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Determinants of joblessness during the economic crisis:
the impact of criminality in the Italian labour market

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Abstract

On the basis of a newly built regional panel data set that considers, not only the evolution of employment in the Italian regions, but also indicators of counterfeiting activities and criminality, we empirically explore the link between employment performance and criminality during the period of a deep economic and financial crisis.

We consider both unemployment and inactivity rates in order to check whether and to what extent, in a period of widely recognized economic crisis, criminal activities of counterfeit and other forms of crime have affected the labour market. We present results of GMM regressions showing a positive/peculiar effect of criminal activities on both the components of joblessness.

JEL codes: E24; J6

Keywords: Inactivity rate, unemployment rate, criminality counterfeit, joblessness

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1. Introduction

The aim of this paper is to empirically evaluate the relationship between criminal activities and employment redundancy in Italy between 2008 and 2013, using a dynamic panel-data model. We are interested in evaluating the effect that counterfeiting - a particular kind of organised crime widely developed and spread in Italy – and other typologies of crime have had on the Italian labour market, in particular on the components of joblessness - respectively, unemployment and inactivity rates - for 20 Italian regions over the 2008-2013 period. We have chosen this timeframe not only because data on counterfeit are available since 2008 only, but also because the considered period is characterised by a sudden increase of both unemployment and inactivity rates due to an important economic crisis begun at the end of 2007 and then lasting for an unexpected long time.

Our analysis takes advantage of a unique and newly built dataset that contains also detailed information on both counterfeiting and criminal activities, which shall allow us to quantify the economic impact of different typologies of crimes on the labour market. In particular, our dataset is built on the basis of the following data:

- (1) The Intellectual Property Elaborated Report of the Investigation of Counterfeiting (IPERICO) database - developed by the Ministry of Economic Development, Department for Enterprise and Internationalization (*Ministero dello Sviluppo Economico, Dipartimento per l'Impresa e l'Internazionalizzazione*) jointly with the Tax Police Force (*Guardia di Finanza*), the Customs Agency (*Agenzia delle Dogane*), and the Service of Criminal Activity of the Ministry of Internal Affairs - gives us a complete resume of all the contrast activities to counterfeiting in Italy over the period 2008-2013. Since 2008, the IPERICO project has elaborated a complete and complex methodology in order to quantify counterfeiting activities and their economic impact. For each Italian region, the dataset contains data related to the number of seizures and pieces seized (and their estimated average value) by Customs Agency and the Tax Police Force.¹
- (2) Data provided by the Italian Ministry of Justice, related to the number of legal actions against different crimes occurring between 2008 and 2013. These data are strongly detailed, being collected on the basis of the information provided by the totality of both the Italian District Prosecutor's Offices for mafia investigations (*Direzioni Distrettuali Antimafia, DDA*) and the Public Prosecutor's offices (*Procure*). In particular, for each Italian region, the dataset gives us detailed data related to the universe of people involved in legal actions. This peculiarity shall allow us to distinguish those crimes

¹ In this respect, it is important to notice that the data related to both the number of seizures and the number of the seized pieces represent the universe of observations, whereas the value of the seized goods is estimated according to a methodology elaborated by the General Direction of the Ministry of Economic Development for the contrast activity against counterfeiting. Such estimates are based on the value assigned to the seized goods by the Custom Agency, according to both the quality of the goods and the differences between the expected counterfeited sale price and the market price of the original good.

related to criminal organizations and “small crime”, with the latter being related to all criminal activities not connected to organised crime (see section 2).

(3) Finally, we use regional data related to both economic activity and labour market. In particular, we refer to the standard yearly statistics for the twenty Italian regions over the years 2008-2013. All these data, but the human capital index, whose source is the Eurostat database, derive from the Italian National Statistical Institute (ISTAT).

The persistence of high levels of both unemployment and inactivity rates has been often explained on the basis of institutional imperfections in labour markets. Indeed, these imperfections hinder the proper functioning of labour markets, making them inflexible. As a consequence, policy suggestions have been often addressed to remove obstacles to flexibility: decrease unemployment benefits, weaken job protection legislation, increase mobility of labour and improve product market competition (Watt and Janssen, 2003 and OECD, 1997).² In this respect, by relying on a broad range of statistics and indicators, a set of contributions investigates the determinants of employment performance, in order to mitigate the sharp divide between the unemployed and the economically inactive people occurring because the statistical definitions roughly consider “unemployed” those people currently engaged in active job search, while “inactive” are those people who do not intend even to look for a job (Gregg and Wadsworth, 1998).³ A different set of contributions within the economic literature is devoted to studying the impact of labour market institutions on the unemployment rate,⁴ while a further different set of contributions deals with the influence of institutional arrangements beyond the labour market.⁵

Another body of literature on labour market takes into consideration the fact that the economic structure of the majority of the EU countries is characterized by the existence of shadow economy and the labour market is likely affected by this problem in both the northern and the southern countries

² This view has undergone some criticisms (Baker et al., 2003 and Freeman, 2005). Empirical results provided in those contributions indicate that the relationship between institutional arrangements and employment performance is indeed more complex than the policy recommendations seemed to imply. Moreover, a few theoretical papers have argued that removing rigidities and implementing flexible labour markets may indeed be quite complicate because the various imperfections are complementary to each other (Coe and Snower, 1997; Orszag and Snower, 1999).

³ Most contributions – for example, Schmitt and Wadsworth (2002), Faggio and Nickell (2005) and Bicakova (2005) - have focused on the consequences of markets deregulation on wages disparities and employment opportunities for marginal workers.

⁴ See, for example, Calmfors and Driffill (1988) Nickell (1997), Siebert (1997), Blanchard and Wolfers (2000).

⁵ Amable et al. (2007), Blanchard and Giavazzi (2003), Koeniger and Vindigni (2003) consider the existence of interactions between product and labour markets institutions; Wasmer and Weil (2004), Acemoglu, (2001) consider the interactions between labour and financial markets imperfections. Some of these studies point out that deregulation may yield perverse effects on employment (Amable and Gatti, 2004), but only few empirical work – e.g., Boeri et al. (2000); Haffner et al. (2000); Nicoletti and Scarpetta (2002) - try to account for these interdependencies.

(Boeri and Garibaldi, 2002).⁶ According to this stream of literature, the existence of shadow economy could strongly be related to the presence of criminal organizations, which also drive to (local) governments' corruption, thus reducing the "tax morality" and representing a great disincentive for private investment.⁷ In the same stream of literature, empirical results support the existence of strong linkages between shadow employment and unemployment (see Boeri and Garibaldi, 2002 and Lisi, 2010).⁸ In particular, Lisi (2010) highlights the fact that unemployment influences (with positive sign) the shadow employment and vice-versa, so that there exists a bidirectional (positive) causal relationship between the two variables. Boeri and Garibaldi (2002) focus on a notion of shadow illegal employment related to labour-tax evasion,⁹ rather than to the presence of organized crime. In either case, however, the highest shadow employment and the highest labour-tax evasion can be found in the South of Italy, which is also the area where strong criminal organizations and high levels of both unemployment and inactivity rates arise (see below, section 3).¹⁰ Furthermore, Burdett et al. (2003) build up a theoretical model where both crimes and unemployment (and inequality) are endogenous. The introduction of crime in a standard job-search model, which usually generates a single equilibrium wage, drives to multiple equilibria. The consequence is a wage dispersion and, hence, a strategic interaction between firms and workers. Such a connection is legitimated by the hypothesis that the choice of any worker to be honest or not relates to the amount of perceived salary. If firms are reassured on the behaviour of their workers, they will be more willing to guarantee higher wages,

⁶ They highlight the fact that the size of the informal sector in European countries is affected by a large variance, which range from the 10-12 per cent of the GDP in the Nordics, to figure from 20 to 30 per cent of the GDP in the Southern Europe and Ireland. Moreover, they suggest also the existence of a significant within-country variation: the shadow economy (and so the shadow employment) is higher in depressed regions, such as the South of Italy that is also characterised by low productivity. As for Italy, Calzaroni and Pascarella (1998) suggest that the proportion of irregular employment fluctuates from a 30-35% in the South of Italy to less than 10% in the North, while the Centre seems to be collocated in between (about 20%).

