00239** (0.00110)		
Number of positive news stories: firm in PE data (SIRET)					−0.00017 (0.00042)		
Number of positive news stories: firm NOT in PE data (non SIRET)					−0.00063 (0.00098)		
Number of negative news stories: firm in PE data (SIRET)					0.00012 (0.00053)		
Number of negative news stories: firm NOT in PE data (non SIRET)							
Observations	4,891	84,352	84,352	84,352	84,352	32,525	51,827
County	X	X	X	X	X	X	X
Day of release	X	X	X	X	X	X	X
Defendant characteristics	X	X	X	X	X	X	X
Mean of dependent variable	0.263	0.0585	0.0585	0.0585	0.0585	0.0585	0.0485

*Notes:* The measure for 'number of Jobs created' is normalised at the county level. Regressions include controls for: age, gender, nationality (French or other), place of birth (France or other), type of release (probation or unsupervised), a dummy for reporting being married, a dummy for reporting having children, type of offence, sentence length, type of prison of release (short term or long term), education (no degree, high school degree, professional school degree, higher degree), day of release and county. All SE are clustered at the county level.

*Source:* Authors' calculations based on prison records, provided by the French Direction of Prison Administration, data collected from PE, and data collected from the Observatoire de l'Investissement.

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.10$ .

friends/family are likely not relevant to our findings, since these people had access to information even in the pre-release period.

In column 3, we measure the effect of economic news covered by online-only sources. The biggest difference is that the audience for these online-only sources of information is much lower than news published on newspapers' website.<sup>24</sup> Column 3 indicates that information from these low-audience news outlets has no effect on recidivism. Indeed, the difference with the effect observed in Table 6 could come from the nature of the events covered. However, the two types of news are collected by the same private firm, following the same procedure and the results are very much consistent with a story based on the access to information. In column 4 we look at the effect of news on public-sector jobs. Those positions, according to French law, are not available to former inmates. Thus we do not expect them to have an effect on recidivism if former inmates correctly process the information they obtain from the media. Results reported in column 4 confirm this intuition.

Third, we offer a direct test of the overlap between official job announcements and news coverage of jobs. For each news story, the French agency for employment provided us with information on whether the firm mentioned had ever published a vacancy on the PE website. Even if it is not possible to directly link the news stories to any specific vacancy, we know which news are about firms that at some point worked with PE. We can therefore distinguish between news stories about firms working or not working with PE. The idea is that when controlling for vacancies, news stories about firms also publishing job offers on PE are less likely to capture another relevant dimension of the job market compared to firms not working with PE. We present the result of this exercise in Table 6, column 5. It appears that positive news on firms publishing vacancies on the PE website decrease recidivism even after controlling for vacancies. This result further strengthens an explanation of the effect based on information on available jobs.

In the last two columns of Table 6, we compare inmates that were formerly unemployed to those that had a job before incarceration, and we find that positive news about job creation have a negative and statistically significant effect only for the former. These results are consistent with an information mechanism. Keeping constant the underlying labour market conditions, media exposure of new job creation affects former inmates with weaker ties to official employment opportunities. This could either be because they were not employed before incarceration or because they spent more time in prison and were in more isolated facilities.

Note that in our main specifications, we do not control for type of job posting. In Online Appendix A.3, Table C5, we explore more directly whether our results on the effects of news coverage of jobs still hold when we control for industry-specific variations in job availability. Our main measure of industry-specific job offers is only available from November 2009 to April 2010, and July 2010. For this smaller sample, we do not find a correlation between news on jobs and recidivism (column 2 of Table C5); however, this is due to the smaller sample size and not to the additional control: when we look at the correlation over that same time period without controlling for types of jobs, the coefficients are very similar (column 3 of Table C5). For the whole sample, we can compute another measure of jobs offered, based on the type of firm posting vacancies, instead of the type of job proposed. This measure is noisier, since a firm can offer different kinds of jobs, but it helps us identify the sector in which a firm is posting a job. Our main results on the effect of different kinds of job offers on recidivism from column 4 of Table 3 are similar using this measure (column 4 of Table C5). With this measure, for the whole time

<sup>24</sup> News published in online-only sources is slightly less frequent (1.2 vs. 1.4 in the 30 days following release). However, these differences are unlikely to explain why the coefficient would be ten times smaller.



period, we find that controlling for job offers by type of jobs does not affect the coefficients on news on jobs (column 5 of Table C5). This suggests that news on jobs directly affects recidivism, even conditional on industry-specific job fluctuations.

