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Copper Cable Theft: Revisiting the Price–Theft Hypothesis

Aiden Sidebottom[1], Matt Ashby[1], and Shane D. Johnson[1]

Abstract

Objectives: To test the commonly espoused but little examined hypothesis that fluctuations in the price of metal are associated with changes in the volume of metal theft. Specifically, we analyze the relationship between the price of copper and the number of police recorded "live" copper cable thefts from the British railway network (2006 to 2012). *Method:* Time-series analysis was performed using 76 months of data to determine the association between mean copper price and police recorded "live" copper cable theft. Two rival hypotheses, that changes in the theft of copper cabling reflect changes in the theft of railway property more generally (or the reporting thereof) or variations in the rate of unemployment, were also tested. *Results:* We find support for the price–theft hypothesis: Changes in the price of copper were positively associated with variations in the volume of "live" copper cable theft. A downward trend in copper cable theft in recent years is also observed, although the mechanism/mechanisms

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underpinning this pattern is unclear. *Conclusion:* The theft of "live" copper cable is associated with fluctuations in copper price. As such, it differs substantially from the "crime drop" typically noted for most types of crime providing further support for the price–theft hypothesis.

Keywords
copper theft, crime drop, financial crisis, metal theft

Introduction

That crime is influenced by economic factors is one of the oldest propositions in criminology. For at least 150 years, criminologists have shown a keen interest in understanding how changes in macroeconomic conditions, such as levels of unemployment or poverty, are associated with differing rates of crime (Becker 1968; Cohen and Felson 1979; Merton 1938). Recognizing that different choice-structuring factors invite or make possible different forms of crime (Cornish and Clarke 1987), criminological enquiry has increasingly focused on the study of particular types of crime rather than considering "crime" in general. For a number of reasons, metal theft is an interesting case study of the effects of changing economic conditions on rates of offending. For instance, while most industrialized countries have experienced year-on-year reductions in several crime types since the mid-1990s (see Farrell et al. 2011; Tseloni et al. 2010; van Dijk, Tseloni, and Farrell 2012), metal theft shows a largely upward trajectory. A common interpretation of this finding is that general increases in the price of metals experienced in the past decade have made this type of crime more attractive to thieves.

This account can usefully be reformulated using a crime opportunity framework. Crime opportunity theories are concerned with the role of immediate environmental factors in crime causation. Hallmarks of crime opportunity theories include a focus on crime events (as opposed to offender disposition) and an interest in how the attributes and activities of crime targets (animate and inanimate) are associated with variations in rates of victimization (Clarke 1999; Cohen and Felson 1979). The decision-making model underpinning crime opportunity theories is the rational choice perspective (Cornish and Clarke 2008), which holds that prospective offenders make (bounded) situated decisions based on the perceived effort, risks, and rewards of committing specific crime types. Crime is considered more likely if the anticipated rewards outweigh the expected risks and effort. The rewards from successfully committing crime can take many forms, from the accumulation of assets to psychological satisfaction. However, despite this diversity, much acquisitive crime is considered to be motivated by financial gain.

Metal prices are an example of a macroeconomic environmental factor that might influence offender decision making. From a crime opportunity perspective, all things being equal, increases in the price of metals would be expected to make the theft of metal more attractive which, in turn, should lead to an increase in the frequency of metal theft. That is, changes in the choice-structuring properties associated with the crime in question directly influence the rate of crime. Crucially, this is a *target-oriented* account of metal theft for which changes in the rate of crime are expected regardless of changes in offender disposition or long-term structural factors that are at the core of theories of criminality.