⁷ In this respect, Daniele and Marani (2008) find a significant negative relation between organized crime and foreign direct investments flows: if the "regular" economic activities are strongly discouraged in those areas affected by a strong presence of organized crime, these same areas are likely to be those where the expansion of shadow employment is stronger.

⁸ In the same strand of literature, Becker (1968) and Edmark (2005) examine the effect of unemployment on criminality, whereas Chang and Wu (2012) investigate the effect of crime on unemployment. In particular, Chang and Wu (2012) find that an increase in the average crime rate in the economy leads to a decrease in the employment rate due to a reduction in the number of vacancies offered by firms.

⁹ The authors refer to the definition of "shadow sector" provided by the System of National Account (1993) which defines it as the set of legal activity unknown to the public administration because of tax evasion, unwillingness to pay social contributions, non-application of contractual wage minima of hours of work and health at work standard.

¹⁰ Boeri and Garibaldi (2002) found empirical evidence that unemployment and shadow employment share similar properties. A drop of unemployment has the effect to reduce the shadow employment, while policies aimed to contrast the illegal employment without tackling the structural unemployment seem to increase unemployment. A possible explanation is that a rise in "contrast activity" against shadow employment could require a tax increase to finance the increasing cost of the contrast activity itself. This determines a similar variation in unemployment, followed by an increase of shadow employment. Moreover, since people working in the shadow sector are not generally unemployed - resulting instead inactive workers - they could start looking for a regular job, once the illegal job is lost, thus becoming unemployed in the national statistics.

which will avoid workers to fall back within criminal activities. For this reason “[...] if you live in a neighbourhood with lots of crime, the relative returns to legitimate activity are low, and this encourages crime.” (Burdett et al., 2003, p. 1777)

In spite of a rich economic literature both on labour market and on its relation with the shadow economy, strong empirical results lack (at least) one issue related to the employment effects of crime: the focus on the criminal activity of counterfeiting that is quite spread in Italy both in the South and North regions. Indeed the impact of counterfeiting, which constitutes an important share of the shadow economy, on the dynamics of unemployment and inactivity rates is still to be assessed.¹¹ This seems particularly interesting since counterfeiting harms the intellectual property and, as a consequence, the proper market functioning. Like other criminal activities, it might cause a reduction in investments in the area affected by the phenomenon and, in periods of economic crisis, this might boost (unemployed) workers to look for illegal jobs. Therefore, evaluating the impact of this form of crimes on unemployment and inactivity rates constitutes an important issue in order to better understand the dynamics of the labour market in Italy.

As mentioned, the period analyzed here is characterized by a deep and prolonged economic and financial crisis, which has produced negative effects on employment, persisting for a long time even after the peak of bad performance and likely altering individual priorities in the labor market choices. Italy was hit by the financial crisis that broke out in the United States in the second half of 2007 and then spread to the entire world economy. In particular, the financial and economic crisis, associated with the longest and deepest recession since the end of World War II, hit Europe in 2008 and gave rise to a rapid and large fall in economic activity in the area. The impact of the recession is well documented by the data on employment, as well as on industrial production and GDP, which recorded a sharp reversal of trend in 2008-09 compared with the period immediately preceding the outbreak of the crisis. In the second half of 2009 and the first half of 2010 some encouraging signs pointed to an inversion of the economic cycle. GDP began to grow again, although at a modest pace, and considerably varying, in Europe, from country to country, and, in Italy, from region to region. However, the strength of this recovery was rather moderate especially for the euro area. In Italy, the signs of recovery were particularly weak and uncertain and likely aggravated by a forecasting scenario that subsequently proved over-optimistic about the imminent exit from the crisis. As a matter of facts,

¹¹ As for the effect of criminal activities, in particular of organized crime on employment, some scholars have shown the existence of a positive and significant impact of the mafia pressure in the employment dynamics. In this sense, Scognamiglio (2015) performed an empirical analysis aimed to evaluate the effect of mafia-type criminal organizations on the employment in different sectors. In particular, the author uses a law (which was in force in Italy between 1956 and 1988 and forced the mafia members to resettle to another town) as a proxy for the arrival of illegal capitals in a new area. He assumed that the higher the number of resettlement in a given province, the higher the probability to create criminal connections in the destination province. By looking at eight employment sectors, he shows that the resettlement of mafiosos had a positive and robust impact on the employment mainly in the construction sector, which better allows the criminal organizations to invest in new localities for money laundering purposes.

in 2011 the world economy slowed again and the cyclical outlook for the advanced countries deteriorated. The phase of pronounced cyclical weakness, thus, continued in 2012, affecting even some of the strongest European economies. In this context, in Italy, the regional differences, among others, determined different effects on growth, employment, and economic stability: the decidedly poor performance of various indicators related to labour market seems to support the view that some Italian specific features also related to criminality might have affected the outright economic decline (see below, sections 2 and 3).

Our paper aims at understanding the impact of these crucial criminal phenomena on labour market, with particular attention on the two main components of the joblessness rate, namely, inactivity and unemployment rates. With this purpose, we shall use the following estimation strategy. We estimate separately the inactivity rate and the unemployment rate as our dependent variables, including in our analysis, other than the standard macroeconomic indicators on the employment performance, also the basic indicators capturing two different types of criminal activities (small crime and organized crime) and those measures capturing the presence of counterfeit activities likely to be related to criminal organizations.

The paper is organized as follows. Section 2 provides a description of the data considered in this analysis. In section 3 we present some stylised facts on counterfeiting and the linkages between criminal activity, unemployment and joblessness indicators. In Section 4 we describe the model and the empirical results. Section 5 concludes.

2. The data

The empirical analysis builds on yearly data for the twenty Italian regions for the period 2008-2013. Summary statistics of the variables used are reported in Table 1.

Our dependent variables shall be, in turn, inactivity rate, IR, and unemployment rate, UR, i.e. the two component of joblessness rate.

