THE IMPACT OF RECONSTRUCTION SPENDING ON THE LABOR MARKET FOR INSURGENTS

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ABSTRACT:

Despite the frequent assertion that reconstruction and economic development programs are effective policy mechanisms for combating insurgencies and more broadly violence, there is very little rigorous evidence evaluating the impact of these programs or their underlying causal logic. If reconstruction spending reduces the labor pool available to insurgent organizations by improving outside options for potential recruits, it may play a crucial role in both rebuilding post-conflict societies and increasing stability for future growth and development. This paper uses a particular form of reconstruction spending, U.S. Commander's Emergency Response Program (CERP), a small discretionary reconstruction program focused on generating employment activity and procurement of technology for local Iraqi use. Using a simple theoretical model, we show that if improved legal sector employment conditions affect insurgency participation, we would expect to observe both reduced insurgent recruiting, but also insurgent groups substituting away from labor-intensive forms of violence and towards more capital-intensive attacks. The primary concern with this estimation is that employment-generating reconstruction spending is not uncorrelated with unobserved trends in violence. To address this we use the interaction of rotations of U.S. military forces in Iraq across various regions in Iraq during different periods of CERP funding levels as an instrument for the fraction of labor-intensive projects in a region. We find that a 10% increase in the fraction of labor-intensive projects reduces violence by about 5%. We also find this reduction comes largely from a reduction in labor-intensive forms of violence, such as small arms fire, torture, and execution. Overall, we find evidence that the legal labor market is a substitute for insurgent activity and thus employment generating activities may be an effective strategy to reduce both recruitment and retention in the insurgency.

1. INTRODUCTION

In recent years there has been a renewed interest in insurgency warfare. The United States military is fighting protracted insurgencies in Iraq and Afghanistan, and every aspect of U.S. strategy, doctrine, and tactics -- from calls to "take the gloves off" to increasing reconstruction and steps to win the loyalty of the population – have been the subject of intense debate among scholars, the public, and military professionals. More broadly, insurgent armed conflict remains a critical security issue in many areas of the developing world. As many scholars have documented, the majority of wars since World War II have been civil rather than interstate conflicts, fueled in part by the spread of conditions favorable to insurgencies. The failure to defeat these insurgencies and establish minimal public order drives a cycle of insecurity, chronic state failure, and poverty in many areas of the world including the Middle East, Africa, and Asia. Not only is the frequency of insurgent conflicts increasing, but insurgencies are becoming more protracted, more difficult to defeat, and more destructive. For both the United States and failing states at perpetual risk of civil war, the overriding security issue is ending insurgent conflict and restoring governmental authority and legitimacy – in other words, improving the practice of counterinsurgency.

While the importance of improving counterinsurgency strategy is increasing, the existing empirical evidence regarding the efficacy of different strategies is limited. With few exceptions, research and scholarly debate has focused on the military response to an insurgency, with differing views regarding the extent to which the local population should be protected (a "hearts and minds" model) versus harsh treatment of any perceived support of insurgent activity (an attrition model). Both models treat the insurgency as an entity distinct from existing social and economic conditions. Separately, focus on post-conflict development has typically studied the feasibility of establishing well-functioning markets or delivering social services. Thus, despite the economic intuition that "boosting the economic returns for staying on the right side of the law, [as a] 'carrot' might dramatically alter the cost-benefit calculation facing potential

criminals and rebels,"[1] military strategy and economic recovery have been largely divorced both in policy debate and scholarly research.

This paper attempts to identify the effects of improving economic conditions, and particularly the impact of labor-generating reconstruction activities, on violence production by insurgent organizations. Using a simple multi-sector labor supply model, we show that greater availability of outside options in the legal labor market may reduce the total person-hours available to the insurgency.[2] Many of the rank-and-file individuals that make up an insurgent organization may choose to participate in illegal insurgent activity either for economic reasons or for a lack of better options. By improving the legal employment market, job creation may create higher opportunity costs for individuals to participate in insurgency, and thus raise the cost of labor for insurgent groups. Akin to previous research on multi-sector choice (e.g. Heckman and Payner, 1978; Grogger, 1998), we show that improvements in the outside labor market options through reconstruction projects may be associated with not only reduced insurgent recruiting, but also insurgent groups substituting away from labor-intensive forms of violence and towards more capital-intensive attacks.[3]

To test whether reconstruction related labor market effects reduce violence levels we use variation in reconstruction generated by the Commander's Emergency Response Program (CERP) in Iraq from June 2003 to April 2008. Due to the decentralized administration of CERP, there has been tremendous variation across military units in how CERP funds have been used.[4] Using this division level variation in spending on CERP projects, we investigate the effect of labor intensive projects on the level and type of insurgent violence in Iraq.