Take copper. Copper is among the world's most widely used metals. It is used extensively in several industries, including construction, transport, and telecommunications. High global consumption rates alongside the development and industrialization of emerging economies such as China and India have seen available copper reserves strained under mounting demand (International Copper Study Group 2013). A growing imbalance in the supply and demand of copper has resulted in marked increases in the price of copper. From an offender perspective, there are several features that make copper an attractive target for theft. These factors can be stable or dynamic, and can relate both to the form of copper, its many functions, and to scrap metal markets more generally. For example, the distinctive color of copper means it is easy for thieves to identify compared to other (less valuable) metals. Property marking, if present, can often be easily removed (e.g., by burning) thereby blurring the provenance of the metal. The ubiquitous use of copper means there are plentiful opportunities for theft, though clearly some are easier to exploit than others. In relation to scrap markets, little effort is typically required to prepare copper for resale and opportunities for disposal in the form of scrap metal dealers and pawnshops are readily available. Yet, these are all relatively stable attributes and cannot plausibly explain the changes in patterns of copper theft. Price, by contrast, is volatile, such that increased market prices are associated with corresponding increases in the price per weight available at scrap metal dealers and pawnshops. Thus, the described upward trend in the price of copper (primary or scrap) increases the profitability of stealing copper and hence the attractiveness of copper-bearing items as targets for theft, be they railway cables, electrical wires, or water boilers.

Commentators on the recent boom in metal theft invariably make reference to the price–theft hypothesis (see, e.g., Bennett 2008; Kooi 2010;

Lipscombe and Bennett 2012), yet empirical tests are scarce. We propose two possible reasons for this: First, the recency of the increases in metal theft has meant that there has been little time for research to be conducted and published; second, many countries (including the United States and United Kingdom) do not have a distinct police recording crime category for metal thefts. This is problematic because the theft of metal-containing items can therefore be recorded under several different crime categories, which makes it difficult to extract relevant data on metal thefts.

However, where relevant data are available, the evident volatility in the price of metals over time makes empirical testing of the association between price and theft particularly appealing, since clear (casual) predictions can be made as to what patterns should be expected for the theft of it. A study by Sidebottom et al. (2011) is one exception in which this association was examined. In that study, using data for the period 2004 to 2007 and a formal time-series model, the authors examined the relationship between copper price and levels of police recorded copper cable theft from the British railway network,[1] finding the two to be significantly and positively correlated. Two alternative hypotheses—that the theft of copper reflected more general trends in levels of theft or that observed variations over time reflected changes in macroeconomic conditions, as would be suggested by some theories of criminality (such as Merton 1938)—were also tested but not supported. The patterns observed were thus interpreted as evidence of metal thieves' responding to price changes in the copper market. Similar findings are also reported by Posick et al. (2012) in their study of metal theft from commercial and residential properties in Rochester, NY, although in that study the authors use a simple bivariate correlation to test the price–theft hypothesis, meaning that any inferences drawn may be unreliable.

In this research note, we provide a further test of the metal price–theft hypothesis. Our article has three original features. First, the data used here cover a longer period of time than prior studies. Second, to the best of our knowledge, this is the first study to test the metal price–theft hypothesis using data that span the 2007-08 global financial crisis, a period that saw dramatic fluctuations in the price of many commodities, including copper. To illustrate, during 2008, there was an abrupt change in the wholesale price of copper, with prices falling from over US$8000 per tonne to around US$3000. It is contended that these extreme price movements approximate a (natural) experimental manipulation for which the direction of cause and effect (i.e., the global price of copper is hypothesized to affect the rate of copper theft in one country) would clearly be unidirectional. Put differently, as the prices of metals are determined on the basis of global demand relative to supply, both immediately and in the future, metal prices are unlikely to be affected by levels of theft in a country the size of Britain. The extreme price shifts in our data, we argue, therefore provide for a sharper test of the impact of metal price on levels of offending. This is important for the testing of hypotheses for which experimentation is not plausible.

Third, we focus exclusively on a hitherto unexplored subcategory of copper cable theft: the theft of "live" railway cabling, referring to cabling that is in use on the railway network as opposed to in storage prior to use, or abandoned after use. We make the distinction between "live" and "nonlive" cabling for two reasons. The first is victim oriented: The theft of live cabling typically causes greater disruption than the theft of nonlive cabling. The theft of "live" copper cable often prevents trains from operating on the affected line/lines and, consequently, can generate large-scale disruption: A single incident can close a main railway line for several hours, disrupting thousands of passenger journeys and incurring huge financial costs. Nor is the damage incurred always proportionate to the amount stolen: The theft of a small but critical length of copper railway cable might be worth US$ 50 to the metal thief but cause upward of tens of thousands of dollars in delays and disruption. In 2010/2011, Network Rail—who own, operate, and maintain railway infrastructure (including tracks, signals, power supplies, and bridges) in Britain—estimated that copper cable theft delayed trains by more than 6,000 hours, costing over US$ 24 million in repairs and compensation to train operators.[2]