As for the explanatory variables, we consider some labour market and economic indicators obtained from the Italian National Statistical Institute (ISTAT): log of real regional GDP; the regional trade balance, TB, as given by the difference of regional import and export; the regional average labour productivity, ALP, as given by one period lag of log real regional GDP *minus* log employment; the number of regional foreign residents, FR. Notice here that most empirical analyses related to employment quite often include the above as explanatory variables. As for the effects of competitiveness, measured by improved trade balance (TB) and average labour productivity (ALP)¹², they are both expected to improve labour demand and employment. As for the expected impact of the FR variable in the Italian labour market, notice that both the political debate and the empirical

¹² See, for example, Ozel et al. (2013).

literature assessing the effect of immigration on destination countries' labor market adjustments,¹³ are quite controversial: We can observe different, and often opposite, results, supporting either the view that foreign and native are substitute, or that foreign workers barely replace native workers or that there exists complementarity between foreign and native workers, given that foreigners tend to settle in the most developed areas of Italy and therefore they should not represent a cause of distortion in the labour market.

Table 1. Summary statistics of the considered variables: period 2008-2013, yearly frequency, regional observations

Variable	Description	Obs	Mean	Std.Dev.	Min	Max
UR	Log of unemployment rate as given by the ratio of unemployed to working age population	120	2.136561	0.475922	1.050592	3.113999
IR	Log of inactivity rate as given by the ratio of inactive working age population to total working age population	120	3.586571	0.206668	3.301985	3.980784
FR	Number of foreigner residents	120	202172.3	235110.7	6271	1100000
ALP	Average labour productivity as given by one period lag of the log of real regional GDP <i>minus</i> the log of the employment	120	4.17092	0.20666	3.89096	4.806435
TB	Regional trade balance as given by the difference between export and import	120	-0.57371	2.520323	-12.8069	0.299697
CA_n	Number of seized counterfeited goods	120	2786066	4268666	64	2.10E+07
CA_val	Total values of seized counterfeited goods	120	3.16E+07	5.55E+07	853	4.20E+08
OC	Proxy for organized crime	120	294.2167	509.433	0	1919
PC	Proxy for small crime	120	299.3833	624.9412	0	3367
HC	Proxy for human capital	120	55.96125	6.412306	43.2	67.8
CA_dim	Log transformation of the average dimension of seizures	120	7.107727	1.599914	2.549445	10.30814
GDP	Log of real regional GDP	120	10.69732	1.096344	8.278133	12.79485

Following the approach used in Amable et al. (2007) we shall also refer to a human capital indicator, HC, capturing the number of people who have acquired levels of education between the upper secondary education and doctoral level or equivalent, according to International Standard Classification of Education 2011 (levels between 3 and 8 of ISCED 11, source: Eurostat). Indeed, HC has been widely recognised to be an important determinant of GDP, as in Mankiw et al. (1990), or of GDP growth rate, as in Lucas (1988) and we also expect it to be relevant for labour market.

In order to consider the impact of criminal activities on employment performances, we need to find reliable indicators because the different kinds of criminal activities at a regional level are directly unobservable. We distinguish three broad types of criminal activities of main interest here: organized crimes (OC), small crime (PC) and (various indicators of) organized counterfeiting activities (CA). We use as proxies spatially signaling the presence of small crime, organized crime and counterfeit

¹³ See, for example, Visco (2008); Foged and Peri (2016) and Frattini (2012).

those indicators referred to their contrast activity. We are aware that such indicators underestimate the considered phenomena, because they ultimately relate to the disclosed part of them, i.e. the part emerging after successful contrast activity. Moreover, such indicators might be biased in the long term because their variability depends on the intensity of the contrast activity by part of the police forces involved and not by changes of the criminal activities *per se*. However, in a relatively short term as the one considered here, we can safely assume that the contrast activities have been kept constant, also because the amount of public expenditures devoted to such activities has not changed in real terms over the considered period.

For organized crimes (OC) as opposed to non-organized or small crime (PC), we shall refer to data provided by the Italian Ministry of Justice. Such data allows us to proxy the presence of criminal organizations and small crime in each Italian region. The whole dataset - collected at a city level (according to the precincts of the Public Prosecutor's Office and of the District Prosecutor's Offices for mafia investigations) and then further aggregated at a regional level - gives us detailed data related to the number of people involved in legal actions for the following typology of crimes: mafia-type criminal organization (as from art. 416 bis of the Italian penal code, IPC), criminal conspiracy aimed to commit the crimes such as human trade (art. 600 of the IPC), slavery (art. 601 of the IPC), slave trade (art. 602 of the IPC)¹⁴, criminal conspiracy aimed to commit illegal trade of drugs and psychotropic substances (art. 74 of the Decree of the President of the Republic 309/90), criminal conspiracy aimed to commit contraband of tobaccos (art. 291 *quater* of the Decree of the President of the Republic 43/73), criminal conspiracy (art. 416 of the IPC), slaughter (art. 422 of the IPC), murder (art. 575 of the IPC), theft (art. 624 of the IPC), home burglary and bag snatching (art. 624 bis of the IPC), armed robbery (art. 628 of the IPC), extortion (art. 629 of the IPC), money laundering (art. 648 bis of the IPC), usury (art. 644 of the IPC) and, finally, all the categories of crime connected with possession and use of not denounced weapons (law n. 497/1974, and law n. 110/1975). In our analysis we shall use two aggregations of some of the above felonies in order to proxy, respectively, organized crime (OC) and small crime (PC). As for OC we have aggregated the following variables: mafia-type criminal organization (or mafia-like crime syndicates as from art. 416 bis of the IPC), criminal conspiracy aimed to commit the crimes as from art. 600, 601, 602 of the IPC (art. 416, comma 6 of the IPC) and criminal conspiracy (art. 416 of the IPC). The presence of PC in the considered region is given by the aggregation of those felonies such as murder, extortion and the crimes connected with possession and use of not denounced weapons, if not recognized to be connected with criminal organizations such as mafia-like crime syndicates.

As for counterfeiting activities (CA), we refer to the IPERICO database - developed since 2008 by the Ministry of Economic Development jointly with the Tax Police Force, the Customs

¹⁴ In particular, we refer to art. 416, comma 6 of the IPC.

Agency and the Service of Criminal Activity of the Ministry of Internal Affairs. The dataset collects all the contrast activities to counterfeiting carried out in Italy over the period 2008-2013, distinguishing them on the basis of 11 commodity-related categories: clothing; accessories; shoes; watches; jewellery; electrical devices; electronic and computer devices; toys and games; cds and dvds; sunglasses; makeup cosmetics, perfumes and fragrances. Notice here that the categories of goods in the database do not consider those goods, often subject to counterfeit, such as medicines or foods, which are under the jurisdiction of Italian Health-Care Ministry. For our purposes, we shall consider three indicators: number of seized counterfeited goods (CA_n), the (log transformation of the) average dimension of counterfeited good's seizures in each region (CA_dim), estimated value of the seized counterfeited goods (CA_val). CA_dim and CA_n are taken as proxies of the presence in the region of such specific illegal activity, mainly related to the exchange of goods. We also refer to CA_val, because it provides the estimated value of the seized counterfeited goods and highlights the expected profitability from such illegal activity. Indeed, such an indicator is less affected than the others by those elements - such as the presence of big harbor or the national borders, where usually more controls take place – thus affecting the dimension of seized pieces (see below, section 3). As a consequence, CA_val helps to balance the spatial bias of CA_dim and CA_n emerging in those regions where the average dimension of seized goods is particularly high.