The information effect that we have just documented could be due both to the fact that positive news about labour market conditions increase former inmates' optimism about the odds of finding a job in the legal market and the fact that information about job creation reduces job search costs for former inmates. Taken together, our results seem to suggest that both are at play. Indeed, former inmates are likely to have few connections with legal labour markets and have liquidity constraints (Munyo and Rossi, 2015; Tuttle, 2016). Thus, information about firms' potentially hiring matter to lower search costs. Moreover, former inmates plausibly start off with low priors about the odds of finding a job after release. Our null results on negative news stories are consistent with the idea that bad news about job market conditions simply confirm these priors, and have no effect on the propensity to reoffend, while good news change these priors and diminish recidivism. This effect is likely not driven by naive optimism but rather by an update of one's priors about the probability of finding a job in relevant sectors. In other words, only news that carries relevant information matters, and not good news in general. Indeed, we find that former inmates do not react to jobs in the public sector that are not available to them. They might have had lower recidivism if the effect was simply driven by optimism in response to a perceived improvement in labour market conditions.

There are many potential public policy levers that could be used to reduce recidivism. We ask how news coverage of job creation contrast to other potential policies. Using our preferred estimates (column 3 of Table 5), we find that a one standard-deviation increase in the number of positive news stories (+ 2.06 news stories) is correlated with a 2.74% decrease in recidivism. We can contrast this to other estimates in the literature: one extra month in prison is associated with a 4% reduction in recidivism (Kuziemko, 2013); two additional weeks in prison plus one extra month on probation are associated with 5% reduction in recidivism (Philippe, 2015); one extra month in expected future sentences is associated with a 1.3% reduction in recidivism (Drago *et al.*, 2009). Depending on estimates, it appears that providing information to people on jobs is roughly equivalent to spending two extra months in prison, or expecting five more months in prison if reconvicted.

The effects are smaller than those of alternatives to incarceration such as electronic monitoring, which are associated with a 25% (Ouss, 2013) to 50% (Di Tella and Schargrotsky, 2013) reduction in recidivism. Thus, avoiding incarceration altogether might be a more cost-effective way to reduce recidivism in some cases, but providing inmates information about available job opportunities at the time of their release from incarceration still appears to be a very cost-effective policy.

## 5. Conclusion

Consistent with the economic approach to the study of crime we find that former inmates respond to the incentives provided by variation in formal labour market opportunities. This confirms the role of incentives in the formal labour market, even though other research has shown the importance of informal employment for people when they are released from prison (Western *et al.*, 2015). Our study adds to our knowledge about what works in reducing offending. Our results on media coverage of job creation and destruction suggest that information about local labour market conditions is valuable for inmates and reduces their propensity to recidivate, in

particular for inmates that had weaker ties with the legal labour market before incarceration. Moreover, we show that the creation of legitimate labour market opportunities in some sectors also works in economies such as France where the share of inmates over the total population is lower, so where former prisoners may be more prone to offending.

From a policy perspective, our analysis suggests that policies targeted at reducing unemployment may have positive spillovers by reducing recidivism and highlights the role of information about job availability, over and beyond the effect of unemployment reduction—which is a harder policy lever to manipulate. Improving labour market conditions is costly, and focusing efforts on people released from prison or otherwise involved with criminal justice might be perceived as unfair, or potentially create some moral hazard problems. Our finding that media coverage of job creation matter has a much more tractable policy implication: diffusing relevant job information is much less costly than increasing employment. The importance of information has been shown to play an important role in other contexts, such as investments in schooling (Jensen, 2010; Hoxby and Turner, 2015), risky sexual behaviours (Dupas, 2011) or retirement investments (Duflo and Saez, 2003). It is not a new finding that information plays an important role in labour markets (Stigler, 1962). Some research places particular emphasis on its diffusion via social networks (Ioannides and Datcher Loury, 2004). Recent field experiments suggest that information interventions may be effective in reducing unemployment, especially among those at risk for longer stretches of unemployment—which could include former inmates (Altmann *et al.*, 2015). Our findings suggest that improving the matching of job seeker to job opportunity through information could also impact important outcomes like offending, which might matter in particular when assessing the costs and benefits of social policies.

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Additional Supporting Information may be found in the online version of this article:

## **Online Appendix Replication Package**

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