The second reason is offender oriented. Stealing "live" copper cable is typically more dangerous than the theft of nonlive cabling since live cables often carry electrical current and tend to be closer to passing trains.[3] There are several reported cases of thieves being electrocuted, burnt, or hit by trains while attempting to steal live copper cabling.[4] Its removal also requires considerable effort and resources (i.e., cutting instruments) since live cabling has to be severed from whatever it is tied to and cut into sections short enough to be taken away.

In what follows, we test the following hypothesis:

Hypothesis 1: Fluctuations in the volume of "live" copper cable thefts are positively correlated with variations in the price of copper.

We also test two rival (alternative) hypotheses. The first is that trends in the theft of copper cabling can be explained (not by changes in the price of copper but) by variations over time in the security of the British railway system, due to, say, changes in policing or crime prevention activities. If this were the case, then we would expect changes in the theft of copper cabling to follow changes in other forms of acquisitive crimes along the railway network. We therefore test the rival hypothesis that:

> **Hypothesis 2:** Fluctuations in the volume of "live" copper cable theft are positively correlated with variations in the theft of railway property more generally.

If no association is observed, then more confidence can be attributed to the assumption that changes in the volume of "live" copper cable thefts are not simply an artifact of some general trend.

Our second rival hypothesis concerns unemployment. There is a long history of research on the links between unemployment and rates of crime (see, e.g., see Cantor and Land 1985; Chiricos 1987; Levitt 2001). At the individual level, an inability to acquire legitimate earnings is considered to increase the likelihood of participation in crime. At the national level, according to this line of reasoning, it follows that increases in unemployment will drive up levels of crime. Research evidence in support of a simple unemployment–crime association is mixed and tends to differ by crime type (for reviews, see Chiricos 1987; Yearwood and Koinis 2011). For the specific offence of copper cable theft, Sidebottom and colleagues (2011) found no association between unemployment and levels of theft. This hypothesis is nonetheless included here since our data span a time period that has witnessed general increases in unemployment associated with the economic downturn, prompting fears in the media of a recession-induced crime wave. We therefore test the following hypothesis:

> **Hypothesis 3:** Fluctuations in the volume of "live" copper cable theft are positively correlated with variations in the rate of unemployment in the United Kingdom.

If no association is observed, then it is less likely that changes in the volume of "live" copper cable thefts over time are the result of changes in macroeconomic conditions in the United Kingdom.

Data

"Live" Copper Cable Theft

Data were provided by the British Transport Police (BTP) for the period January 2006 to April 2012 inclusive. This mass public transport system includes over 35,000 km of railway track, 3,000 railway stations, and services around one million users per day. The data comprised incident-level reports of all recorded thefts of "live" cable from the British rail network. Live railway cabling serves two main purposes: controlling line side signals that are vital for train safety and distributing electricity to power trains. Their wide use means that at least one, and sometimes many, live cables run along most of the 35,000 km of railway track in Britain.

It is worth noting that the data analyzed by Sidebottom and colleagues (2011) did not differentiate between the theft of live and nonlive railway cabling. Here, we focus on the former. It is possible that these data include thefts of metals other than copper, for example, some line side power cables are made of aluminum. To estimate this, we manually checked the free-text field of all theft events that specified the metal contained in the stolen cable. Of these 1,221 crime reports (24 percent of the total sample), 88 percent were thefts of copper cable, 6 percent were aluminum, and 5 percent were lead. Since the majority of crime reports did not specify what metal was stolen, noncopper cable thefts could not be completely excluded from the data, but we have no reason to suspect that there are any systematic recording issues associated with the data.