All the mentioned variables shall be included as covariates in both our regressions (reported in section 4), with IR and UR as dependent variables. Nevertheless, notice that in our final estimates we only report the regressions with explicative variables resulting significant. We will find that some of them have only a significant effect on unemployment rate and some others only on inactivity rate.

3. Some stylised facts

Counterfeit is a crime related to the violation of the right of intellectual property. Therefore, it negatively affects the good functioning of the competitive market. In particular, there exists a strong and positive relation between the functioning of the market and the existence of protection of industrial properties, such as the respect of the brands, and the correct information provided to consumers about the quality of goods or services. Thus, the presence of counterfeiting activities in the market originates several problems (OECD, 2008).

OECD (2008) points out the following negative effects on the economic activities: the effects on the owners of the rights which have been violated (these effects are usually related to reduction of sales, loss of prestige and reputational damages, increase of costs for protecting the brand); the effects on consumers due to the absence of any quality-control; the effects on the public sector due to the direct loss, caused by the reductions of fiscal revenues, and indirect loss, connected to a general loss of trust in governments' ability to protect intellectual property rights. Here, we shall be mainly concentrated on the general socio-economics effects of the phenomenon. Indeed, counterfeit

discourages innovations, with a consequent damage of economic competitiveness and a likely fall of the economic growth. Moreover, it generates distortion in labour market, by increasing the turnover from the regular to the shadow/irregular employment sectors. Furthermore, counterfeiting can also generate a reduction of the foreign direct investments in those areas where the intellectual property rights are not preserved. Finally, counterfeit is usually related to the expansion of organized crime, with consequent distortions of trade as well as (unknown) damages to natural environment.

In the considered period, Italy is characterised by unemployment and inactivity rates higher than usual because of the worldwide economic and financial crisis. Obviously, the observed persistence in unemployment and inactivity rate above their average long-term levels might be due to several elements such as rigidities in the labour market, excessive taxes on labour and/or other institutional factors. It is worth mentioning that a first factor that lets production below its pre-crisis trend level is the reduction in the potential supply of labour. Empirical evidence has shown that deep and prolonged recessions can reduce the potential supply of labour essentially in two ways: by lowering the labour participation rate and raising the ‘natural’ unemployment rate. The former is due to a ‘discouragement effect’ because of adverse expectations regarding employment opportunities; as for the latter, it has been found that a prolonged high level of unemployment tends to result in an increase in the ‘natural’ unemployment rate.¹⁵ A second important factor relates to the dynamics of income distribution during the crisis: the welfare of the EU countries has been hurt not only by the problems deriving from prolonged low growth but also by a persistent and widespread tendency for inequality in the distribution of income and by the emergence of new areas of poverty (OECD 2015). A third important factor is the effect of criminality (either organized or not). In this respect, it is of interest considering whether in the peculiar (quite long) period of global economic crisis, high unemployment and inactivity rates go together with those important criminal activities widely spread in the country. The latter issue, however, has received scant econometric attention and the relationship between either UR or IR and criminality, including counterfeit productive activities, as noted before, has not been *per se* the subject of a large portion of literature.

Here we concentrate on unemployment and inactivity rates in the 20 Italian regions over the period of economic and financial crisis (2008-2013) also in the light of the behaviour of the main indicators of criminality and counterfeiting.

By looking at a long time series (source OECD) of the Italian labour market indicators (figure 1), the economic and financial crisis determined a structural change in the unemployment rate since

¹⁵ This is due to a ‘hysteresis effect’ that may be produced when, owing to a long period of unemployment, human capital diminishes and, more generally, the professional abilities decline to the point that prevents people being hired again. This effect may be accentuated by the introduction during the crisis of excessively generous benefits and other forms of unemployment support that discourage the supply of labour (IMF 2009, Chapter 4; OECD 2009, Chapter 1 and the literature quoted therein).

2007, when the UR began to increase up to 2011, when it calmed down for one year, but sharply increased again afterward. Notice that the unemployment rate is characterised by a negative slope up to 2007, it dramatically overturns from the crisis onwards, reaching in Italy, figures even higher than the pre-euro ones. The inactivity rate shows a first bottom peak in 2008 and then slightly increases up to 2011, beginning to decline afterward with alternate behaviour.

As shown in figure 1, the pattern followed by these two variables is quite weird. In particular, if after a big bust it is presumable to observe a significant increase in the unemployment rate, it is not so straightforward to find a similar response (with a year lag) in the inactivity rate. Part of the explanation, we believe, can be found in the fact that, during the deep recession, a significant increase in the joblessness could be strengthened by some workers' preferences for a criminal/shadow activities alternative to (hard to find) regular jobs. This idea is consistent with part of the literature discussed in Section 1.

Figure 1. Unemployment and Inactivity rates in Italy (1998-2014)

Source: OECD.stat

Figure 2 summarizes the Italian aggregated data for counterfeiting, organized and small crime, in the 2008-2013 timeframe. For each variable, we refer to the composition ratio over the total of the period in order to deal with different scales of the data.¹⁶ As shown, the average dimension of seizures varies around 15% in the first three years of the financial crisis, while it rises significantly after 2010. The variable related to organized crime, almost constant, slightly increases during the years 2009-2011, while small crime slightly decreases up to 2011, when it rose significantly in 2012 and declines afterwards. The behaviour of these variables might signal that during a crisis, characterized by structurally high unemployment, the criminal organizations represent a valid alternative to regular jobs. In this context, counterfeiting sector represents one of the profitable economic alternatives available to criminal organizations for new investment. On this basis, it could also be argued that such illegal activities became one of the drivers of the shadow employment. For this same reason, being employed in this “illegal sector” might be perceived as a valid alternative to a regular job during periods of high unemployment. This attitude may have been supported by the persistence of the financial crisis, as we observe an increasing trend in the counterfeiting variable throughout the period of economic crisis.

Figure 2. Counterfeiting, organized and small crime in Italy 2008-2013. Annual aggregated data, composition ratio on the total of the considered sample.

Source: elaboration on data provided by Italian Ministry of Justice and from the IPERICO data set

¹⁶For each variable, we have taken the ratio between the annual national average and the sum of the mean of all the considered years. In particular, here we use the average dimension of seizures aggregated at a national level.

Taking the average values of our main indicators for each region over the period considered, figures 3 and 4 summarize the main features concerning, respectively, unemployment and inactivity rate, and organized crime, small crime and counterfeiting in the Italian regions. In particular, figure 3 shows the values of unemployment and inactivity rates sorted by unemployment (from the smallest to the largest). Figure 4 highlights the composition ratio on the total for each region over the considered time-frame¹⁷ of the variables related to crime, i.e., OC, PC and CA_dim.