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[1] Fisman and Miguel 2008, pp. 189-190.

[2] In the economics literature on the social determinants of criminal activity, see Becker 1968 and Glaeser 1998. Arguments about the effect of economic deprivation and grievance in motivating individuals to participate in rebellions are also prominent in the civil war literature. See Humphreys and Weinstein 2008; Miguel and Fisman 2008; Collier 2008; Fearon and Laitin 2003.

[3] There is some evidence that the military has considered such issues in its ongoing revisions of counterinsurgency strategy. The U.S. Army/Marine Corps Counterinsurgency Field Manual (FM 3-24) published in 2007 cites strengthening the local economy and generating employment as an important part of an effective COIN campaign: "Unemployed males of military age may join the insurgency to provide for their families. Hiring these people for public works projects…can remove the economic incentive to join the insurgency." *The U.S. Army/Marine Corps Counterinsurgency Field Manual* (FM No. 3-24) (Chicago: University of Chicago Press: 2007), 5-48.

[4] On the variation in COIN tactics between units, see Kahl 2008. For journalistic accounts of the lack of a clear COIN doctrine in the early years of the war, see Gordon and Trainor 2006.

A first order concern for such an approach is that the spending on labor intensive projects is not independent of other factors related to violence. Thus a simple linear regression of attack levels on spending will tend to be biased by these unobserved factors and potential reverse causation. To address this we use data on U.S. force rotations, to assign CERP spending by U.S. Army and Marine divisions in a particular area of operation (AO). A second concern is that such divisional rotation will identify not only the effect of CERP spending but also any other variation specific to a given unit. To address this, we use the US federal funding levels of the program to identify high and low funding periods and then difference between these two types of periods. This strategy thus relies on variation in CERP spending linked to federal funding authorizations which affect project types within a unit across time and AO. This empirical strategy relies on the fact that from 2003 to 2007, variation in the use of CERP funds was related to the varying preferences or structures of different military units. These differences generated two types of actions: CERP funding allocation and other counterinsurgency activity. With increased funding in on the former category, we assume the latter is fixed over time and thus use a combination of instrumental variables and difference in differences to identify the effect of CERP spending on violence.

Based on this evidence, we find that the amount spent and the number of projects initiated have no effect on violence. However, our key result is that a greater fraction of spending devoted to labor-intensive projects (whether a project employs labor our not) is associated with a decrease in violence. Specifically, an additional 10% spent on employment is associated with an approximately 5% reduction in violence. In addition, we find that, consistent with the labor-capital substitution argument, this generates a 15-20% decline in labor-intensive forms of violence. It is theoretically ambiguous whether this change in composition would increase fatalities but we find that deaths per attack remain constant suggesting that attack methods do not shift to more capital intensive and lethal forms of violence.

The results of this paper contribute to two strands of literature. First, consistent with previous work by economists on the relationship between unemployment and crime, we find a clear substitution between the legal and illegal sectors. To that end, it suggests that insurgent groups must rely on individuals with a more marginal attachment to their

groups to produce the levels of violence currently observed. This also provides evidence that in communities with relatively few opportunities, the introduction of legal labor markets can have dramatic effects on aggregate illegal activity. Second, the research contributes to a growing literature on the efficacy of reconstruction in post-war situations. A recent paper by Berman, Felter and Shapiro (2009) finds that the provision of public services can reduce violence by providing an alternative to insurgent provided goods and services. This project complements these findings by noting even as the construction for these services occurs, there may be labor market benefits which also reduce violence. Combining the two results suggests that reconstruction may be a powerful tool to reduce violence both in the short-term, due to the increased opportunity cost of participation in the insurgency, and in the long-run, due to the increase good-will and individual returns after the presence of the counterinsurgent. Given the relatively limited evidence on reconstruction and the difficulty detecting and directly combating insurgencies, economic and social reconstruction programs, and the corresponding labor intensive construction that accompanies them, can be an important counterinsurgency tool.