All police recorded crime data are liable to undercount the true extent of crime because of underreporting. Of particular concern here is the possibility that victims might be more likely to report metal theft when metal prices are high. However, we suggest that prices are unlikely to affect reporting practices because the replacement cost of metal is only a small proportion of the overall cost of theft. Much more significant are the costs of disruption to services caused by thefts and the labor costs associated with repairs, neither of which vary with metal prices.

Copper Price

The copper price data analyzed here are based on the London Metal Exchange (LME) daily cash settlement price and are expressed as monthly averages in U.S. dollars per tonne (January 2006 to April 2012). For the purposes of analysis, the LME price data are considered a proxy measure for the monthly price (per weight) that offenders may receive if disposing of stolen metals. While the price offered by those willing to purchase metals (such as scrap metal dealers, pawnbrokers, fences) may well be lower than the LME price, movements in the price of scrap metals are found to closely mirror changes in the price of primary metals (see, e.g., Aruga and Managi 2011). Moreover, LME prices are frequently used as the standard reference price for nonferrous metals such as copper (Watkins and McAleer 2004).

Theft of Railway/Commercial Property

These data comprise monthly counts of BTP-recorded theft of railway/commercial property for the period January 2006 to April 2012. This category contains several offense types such as theft from shops at stations, theft from vending machines, and cable theft. Cable thefts (live and nonlive) were excluded. This measure is included to test the hypothesis that changes in the monthly counts of recorded live copper cable thefts simply reflect changes in the levels of theft of railway property more generally, or the BTP recording practices for such offences.

Unemployment Rates

The monthly unemployment rate for the United Kingdom is taken from EUROSTAT and refers to the percentage of the population aged 16 to 74 who are without work but who are available for and actively seeking employment.[5] These estimates are derived from standard Labor Force Surveys routinely conducted throughout European Union member states to produce comparable labor market indicators.

Results

Figure 1 shows the average monthly copper price according to the LME against monthly counts of BTP-recorded "live" copper cable thefts for the period January 2006 to April 2012. Monthly changes in the theft of live cabling appear to closely mirror fluctuations in the price of copper. Two features warrant mention. The first is the large drop in live copper cable thefts beginning in late 2008. This reduction occurs at the height of the global financial crisis during which, as Figure 1 shows, the price of copper dropped precipitously. The recovery in the price of copper in 2010 is accompanied by a delayed but steady uptick in the volume of live copper cable thefts until late 2010. This brings us to the second noteworthy feature: From mid-2011 while the theft trend still corresponds to changes in the price of copper, there appear to be initial signs of some divergence. Several possible explanations might account for this finding, and we will return to this issue in the Discussion section.

Despite the evident similarity in the time series of copper price and copper cable theft, it is fallacious to draw causal inferences on the basis of tightly matching trends. We therefore performed a statistical analysis to assess whether monthly changes in the price of copper are positively

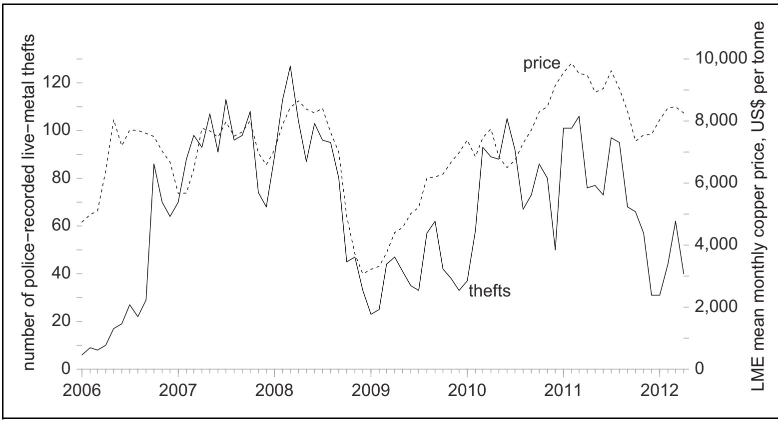

Figure 1. Time series of LME copper prices (US$ per tonne) and BTP-recorded "live" copper cable thefts ($n = 5{,}013$), January 2006 to April 2012. LME = London Metal Exchange; BTP = British Transport Police.

associated with variations in the volume of "live" copper cable theft, after accounting for other factors (measured and unmeasured). To assess whether changes in the volume of cable theft is merely an artifact of theft patterns on the railway network more generally or changes in the rate of unemployment in the United Kingdom, we examined the association between the volume of "live" copper cable theft, monthly counts of BTP-recorded theft of railway/commercial property, and unemployment rates for the United Kingdom (January 2006 to April 2012).