On the one hand, it emerges that southern regions are the most affected by both inactivity and unemployment phenomena as well as by organized crime, and that Sicily and Campania take the highest values. On the other hand, counterfeiting is characterised by a spatial distribution different from other forms of crime. Figure 4 shows that counterfeiting is spread over all the Italian regions, with some peak of the average dimension of seizures in the southern part of Italy (except for Sicily), but also in Latium, Veneto, Friuli Venezia Giulia, Emilia Romagna, Valle d'Aosta, Trentino Alto Adige and Abruzzo. In this respect, it should be noted the high values of the counterfeiting indicator in those regions, such as Abruzzo and Veneto,¹⁸ where the presence of big harbours could have determined an over-disclosure of the phenomenon with respect to other parts of Italy. A similar reasoning applies to regions such as Friuli Venezia Giulia, Trentino Alto Adige and Valle d'Aosta, where the high figures of counterfeiting indicators could be explained by the presence of the national borders, where customs' controls would have determined the over-disclosure of the phenomenon. For this reason, as mentioned, we consider also a different indicator of counterfeiting activities, given by the estimated value of the seized goods, which is a reasonable signal of the diffusion of valuable counterfeiting activities. Figure 5 shows that the regions with the highest peaks of seizures (Figure 4) are different from those where the value of the seized good is the highest. In particular, the highest values of the seized good can be found in six regions (Latium, Campania, Lombardy, Tuscany, Veneto and Puglia) characterized either by a significant level of criminality (as the case of Campania and Puglia) or by rich markets, usually linked to the presence of big metropolitan areas (i.e. Rome for Latium, Milan for Lombardy, and Naples for Campania). Finally, the cases of Tuscany and Veneto suggest that the counterfeiting might be supported also by the presence of a strong industrial background. For example, in Tuscany, an important economic area with a fierce industrial history in the textile sector¹⁹ has been widely turned into a shadow production of counterfeited products.

¹⁷ In this case, for each region and for each variable, we have used the ratio between the average value in the considered period and the sum of the regional mean in the same years. The same procedure has been applied in figure 5.

¹⁸ Here we refer, for Veneto, to Venezia-Mestre, which is one of the main commercial harbours in Europe for general cargo, and, for Abruzzo, to the harbours of Ortona and Pescara.

¹⁹ As for Tuscany we refer to the example of Prato, which has been one of the most important Italian industrial districts, as reported in Becattini G. (1997).

Figure 3. Unemployment and Inactivity rate in the Italian regions (average values of the considered period)

Source: elaboration on data provided by the Italian National Statistical Institute (ISTAT)

Figure 4. Counterfeiting (average dimension of seized goods), small and organized crimes-regional composition ratio on the total over the considered sample (2008-2013)

Source: elaboration on data provided by Italian Ministry of Justice and from the IPERICO data set

Figure 5. Counterfeiting (value of seized goods), small and organized crimes-regional composition ratio on the total over the considered sample (2008-2013)

Source: elaboration on data provided by Italian Ministry of Justice and from the IPERICO data set

4. Econometric framework

4.1. The model

In order to evaluate the impact of criminal activities on the Italian labour market, we exploit the econometric properties of a dynamic panel data model with a Generalized Method of Moments (GMM) estimator. We concentrate on the two components of joblessness rate, say, inactivity and unemployment rates, that we consider, in turn, as our dependent variables.

The GMM estimator allows us to tackle the two main econometric issues that always occur in these kinds of estimates. We refer to the presence of fixed effects and of endogenous and predetermined variables within our reference equations. The two issues are strictly interrelated. Indeed, the use of a dynamic panel in the presence of the predetermined²⁰ lagged dependent variable within regressors helps to capture the persistence of the agents' behavior in the labour market. This problem arises also as a consequence of the use of annual data: searching for a job as well as hiring and firing workers are costly activities, therefore both inactivity and unemployment rates may adjust with delay to changes of their own direct determinants. Moreover, the adjustment process may depend on the difference between inactivity (unemployment) rate and its previous year's value. Therefore, the use of a dynamic model is also preferable, since it allows us to include lags of the dependent variable as a covariate. For all these reasons our reference equation takes the following form:

²⁰ A predetermined variable is independent of current and future disturbances but influenced by past ones.

$$y_{i,t} = \alpha y_{i,t-1} + X'_{it} \beta + \eta_i + v_{it}, \quad \text{with } \eta_i + v_{it} = \varepsilon_{it} \quad (1)$$

where the error term has two components: the fixed effects, η_i and the idiosyncratic shocks, v_{it} .

$y_{i,t}$ represents our dependent variable, in turn the unemployment rate, UR, and the inactivity rate, IR. The matrix X' includes the explicative variables. The lagged dependent variable, $y_{i,t-1}$, among the regressors is correlated with the fixed effects in the error term by construction, thus giving rise to “dynamic panel bias” (Nickell, 1981). This positive correlation violates an assumption necessary for the consistency of the OLS estimator, which yields a biased estimate. The classical approach used to solve this problem refers to control for shocks that are specific to one region (fixed effects). In particular, the most common approach relates to the introduction of regional dummies, in order to use the so-called Least Square Dummy Variables (LSDV) estimator. However, it does not eliminate the dynamic panel bias and it is formally equivalent to the Within Group, WG, estimator. Therefore, it cannot be relied upon because of its inconsistency (see Nickell, 1981; Bond, 2002; and Roodman, 2009)²¹.

There are other ways to sort out the dynamic panel bias. The method used here transforms data to remove fixed effects by applying the differentiation to the original equation.²² By transforming equation (1) we obtain:

$$\Delta y_{it} = \lambda_1 \Delta y_{i,t-1} + \lambda_2 \Delta X'_{it} + \Delta v_{it}. \quad (2)$$

where the fixed effects are washed out, but the lagged dependent variable is still correlated to the “transient” error Δv_{it} , sharing the term $v_{i,t-1}$. Furthermore, each variable that is not strictly exogenous in the matrix of the other regressors X_{it} ²³ becomes now potentially endogenous, being likely related to

²¹ “Under the Within-Groups transformation, the lagged dependent variable becomes $y^*_{i,t-1} = y_{i,t-1} - \frac{1}{T-1}(y_{i2} + \dots + y_{iT})$ while the error becomes $v^*_{it} = v_{it} - \frac{1}{T-1}(v_{i2} + \dots + v_{iT})$. (The use of the lagged dependent variable as a regressor restricts the sample to $t=2, \dots, T$.) The problem is that the $y_{i,t-1}$ term in $y^*_{i,t-1}$ correlates negatively with the $-\frac{1}{T-1}v_{i,t-1}$ in v^*_{it} while, symmetrically, the $-\frac{1}{T-1}y_{it}$ and v_{it} terms also move together. So regressor and error are still correlated after transformation” Roodman (2009, p. 19). Basically, this constitutes the so-called “Nickell bias”, which makes the WG estimator inconsistent.

²² A further method consists of instrumenting $y_{i,t-1}$ and all the other possible endogenous variables with variables which must be uncorrelated with the fixed effects. This is the case of the GMM-system, which we do not take into account in this work.

²³ The presence of other endogenous variables in the vector X' of the other regressors is another reason of the better performance of a GMM estimator in comparison to other kinds of estimators. Kiviet (1995), for instance, argues that the best way to handle dynamic bias is to perform LSDV, and then correct the results of the bias, because it enhances the

the transient error term. Thus, lagged dependent variable and other likely endogenous variables need to be properly instrumented in order to eliminate this problem.

In this respect, the GMM estimator allows us to exploit internal instruments which can be drawn from the dataset. Natural candidates to instrument the lagged variable $\Delta y_{i,t-1}$ are $y_{i,t-2}$ and $\Delta y_{i,t-2}$, as well as all further longer lags which are not related to the error term (Rodman, 2009). In order to assess this issue we shall rely both on the Arellano-Bond test, which is applied on residuals in differences, and on the over-identifying restrictions Sargan/Hansen tests. Finally, we introduce some variables in the matrix of external instruments in order to better perform our estimates.²⁴

4.2. Empirical results

As we have already mentioned, we want to assess the impact of criminal activities in the 20 Italian regions, in the period 2008-2013, on both the inactivity and unemployment rates as represented in equation (2).