The rest of this paper is organized as follows: Section 2 lays out a theoretical framework for understanding how labor market conditions affect an individual's decision to participate in insurgent activity. Section 3 discusses our data sources on military and civilian casualties in Iraq, CERP disbursements, and U.S. force rotations. Section 4 presents our results and analysis. Section 5 concludes.

2. Theoretical Framework

The relationship between legal labor markets and crime is intuitively plausible and has formed the basis of much of the economics of crime research, beginning with Becker (1968) and Ehrlich (1973). Despite the long history of research on this question, empirical support for a causal effect of employment rates, legal sector wages, or other measures of legal markets on criminal activity has been difficult to isolate. This is because there is complex set of personal, social, and economic factors that make it difficult to identify the effect of labor market conditions on the propensity to engage in criminal activities. As a result, existing empirical evidence on this question is largely mixed. Evidence from sociology suggests a relatively weak relationship between

unemployment and crime. On the other hand, economists have found stronger evidence for a causal relationship between labor market conditions and crime rates (Grogger, 1998; Gould, Weinberg, and Mustard, 2001; Raphael and Winter-Ebmer, 2001).

Some have applied a parallel reasoning relating labor market opportunities to the ability of insurgent groups to produce violence. Individuals who might be recruited by insurgent groups face a similar choice between participating in illegal insurgent activity and seeking legal employment, and may be less likely to participate in illegal insurgent activity as the opportunity costs for foregoing legal employment increase. While the empirical evidence on this is limited, many scholars, policymakers, and military officials have accepted this logic. The 2007 U.S. COIN field manual, representing the most up-to-date knowledge in the U.S. Army on best practices in counterinsurgency, cites strengthening the local economy and generating employment as an important part of an effective COIN campaign: "Unemployed males of military age may join the insurgency to provide for their families. Hiring these people for public works projects…can remove the economic incentive to join the insurgency."[5] An example of the employment claim in the Iraq context was given by LTC Leonard DeFrancisci, who served in the Marine Corps' Regimental Combat Team 1 (RCT-1) during Operation Al Fajr in November 2004:

> "Insurgents recruited those who were most disaffected by the economy: unemployed military-age males. Short-term, labor-intensive projects were the best way to counter such recruitment. When Marines evaluated project proposals, they usually chose the one that offered the most local jobs because it would have the greatest impact on reducing the insurgent recruiting pool."[6]

To our knowledge, however, there is no evidence on the effect of reconstruction spending, and its role in improving legal sector employment conditions, on the size of the available labor pool available to insurgent organizations.[7] To formalize the effect of the legal labor market on an individual's decision to participate in insurgent activities, we consider a model of labor supply and time allocation based on the Heckman and

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[5] *The U.S. Army/Marine Corps Counterinsurgency Field Manual* (FM No. 3-24) (Chicago: University of Chicago Press: 2007), 5-48.
[6] DeFrancisci, "Money as a Force Multiplier," p. 25.
[7] Felter, Shapiro, and Berman (2008) present evidence for a different mechanism by which reconstruction and economic assistance programs might reduce insurgent violence (the provision of public goods).

McCurdy (1981) home production model and similar to the model presented in Grogger (1998).

Consider an individual who values only consumption (C) and leisure (L), where leisure is defined as time spent neither working nor committing crime. He or she chooses time at market work t_m and time committing insurgency related violence t_v to maximize utility U. The utility of the individual increases in both C and L but at a decreasing rate (i.e. $U_C(.) > 0$, $U_L(.) > 0$, but $U_{CC}(.) < 0$ and $U_{LL}(.) < 0$) . Like Grogger, we allow the individual to face a market wage w but concave returns to insurgency participation $p(t_v)$. For simplicity we let p capture all of the various ways in which insurgency participation may generate benefits (psychic rewards, income, etc.) net the various ways in which insurgency participation activity may generate costs (again psychic costs, expected penalties, etc.). The concavity of p thus reflects its declining marginal productivity—i.e. the more insurgent activity an individual engages in, the less rewarding each additional act participation becomes. Using this, we can write the consumer's maximization problem as $maxU(C, L)$ subject to a budget constraint, $c = wt_m + p(t_v) + A$, and a time constraint: $L = T - t_m - t_V$. In this notation, T represents the total amount of time available and A represents any non-labor income. For simplicity, we set A = 0 and define the marginal rate of substitution as: $MRS(C,L) = \frac{\partial U/\partial L}{\partial U/\partial C} = m(t_m, p(t_V), T - t_V)$. Note that in the MRS, the individual's time spent in illegal insurgent activity will change both the available hours for market labor activity, and the non-labor income (in this case, simply the returns to criminal activity).