We began by log transforming the four variables. Next, we performed several diagnostic tests to specify the correct analytical model. It is well known that time-series data often exhibit autocorrelation, whereby the residual errors for sequential time periods are associated. One of the reasons for this is that, in any parsimonious model, variables that may explain some of the variation in a particular time series will inevitably be excluded from the model. Where this is the case, the standard errors of parameters estimated using ordinary least squares (OLS) regression are known to be biased, which can lead to errors of inference. To determine whether our data were autocorrelated, we computed the Durbin–Watson d-test statistic. Our d value of .368 is well below 2, the value commonly accepted as denoting the absence of first-order autocorrelation, thereby indicating that our data are autocorrelated. Autocorrelation can take many forms. To examine this, we visually inspected the autocorrelation function and

Table 1. Augmented Dickey–Fuller Test for Unit Root Using Logged and First-Differenced Variables.

Variable	Augmented Dickey–Fuller *t* Statistic Using Logged Variable	Augmented Dickey–Fuller *t* Statistic Using Logged, First-Differenced Variable
Copper price	−1.838	−5.237**
Other railway theft	−2.860	−11.650**
Unemployment rate	−0.959	−4.620**
"Live" copper cable theft	−3.580*	−8.062**

Note: *Indicates that the augmented Dickey–Fuller *t* statistic is statistically significant at the 5 percent level. **Indicates that the Augmented Dickey–Fuller *t* statistic is statistically significant at the 1 percent level.

partial autocorrelation function (PACF) plots. The PACF plot suggested that the strongest autocorrelation was between observations separated by a single (one month) lag (plots available from the authors on request) and hence that the copper cable theft data exhibited a first-order autocorrelation. This suggests that a first-order autoregressive model would be preferred over an OLS regression.

The next step was to determine whether the data were stationary or whether the mean and variance for the time series changes over time. Detecting stationarity is achieved using "unit root" tests, the most popular being the Augmented Dickey–Fuller procedure. This tests the null hypothesis that a time series *has* a unit root, which would be indicative of nonstationarity. A statistically significant outcome thus indicates that a time series is stationary and hence suitable for analysis using standard models. Table 1 shows that we failed to reject the null hypothesis for three of the four log-transformed variables (copper price, theft of railway/commercial property, and unemployment rate). Put differently, these data were nonstationary. A widely practiced method of dealing with nonstationary data is to transform the data using first differencing. For this article, this means that if Y_t refers to copper price at a given month, then the first difference of Y at period t is equal to the price of copper this month minus the price of copper in the previous month $Y_t - Y_{t-1}$. Following Greenberg (2001), this was completed for all variables considered, including the dependent variable ("live" copper cable theft). First differencing the data generated a set of stationary time

Table 2. Autoregression Analysis of the Copper Price–Theft Relationship Using BTP Recorded "Live" Copper Cable Thefts, January 2006 to April 2012.

	β	*SE*	*p* Value
D.L. Copper price	1.003	.407	<.05
D.L. Other railway theft	.530	.279	Nonsignificant
D.L. Unemployment rate	−.029	.147	Nonsignificant
AR1 term	−.031	.147	Nonsignificant

Note: D = first differenced; L = log transformed; BTP = British Transport Police; AR1 = autoregression.

series suitable for analysis (i.e., all the augmented Dickey–Fuller *t* statistics are statistically significant; Table 1).

Table 2 presents the results of an autoregression (AR1) model of the copper price–theft relationship (for the first-differenced logged values). It shows that, once adjusting for autocorrelation and unit roots in the data, there is a statistically significant positive association between monthly levels of copper price and "live" copper cable thefts. No significant relationship is observed between levels of BTP-recorded thefts of other railway/commercial property, the rate of unemployment in the United Kingdom and levels of "live" copper cable thefts.