In order to obtain our estimates, exploiting the properties of GMM estimator, we shall use the *xtabond2* package available in Stata. Along with our main GMM regression, we also report the estimates obtained with OLS and the WG regressions that we use as robustness for GMM: in the OLS regression the lagged dependent variable is positively correlated with the error term (because of the presence of fixed effects), giving rise to an upward biased coefficient; at the opposite, the WG estimator yields a downward biased coefficient²⁵ (defined in Nickell, 1981, as “dynamic panel bias”). Therefore, robust GMM estimates of the true parameter are supposed to lie between these bounds. This evaluation shall be taken into consideration in order to confirm the goodness of the results.

As mentioned, following a general to specific methodology, in both IR and UR equations we test the significance of all the variables reported in table 1, although the results reported in tables 2 and 3 below are those with only significant explanatory variables.

As for the **inactivity rate** (IR), we refer to equation (2) and test whether the presence of inactive people is associated to the presence of shadow productive activities related to counterfeiting as well as to other criminal activities and labour market indicators.

Concerning the interpretation of the model in this context, note that, as in Watt and Janssen (2003), the insertion of a lagged dependent variable is supposed to take into account the persistence

precision in the final estimates. However, this approach works only for balanced panels and, above all, does not address the potential endogeneity of other regressors. As a result, we need to exploit an estimator that does not require any correction. As highlighted in Roodman (2009) GMM estimator also allows us to address this issue.

²⁴ The easiest way to instrument our not strictly exogenous variables is the 2SLS estimator, within the Anderson-Hsiao (1982) difference and levels estimator (for further details see Roodman, 2009). Here, we exploit the properties of the GMM framework à la Holtz-Eakin, Newey and Rosen (1988).

²⁵ The motivation for the dynamic panel bias to occur is explained in note 21.

stemming from agents current position on the labour market. The variation of the inactivity rate is, thus, affected by its previous value because of the inertia associated with changes in the regional labour markets, where the fraction λ_I of the adjustment captures the delay in the adjustment process.

After the general to specific methodology, among those variables traditionally related to the choice of people looking for a job or interrupting the search, the human capital (HC) and the number of foreign residents (FR) result significant. All the three criminal indicators (i.e., OC, PC and CA_dim) result significant as well. In particular, the two criminal variables, OC and PC, are considered endogenous because of the likely presence of simultaneous causality on the inactivity rate.²⁶ We have instrumented our endogenous variables with their own lags and with some external instruments, including the number of seized pieces (CA_n), their value (CA_val), the indicator of the regional trade balance (TB), and (the logarithm of) GDP. We considered such instruments by relying on the following considerations. As highlighted in OECD (2008), the presence of trade among regions is directly linked to the level of economic activity and, thus, to the level of competitiveness. Therefore, TB might also signal the level of criminal economic activity of exchange of counterfeit goods. On the other side, GDP is often negatively correlated with criminal activities, and those regions with a higher presence of both organized and small crime are also the poorest areas of the country. Thus, GDP and TB²⁷ may be able to instrument our endogenous variables (OC and PC), delivering an error term uncorrelated with the explicative variables. The same considerations apply for the number of seized goods and their value, which are associated with the existence of criminal activities but not with the disturbances. For this reason, they contribute to eliminate endogeneity in PC and OC. We shall find the external instruments to be essential in our estimates, since their presence in the “IV-style” matrix greatly improves the estimates that we obtain.

Table 2 reports our final empirical findings for IR. Column A shows the output of the GMM regression, whereas columns B and C report, respectively, the OLS and the WG (fixed-effects) regressions. In column A we report the two-step GMM estimates, which are asymptotically more efficient than one-step estimates. Instruments used in the Arellano-Bond approach are the log of the lagged dependent variable and both the “criminal variables” two and three periods lagged. We also use the “collapse” option, in order not to stumble on the problem of the proliferation of instruments, which can invalidate our estimation. All the other variables are assumed to be exogenous and are instrumented with their own values. The Hansen test for robust estimation does not reject the null-

²⁶ We choose not to set the counterfeiting variable as endogenous because, as observed in section 3, its spatial distribution is quite different from those of OC and PC, which, for example, assume the highest values in those same regions with high UR and IR. For this reason, the presence of simultaneous causality between this phenomenon and the inactivity rate is weaker. This might also depend on our choice to proxy the latter criminal phenomena with indicators of contrast activities, although goods might have been produced and sold not necessarily where they are seized.

²⁷ We have used the first lag of both GDP and TB, since we assume they can have an influence only after some period of time.

hypothesis of a valid specification, as well as the Arellano-bond test in first-differences that looks at the presence of serial correlation in the error structure. The corrected standard errors, reported in parentheses, are adjusted for the correction of Windmeijer (2005).

The coefficient of the lagged dependent variable, $IR_{(t-1)}$, presents a value of about 0.28, meaning that the level of persistence of the inactivity rate is somewhat low.²⁸ We find a positive and statistically significant impact of counterfeiting, CA_dim , on the inactivity rate, which supports the view that the presence of more inactive people is associated to the likely presence of a market for counterfeited goods. As expected, the impact of organized crime, OC , on the inactivity rate is also positive suggesting that the two phenomena of counterfeiting and organized crime go together. Nevertheless, it is also important to point out again that we use the contrast activity related to this phenomenon. This indicator represents only the “emerged part of the iceberg”, and it is not able to identify the real size of this phenomenon. If real data were available, the effect would have been in the same direction, but the size would have been likely much greater.

Interestingly, the other criminal variable referred to small crime shows a negative and statistically significant impact supporting the view that those activities related to "non organized" criminal behaviors, identified by the variable PC , reduces the inactivity rate. Indeed, it has been widely recognized that PC is perceived as a disturbing factor for both organized crime and counterfeit activities which are often related to OC . The presence of a widespread (and uncontrolled by the criminal organizations) criminal activity increases the presence of police force in the area affected by the phenomenon and it acts as a disturbing factor for the organized crime, which, in turn, might reduce its activity in the black market. As we find opposite significant effects on the labour market, this dual behavior of criminality provides evidence supporting our choice to consider two different indicators referred to criminal activities in our model.²⁹

²⁸ Notice that the coefficient can be viewed indifferently as either the lag in the inactivity rate in levels or the lag in its growth rate.

²⁹ Moreover, including both criminal variables we do not even bump into multicollinearity, which could have been a reasonable issue to overcome. Indeed, the lack of correlation between OC and PC is also explained by the different spatial distribution among the Italian regions from 2008 to 2013 (see figures 3-5).