The individual's reservation wage can be defined as the marginal utility with no hours spent in either sector, which we denote u_0. Thus participation in the two sectors requires that both $w > u_0$ and $p'(0) > u_0$, or the returns to the first hour of work in either sector is greater than the reservation utility of an individual. An individual working in both the legal and insurgent sectors will choose their optimal time allocation to satisfy: $p'(t_V) = w$ (i.e., the marginal returns from crime are equal to marginal returns from the legal sector). Note that the individuals optimal time spent with the insurgency depends only on the returns to the insurgent activity and the wage in the legal sector—this abstracts away from any costs or returns from insurgent activity which may occur outside the direct reward structure (we will return to this point when considering the role of

public goods provision by many insurgent/terrorist organizations, although in practice we can let the p function capture much of these gains).[8]

Using the first order condition for optimal time in the insurgent sector, the condition for an individual to participate in both the insurgent and the legal labor market is $p'(0) > w$. This partitions the set of individuals into three groups. Individuals face a trade-off from hours spent on insurgent activity and the returns from their participation. On the one hand, insurgent activity increases their non-labor income by $p(t_V)$ thus increasing their total consumption C. On the other hand, participation in the insurgency reduces their total time available for leisure by t_V.

Now suppose we let $p(\ .\ )$, the returns to crime, differ by individual so that some individuals face a higher return to participation in the insurgent sector than others. Individuals for whom $p'(0) \leq w$ do not participate in insurgent activity, and thus set $t_V = 0$. They simply choose optimal labor supply in the standard wage so that $w = m(t_m\ ,\ T)$. These are the income and substitution effects observed in typical labor supply analysis. To choose optimal market hours, the consumer simply chooses t_m to satisfy $w = m(t_m, p(t_V), T - t_V)$. For individuals with high returns to insurgent activity, the return to participation in the insurgency at zero hours is greater than the market wage. Thus, individuals with high returns to insurgent activity will choose t_V^* to satisfy $p^H(t_V^*) = w$. Given this, these high-returns individuals are left with $T - t_V^*$ hours left to allocate and $p^H(t_V^*)$ non-labor income. These individuals then choose market labor supply, t_m^* so that $w = m(t_m^*, r(t_V^*), T - t_V^*)$. Thus there is a set of individuals for whom this optimal level will be $t_m^* = 0$ and thus they will participate exclusively in criminal activity. There will also be some set of individuals for whom both $t_V^* > 0$ and $t_m^* > 0$.

For completeness we mention all three groups but due to data limitations, but in practice we will consider changes in the extensive margin (shifting $t_m^* = 0$ to $t_m^* > 0$) and the intensive margin (increasing t_m^*) together. Consider the following parameterization of the crime participation decision:

$$\mathrm{V} = \Pr(t_V > 0) = \Pr\left(\ln\left(p'(t_V)\right) - \ln(w) > 0\right) = \beta_0 + \beta_2 \ln(w) + \beta_3 X + \varepsilon \quad (1)$$

[8] Berman and Laitin 2008.

In equation (1), *V* is an indicator variable that is 1 if an individual participates in the insurgency and zero otherwise, *X* is a vector of individual covariates, and ε is a random error term. If individual participation decisions were observable, and for a complete set of *X*'s which affect the individual's returns to insurgent participation, one could estimate equation (1) directly. Putting aside issues of omitted variable bias, the coefficient β_1 could then be interpreted as the change in the probability of participation for a percent change in wages. The first issue in estimating the effect of wages on violence is the unobservability of the individual participation decision. To address this, we must consider the way in which this participation is aggregated into observable levels of violence. To do this, consider the following production function of violence in an area *j* at time *t* as $A_{jt} = f(L_{jt}, K_{jt})$ where we define the labor available as $L_{jt} = \frac{1}{N_{jt}} \sum_{i \in N_{jt}} t_{V,i} V_{ijt}$ and capital as $K_{jt.}$ Notice that increases in either the fraction of individuals participating in the insurgency (an increase in *V*) or an increase in the hours supplied by individuals participating (increase in t_V) will increase the total supply of labor to the insurgency. Also note that it does not directly follow that an increase in *L* will increase *A* as it depends on the cross-substitution effects of labor and capital in the production of violence. To consider the empirical implications of this framework, suppose we allow the production function to assume a standard Cobb-Douglas form so that: $A_{jt} = aL^{\alpha}K^{\beta}$. In log form and assuming a fixed (or at least sticky) supply of capital, we can reparameterize this as:

$$\ln(A_{jt}) = \ln(a) + \alpha \ln L_{jt} + \beta \ln K_{jt} = \alpha_0 + \alpha_1 \ln L_{jt} + \alpha_2 X_{2,jt} + \xi_{jt} \qquad (2)$$

In equation (2) the set of covariates X_2 are region and time covariates which fully describe the availability and pricing of capital. Again putting aside concerns of omitted variable bias, if we could directly measure the labor supply *L* and the total number of attacks *A*, we could estimate equation (2) directly. To interpret these estimates as the response of individual decisions to wages, note that $\frac{\partial log A}{\partial log L} = \frac{\partial A}{\partial L}\frac{L}{A} = \epsilon_{AL} = \alpha_1$. Thus, if we could estimate equation (2), the coefficient α_1 could be interpreted as the elasticity of attacks to total labor. However, our interest is the relationship between attacks and wages, or $\frac{\partial A}{\partial w} = \frac{\partial A}{\partial L}\frac{\partial L}{\partial w}$, or rewriting in terms of elasticities,

$\frac{\partial A}{\partial w}\frac{w}{A} = \epsilon_{Aw} = \left(\frac{\partial A}{\partial L}\frac{L}{A}\right)\left(\frac{\partial L}{\partial w}\frac{w}{L}\right) = \epsilon_{AL}\epsilon_{Lw} = \alpha_1\beta_1$ where α_1 is the attacks-labor elasticity and β_1 is the elasticity of insurgent labor supply with respect to the legal market wage as represented in equation (1). Using this intuition and the relationship between *L* and *w*, we could consider estimating an equation of the form:

$$\ln(A_{jt}) = \gamma_0 + \gamma_1 \ln w_{jt} + \gamma_2 X_{jt} + u_{jt} \quad (3)$$

In equation (3), we can interpret the coefficient γ_1 as our parameter of interest which combines the production factor share of labor (α_1) and the cross-sector elasticity of labor (β_1). This implies that as α_1 approaches 1, our estimate from equation (2) will isolate our parameter of interest (β_1). Alternatively, as α_1 approaches zero, we do not expect attacks to change because changes in the labor supply available to the insurgency does not affect their total production and the parameter of interest (β_1) is not estimated. For intermediate values of as α_1 (i.e. $0< \alpha_1 < 1$), the magnitude of the effect of a change in wages on a change in attacks will be ambiguous though the sign will be weakly negative. In the case of heterogeneous production technologies (e.g. multiple methods of attack), the change will depend on the relative weight of labor intensive versus capital intensive activity in producing attacks. Once again we are prevented from estimating equation (3) due to data limitations. However, it is possible to estimate the changes in the legal employment sector that are likely correlated with *w*. If the demand for labor increases, for a relatively fixed supply, then we would expect increases in the legal sector wage *w*. This is the intuition behind the US military's strategy of allocating reconstruction funding to projects that are labor-intensive and generate employment. We can thus use the fraction of total projects that are labor-intensive in region *j* at time *t* to estimate the changes in the legal sector wage in that area (*labor*). In order to isolate our parameters of interest, we are assuming that $\frac{\partial A}{\partial w} = \frac{\partial A}{\partial (labor)}\frac{\partial (labor)}{\partial w}$, and thus we estimate:

$$\ln(A_{jt}) = \gamma_0 + \gamma_1 \text{labor}_{jt} + \gamma_2 X_{jt} + u_{jt} \quad (4)$$

The problem with estimating equation (4) directly is that, in general, the fraction of labor intensive projects in an area may be determined by many other unobservable factors that may also affect the production of violence. Thus, to estimate equation (4) consistently, we require an instrument that is correlated with the fraction of projects that are labor intensive and uncorrelated with any other determinants of violence. We use the

rotation of U.S. military divisions assigned to an area as that instrument. Following the end of the major combat phase of the Iraq war, the U.S. military divided the Iraqi theater into several division-sized areas of operation, each with an independent divisional command, under a central military command in Baghdad (first the Combined Joint Task Force 7, and later called Multinational Force-Iraq). These divisional-sized forces typically deploy to an area of operation for approximately one year, although deployment times have occasionally been lengthened due to constraints on the availability of forces.