Discussion

In this research note, we provide further evidence for the metal price–theft hypothesis (Posick et al. 2012; Sidebottom et al. 2011): Positive movements in the average monthly price of copper are shown to be significantly associated with increases in the monthly count of "live" copper cable theft. We provide support for this hypothesis using data for a period in which abrupt changes in the price of copper were not only observed but were accompanied by abrupt (almost identical) changes in the theft of copper cabling, as predicted. While some may comment that the approach to causal inference adopted here is not without its concerns, we argue that the distinct changes in the concomitant times series (copper price) offer a unique opportunity to test the copper price–theft hypothesis. For instance, drops in the price of copper were clearly accompanied by reductions in the theft of it. Moreover, while factors other than those included in the model may have changed over time, the use of a time-series model enables us to at least estimate the influence of such variables.

No support was found for the rival hypothesis that fluctuations in "live" copper cable thefts reflected changes in the theft of railway/commercial property more generally. This finding is consistent with the results reported by Posick et al. (2012) who found that the number of items stolen during burglaries in Rochester, NY, was not significantly associated with whether metals were stolen, which they interpreted as suggesting that houses were being specifically targeted for their metals as opposed to metals being stolen simply as bycatch of other items taken. We also found no support for the hypothesis that changes in "live" copper cable thefts are associated with the rate of unemployment in the United Kingdom. Taken together, the results are interpreted as providing further support to the claim that increases in the monetary gain associated with metal theft are associated with—and contribute to—increases in rates of offending.

It is interesting to consider how the patterns of copper cable theft described here and elsewhere (Sidebottom et al. 2011) sit alongside the general reductions in crime experienced in many industrialized countries since the mid-1990s. Criminology is presently awash with attempts to provide a satisfactory explanation for the much-discussed "crime drop" (see Farrell 2013; Farrell et al. 2011). Farrell et al. (2010) argue that a good explanation needs to account both for the falls in many "traditional" crime types such as burglary and car crime as well as the *increases* in certain offences such as cell phone theft. They write that many offender-oriented hypotheses, such as the legalization of abortion or the prevalence of toxic lead, fail in this respect and, for acquisitive crimes at least, that greater attention be paid to the abundance and attractiveness of particular theft targets when trying to explain crime-specific long-term trends. Metal theft, like cell phone theft, does not conform to the crime drop, and it is clear that fluctuations occur on a time scale that is simply incompatible with most offender-oriented explanations. Consequently, like Farrell et al., we contend that the results reported here, particularly in relation to the sharp drop in theft that coincided with the economic downturn (and the subsequent changes), are best explained from a crime opportunity perspective. Namely, that changes in the value of metal and the abundance of opportunities for its disposal explain the observed patterns.

Implications for Research, Policy, and Practice

Two issues concerning the metal price data used in this study deserve mention. First, a concern with volatile time-series data such as metal prices is that monthly averages can conceal the considerable *within*-month variation. While LME price data are available at the (trading) day level, counts of live copper cable theft were only available to the authors at the monthly level. Smaller units of analysis such as weeks or even days would permit a more sensitive time-series analysis. Second, LME prices are used here as a proxy for the price available to offenders when selling stolen cable to pawnbrokers or scrap metal dealers. An extension of this research would be to use data that better approximate the *actual* prices available to thieves at the time and point of sale. It may be possible, for example, to obtain data on the daily trading price for metals in scrap metal yards in a particular region. This speaks to a more general point: Implicit in the metal price–theft hypothesis is the assumption that metal thieves react to or are provoked by changes in the price of metals. While evidence from national level analysis such as that reported here and elsewhere (Sidebottom et al. 2011) support this assumption, offender-based research is required both to test this assumption directly and to better understand how, if it all, metal thieves become aware of the changing price of metals, means for its disposal, and how this information informs their targeting strategies. Interviews with metal thieves would be a sensible start.