Table 2 GMM estimates of inactivity rate, IR

Variables	A GMM regression	B OLS regression	C WG regression (FE estimates)
	Group variable: region Time variable : year Number of obs.= 80 Number of groups = 20 Number of instruments = 13 Obs per group: min = 4 avg = 4.00 max = 4 Wald chi2(6) = 18.14 Prob > chi2 = 0.000	R-squared = 0.9855 Adj R-squared = 0.9846 Root MSE = .0259 F(6,93) = 1056.48 Prob > F= 0.0000	R-sq: within = 0.6258 between = 0.110 overall= 0.1152 F(6,19) = 123.47 corr(u_i, Xb) = -0.0391 Prob > F= 0.0000
IR (t-1)	0.281958** (0.1397)	1.001*** (0.023)	0.078 (0.072)
HC	-0.069*** (0.0015)	-0.0006 (0.0005)	-0.009*** (0.0010)
FR	3.07e-07*** (1.11e-07)	-2.97e-09 (1.31e-08)	2.75e-07*** (5.61e-08)
CA_dim	0.0037** (0.0013)	0.0001 (0.001)	0.0025** (0.0013)
PC	-0.00008*** (0.00002)	-0.00001 (0.00001)	-0.00003*** (5.01e-06)
OC	0.00011*** (0.00004)	0.00001 (0.00001)	0.00002** (0.00001)
Constant		0.029 (0.099)	3.76*** (0.286)
Sargan test Chi2(7)= 8.47 Pr>Chi2= 0.293			
Hansen test Chi2(7)= 7.46 Pr>Chi2= 0.382			
Arellano-Bond test for AR(1) z = -2.07 Pr > z = 0.038			
Arellano-Bond test for AR(2) z = -1.61 Pr > z = 0.107			
Difference-in-Hansen tests of exogeneity of instrument subsets GMM (IR(t-1), PC, OC; lag(2 3)) Hansen test excluding group: Difference (null H = exogenous): Chi2(1)= 0.07 Prob> chi2= 0.794 Chi2(6)= 7.39 Prob> chi2 = 0.286 IV (CA_n, CA_val, HC, FR, TB, logGDP, CA_dim) Hansen test excluding group: Difference (null H = exogenous): Chi2(7)= 7.46 Prob>chi2= 0.382			

The other significant variables present a different impact: the number of foreigners has a positive but small impact on the inactivity rate, whereas the human capital shows a negative effect. As for foreign workers, part of the empirical literature shows that they barely replace native workers. Some displacement effect can be found in the short term, but it is rather small and only on the so called dirty, dangerous, demeaning (ddd) jobs. Since foreign workers usually replace native workers only for manual, low-skilled jobs, they might be more willing to accept an illegal job when the regular jobs are not available, thus increasing IR. Furthermore, the economic and financial crisis of the considered period, in which labor demand appears not to be able to adjust the increased supply also coming from foreign workers, seems to be the crucial in determining the positive, although small in size, impact of the foreigners. Human capital plays a positive role in decreasing the number of inactive people in the Italian regions, as it can be viewed as a positive determinant of the economic activities, as in Mankiw et al. (1990) and in Lucas (1988) and also because more educated workers are able to adapt to changed economic conditions. Unlike HC, trade balance, associated to high competitiveness, and ALP do not have a significant impact on inactivity, thus suggesting that the increase in the level of activity, during the economic crisis, does not change the status of inactive workers.

We report in columns B and C, respectively, the outputs of the regressions run using the OLS estimator and the WG estimator, in order to assess the goodness of our estimates. In particular, the bounds of the coefficient related to the lagged dependent variable are provided by these two regressions, and are respectively, 1.001 and 0.078. Valid estimates of this coefficient should lie within this range of values: our estimate (0.2819) is a reasonable value associated to the inactivity rate speed adjustment process.³⁰

The same empirical strategy is applied to estimate the **unemployment rate** (UR) according to equation (2). As before, the insertion of a lagged UR is supposed to capture the persistence stemming from agents current position on the labour market. We shall assume that the variation of the unemployment rate in the period considered is affected by its previous value because the labour market is unable to absorb exogenous shocks in one period, with the estimated coefficient of the lagged dependent variable capturing the speed of this adjustment process.

After a general to specific methodology, the following variables now result significant: a proxy of (legal and illegal) regional trade, TB; the number of foreign residents, FR; and productivity, ALP, with the latter being considered as endogenous. Because our time-varying explanatory variables are all potentially impacted by unemployment rate, we incorporated lagged, rather than contemporaneous, measures of them. Notice here that the effect of competitiveness as measured by improved trade

³⁰ Roodman (2009) suggests that a credible estimate of the coefficient related to the lagged dependent variable should probably lie below 1.00 because values above this bound would imply an unstable dynamic, with accelerating divergence away from equilibrium values.

balance can, in principle, enhance employment performance by boosting the demand. However, increased competitiveness requires price moderation while national authorities, during an important economic crisis, might be tempted to use expansionary policies instead of balance constraints. In this case, an improved employment performance could go along with a decrease in the trade balance (Carlin and Soskice, 2005). On the other hand, increased labour productivity should improve labour demand and employment. In this respect, TB and ALP, considered together, might also be expected to act differently on unemployment, because, for example, increased competitiveness and average productivity could lead to the exclusion from labour market of low skilled workers, who might likely fall into inactivity. In this context, the regional trade balance might be of help to consider the channels of influence affected by extra regional demand.

As mentioned, we consider lagged ALP (as well as the lagged dependent variable) as endogenous. The reason of the endogeneity of ALP can be tracked in the causality between productivity and unemployment. Indeed, both these variables are strongly related to GDP, therefore, we have instrumented them with their own lags and some external instruments, such as the human capital, HC, as well as the indicators proxing the criminal activities. Even in this case, all the instruments seem to be appropriate and provide better estimates. Indeed, on the one hand, they do not directly determine unemployment (or its growth rate) and they are not directly determined by unemployment. On the other hand, they significantly affect ALP likely because of their strong correlation with GDP. More precisely, as we already argued in the case of the inactivity rate regression, GDP is negatively correlated with criminal activities at a regional level, since the higher presence of both organized and small crime the lower the regional GDP; whereas, human capital is positively related to GDP (Mankiw et al., 1990; Lucas, 1988). Therefore, organized crime, small crime, counterfeiting, and human capital present all the characteristics of good instruments and seem to be able to significantly affect unemployment *via* ALP, whereas they are not significant as regressors.

The results from GMM estimation are reported in table 3, together with the output of the regressions run using OLS and WG estimators, which we use as a robustness check.

All the regressors reported in table 3 present a statistically significant coefficient and are correctly signed. In particular, the productivity shows a reasonable negative effect on the unemployment rate, which means that increased productivity tends to decrease UR, as well as the increase of competitiveness, TB. Interestingly, the estimated coefficient of the lagged dependent variable shows a high level of persistence in the unemployment rate, being equal to 0.825. Such a strong persistence in the unemployment process can be explained by the considered time span, which corresponds to the years of the economic and financial crisis and is characterized by a persistent drop

in the Italian GDP growth rate,³¹ with a consequent opposite behavior of UR. Unemployment rate, indeed, rises significantly and is characterized by unconventionally high levels in the considered years. The robustness test confirms the goodness of fit, since the coefficient of the lagged dependent variable stands within the bounds obtained with OLS and WG estimates, reported in columns B and C of table 3, respectively. Indeed, the bounds (0.764 and 0.889) are very close to each other, shrinking the range of real values that our estimates should take on.

Table 3 GMM estimates of unemployment rate, UR 2008-2013

VARIABLES	A GMM regression	B OLS regression	C WG regression (FE estimates)
	Group variable: region Time variable : year Number of obs.= 80 Number of groups = 20 Number of instruments = 11 Obs per group: min = 4 avg = 4.00 max = 4 F(4, 20)=129.08 Prob> F=0.000	R-squared = 0.9404 Adj R-squared = 0.9379 Root MSE = 0.11044 F(4,95) = 374.75 Prob > F= 0.0000	R-sq: within = 0.7135 between = 0.5302 overall= 0.5619 F(4,19) = 672.16 corr(u_i, Xb) = -0.1382 Prob > F= 0.0000
UR (t-1)	0.8255*** (0.0812)	0.8892*** (0.0281)	0.7645*** (0.0534)
FR (t-1)	3.90e-06** (1.80e-06)	6.83e-08 5.33e-08	5.36e-07* (2.60e-07)
ALP (t-1)	-0.385286*** (0.1005)	-0.2669*** (0.0580)	-0.2916*** (0.0533)
TB (t-1)	-0.1292*** (0.0059)	-0.0057 (0.0047)	-0.1031*** (0.010)
Constant		1.4500*** (0.2648)	1.6612*** (0.2908)
Sargan test Chi2(7)= 14.84 Prob>Chi2=0.038			
Hansen test Chi2(7)= 11.46 Prob> Chi2=0.120			
Arellano-Bond test for AR(1) Z= -0.97 Pr>z= 0.332			
Arellano-Bond test for AR(2) Z= -0.86 Pr>z= 0.392			
Difference-in-Hansen tests of exogeneity of instrument subsets GMM (IR(t-1), PC, OC; lag(2 3)) Hansen test excluding group: Difference (null H = exogenous): Chi2(3)= 1.62 Prob> chi2 = 0.655 Chi2(4)= 9.84 Prob> chi2 = 0.043			
IV (CA_n, CA_val, HC, FR, TB, logGDP, CA_dim) Hansen test excluding group: Difference (null H = exogenous): Chi2(7)= 11.46 Prob>chi2 = 0.120			

Concerning variables which have contrasting effects on unemployment and inactivity, the main results are as follows. First, the impact of HC on joblessness appears to work more through

³¹ See, for example, Essenburg (2014).

inactivity than through unemployment, where it is used only as an instrument. Second, other variables appear to affect more unemployment than inactivity. In particular, TB has no significant impact on inactivity rate where it is used only as an instrument, whereas TB directly affects the unemployment rate with a significant and negative impact. This result is consistent with an interpretation in terms of increased competitiveness yielding higher demand for labour. It is also worth noticing that the influence of the trade balance on employment performance is directly linked to the impact on the level of economic activity: a low level of economic activity (associated to a low level of competitiveness, like that under the economic crisis) would mainly hurt the marginal categories of workers and push them to unemployment. Finally, the lagged productivity variable turns out to be crucial in the UR regression - since increased productivity reduces unemployment -, but it does not directly affect the inactivity rate. On the one side, higher productivity pushes aside low-skilled workers, possibly because increased productivity goes along with the use of more modern equipment and up-to-date skills. On the other hand, HC plays a role with respect to inactivity rate but it is not significant in unemployment regression where it enters only as instrument. This result is consistent with the idea that less educated people are more exposed to unemployment than to inactivity and, therefore, they are of main interest for the organized criminal activities.

5. Conclusions

We have investigated the relations between different criminal activities and joblessness indicators (i.e. inactivity rate and unemployment rate) during a period of deep economic and financial crisis.

The severe financial and economic crisis that hit Europe in 2008 caused domestic productive activity to slump and entailed substantial social costs mainly on the employment front. In Italy, the main indicators of joblessness – unemployment and inactivity rate – showed a peculiar behavior in the considered period: unemployment drastically overturned its tendency from 2008, beginning to rise sharply; at the same time the inactivity rate unexpectedly rose too, although at a lower pace, suggesting that people loosing their job also stop their searching activity.

In such circumstances, supporting production and employment became the immediate priority of most European governments. Nevertheless, as it has been stressed in the crisis debate, the European Union is made up with very disparate realities at national level so that the reforms required for enhancing growth and employment are likely to differ even substantially from country to country, and a single reform strategy that would fit all the European countries cannot be even hypothesized. For the Italian reality, this paper argues that consistent and effective actions to boost employment require that due account should be given to an important issue of the complex economic and social environment, i.e., the dynamics of shadow/criminal economic activities. In recent years Italy has been penalized not only by low growth but also by a persistent, widespread, increase in shadow/criminal economy. The

recession has exacerbated the social costs and tensions of the high and increasing disparities in per capita income distribution also arising because of illegal activities.

In this context, given the documented great and widespread expansion of counterfeiting economic activities in Italy in the last 10 years, it seemed to us particularly interesting to evaluate the effects of this criminal activity on the Italian labour market. Indeed, counterfeiting is a criminal activity, which damages the intellectual property and, as a consequence, the market functioning. Thus, it is likely to create a disincentive in investing, at least legally, in the country, with a consequent rise in employment redundancy, and an incentive for (unemployed) workers to look for illegal jobs.

In our empirical analysis we have found a strong positive and statistically significant impact of the presence of counterfeiting activities mainly on the inactivity rate, which comprehends people who stop looking for a new job and, therefore, are not included in the statistics of unemployed. As a corollary, we have found also a strong significant relation between other criminal activities and inactivity rate. In particular, we tested the presence of both organized crime and small crime as determinants of inactivity. Both variables have a significant effect on our dependent variables, although in opposite directions: we have found a positive and statistically significant impact of the organized crime and a negative impact of the small crime on the inactive. Amongst others, the former result can be explained by the fact that the presence of organized crime, likely also associated with the presence counterfeit economic activities, when absorbing labour forces, reduces the (legal) job search. On the other hand, the negative effect of the small crime seems to show that an increase of small crime acts as a disturbing element for the organized crime, which, in turn, reduces (illegal) jobs' opportunities. In our second regression, considering the unemployment as dependent variable, the variables related to crime work well as instruments in the same direction, improving the final estimates that result dramatically robust, given that the coefficients obtained in the robustness analysis based on OLS and FE estimates provide a very tight range for our estimated value.

Against this economic and social backdrop, the pre-eminence taken on by the objective of a faster growth and employment, implies that policy makers must give priority to structural measures that combine the objectives of growth and employment also by reducing illegal shadow activities. The implementation of structural reforms able to provide expansionary short-term effects on output and employment may be a priority for countries like Italy with limited manoeuvre margins for stimulating the economy through standard macroeconomic policies. Among the reforms that have these characteristics, there are the policies aimed at restructuring government expenditure for strengthening and modernizing public infrastructure. The impact of these policies on employment is reinforced by the fact that investment in these sectors often involves substantial use of labour. Moreover, investment in infrastructure may also improve a country's outlook for growth in the long term through the externalities they generate, which contribute to improving firms' productivity (Milone, 2016). Again, short-term effects in terms of job recovery can originate from the adoption of active labour market

policies that aim at accelerating the unemployed search for a new (legal) job, thereby helping to contain long-term unemployment and the exit of discouraged workers from the labour market.

Still concerning the labour market, it should be pointed out that the short-term impact of certain structural reforms on employment may be more favourable if they are introduced together with other reforms including a serious fight to criminality.

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