Further research might also consider the spatial distribution of copper cable theft. In this article, we reported theft levels across the entire British railway system. Our data did not permit analysis at finer spatial units. However, as with most types of crime (see Johnson 2010), we would expect cable theft to be spatially concentrated. Preliminary research, currently underway, suggests that there are significant crime concentrations (see Ashby et al. 2013) but that copper cable theft occurs across the entire British railway network and that "hot spots" of activity occur in different regions rather being specific to particular cities. This suggests that our findings regarding the price–theft relationship likely represent a pattern that is typical across the rail network, but further research might seek to establish this explicitly. In terms of crime prevention, if copper cable theft is found to be spatially concentrated to the extent that other crimes are, then crime prevention efforts might be targeted accordingly to reduce it (see Braga 2012).

The findings reported here have implications for evaluation research. Following the noted increases in metal theft, there has been a corresponding interest in determining ways to effectively reduce it. The evident price sensitivity of copper cable theft emphasizes that any evaluation of such interventions demonstrate that the observed effects are not simply explained by price-driven changes. In the extreme, if an intervention to reduce copper cable theft (or metal theft more generally) had been implemented in Britain in late 2008, any subsequent evaluation that neglected the influence of price could easily draw false inferences as to causal factors underlying the observed trend. This error of inference is perhaps most pronounced for interventions implemented on a national scale where the opportunity to select a suitable control group may be compromised or nonexistent.

It is interesting to note that Figure 1 reveals a divergence in trends in copper price and theft beginning in 2011. The reasons for this are yet to be explained. One possibility is that the reduction in cable thefts is a function of successful crime prevention activity. Since metal theft first became a major concern, police and those responsible for national infrastructure in the United Kingdom have used various preventive tactics including frequent visits to scrap metal dealers, the targeting of prolific offenders, the target hardening of vulnerable metals, and the use of forensic marking technology to reduce the ease with which stolen metals can be disposed of (Lipscombe and Bennett 2012). While anecdotal evidence suggests that some of these interventions have been effective, to date there are no reliable evaluations in the literature of efforts to reduce metal theft. This is a concern since metals such as copper form part of the critical infrastructure of most nations and many such networks are interdependent, meaning that disruptions to one network can easily (and adversely) affect another. Consequently, decisions on how best to reduce metal theft should be informed by evidence on what works under what conditions. As we have shown, that evidence should be based on evaluations that filter out price fluctuation effects as background noise.

To conclude, the variation in rates of copper cable theft reported here follows a different trajectory to those for many other types of crime in western countries. This provides a useful opportunity to test theories of crime causation. Insofar as reductions in this type of crime were observed during a period of economic downturn, because they were not associated with changes in levels of unemployment, and because the changes occurred on relatively fast time scales, offender-oriented explanations (discussed previously) would seem to offer little insight into the dynamics of this type of crime. In contrast, the findings provide further support for theories of crime opportunity and, in particular, that externalities—in this case the price of metals—can directly influence rates of crime without there being changes in the offender population or their dispositions.

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Notes

1. The British Transport Police, which is responsible for policing the British Railway network, *does* collect data specifically on metal theft.
2. This information is taken from: *Network Rail. 2012. Facts and Figures: cable theft*. Available at: http://www.networkrailmediacentre.co.uk/Facts-and-Figures/Cable-theft-190e/SearchCategoryID-ffffffff.aspx
3. Though the exact voltage depends on what the cable is being used for, many overhead power cables carry around 25,000 volts; touching one is a very reliable way to die.
4. See Pitel (2011). "Copper Thieves Cause Chaos on Stansted Line." *The Times*, September 16. Accessed online at: http://www.thetimes.co.uk/tto/news/uk/crime/article3165245.ece. Other studies report copper theft–related burns and injuries more generally, such as Himel et al. (1992), Curinga et al. (2010), and Taylor et al. (2003).
5. EUROSTAT seasonally adjusted unemployment rate. Accessed online (May 7, 2013) at: http://www.ons.gov.uk/ons/rel/lms/labour-market-statistics/march-2013/table-a10.xls. Note that EUROSTAT estimates on unemployment in the United Kingdom (for those aged 16 to 74) differ to those of the Office for National Statistics who use a population frame of aged 16 and over.

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