Military divisional units may be correlated with the types of projects enacted for several reasons. First, the force structure of the division itself may necessitate different types of projects, depending on how heavily armored a unit is, the types of forces it deploys, and the type of training it receives.[9] Second, the culture of divisions may differ in the value placed on labor intensive activities, including reconstruction projects.

An obvious concern is that certain types of military units are assigned to an area based on current or anticipated violence levels. The exclusion restriction for an instrument requires that the assignment of military units to an area is uncorrelated with other determinants of violence. In general, it appears that at the division level this is the case. The most common method by which units (at any level) are assigned to areas based on current or anticipated violence levels is by shifting the units' AOs. AOs at the division level may change slightly during a division's deployment, but these changes are much smaller relative to the size of the unit at the division level rather than at the brigade level or below and therefore are not a major concern. The major concern for our exclusion restriction comes from the possibility that particular division headquarters are moved from one area to another based on current or anticipated violence levels. However, division headquarters movements are planned years in advance with the CENTCOM Force Requirements Enhanced Database (FRED) and it is virtually impossible to change the planned movement of a division headquarters with even a few months' notice. Provided that there is not autocorrelation in violence levels over periods longer than the time required to reassign the movement of a division headquarters, and

[9] For a description of these differences and the impact of variation in force structure on COIN conduct, see Lyall and Wilson 2009.

the reshaping of division AOs once they arrive is small, the assignment of division headquarters to areas will not be correlated with contemporaneous violence.

Another threat to this strategy is if the type of unit is correlated with a set of COIN tactics and practices other than reconstruction activities, and which also affect violence. To the extent that this effect is fixed over time and region, we can difference this individual effect out over time using division, district, and time fixed effects. Identification therefore comes from the change in project spending over time, for a given division. This difference may arise because of changes in the level of funding allocated to the division over time. With greater funding, divisional units with labor specific preferences may increase the fraction of labor intensive projects in the areas in which they control. In contrast, divisional units with non-labor specific preferences may reduce the fraction of labor intensive projects in their areas of control. Using changes in the total level of available funds, as well as the rotation patterns of military divisions, we can estimate a first stage of fraction of labor intensive projects on units. To do this we can either use a simple specification with a single unit:

$$labor_{ujt} = \pi_0 + \pi_1\left(infantry_{uj} * high_t\right) + \delta_j + \tau_t + \mu_u + \upsilon_{ujt} \quad (5)$$

In the first stage equation (5), *infantry* is an indicator variable that is 1 if an infantry division is in charge of district *j* during period of high funding *t*. The fixed effects then include a district specific effect (δ_j), a time specific effect (τ_t) and a unit specific effect (μ_u). A more flexible specification of equation (5) includes the three-way interaction between each unit *u* in some district *j*, during period of high funding where then we have a vector of *u* instruments (as specified in equation (5').

$$labor_{ujt} = \pi_0 + \pi_1\left(unit_{uj} * high_t\right) + \delta_j + \tau_t + \mu_u + \upsilon_{ujt} \quad (5')$$

Using the predicted fraction of labor intensive projects funded by the division, we can then estimate the second stage regression akin to equation (4) but replacing fixed effects for the more explicit covariate controls.

$$\ln\left(A_{jt}\right) = \gamma_0 + \gamma_1 \widehat{\text{labor}}_{jt} + \gamma_j^D + \gamma_t^T + \gamma_u^U + u_{jt} \quad (6)$$

In equation (5), γ^D, γ^T, γ^U represent fixed effects for district, week, and unit respectively. We can also estimate a reduced form using the single instrument from equation (5).

$$\ln\left(A_{jt}\right) = \lambda_0 + \lambda_1 \widehat{\text{labor}}_{jt} + \lambda_j^D + \lambda_t^T + \lambda_u^U + \zeta_{jt} \quad (7)$$

The estimates of γ_1 and λ_1 provide estimates for the aggregate effect of changes in wages (or labor demand) on production of violence (either attacks or deaths per attack). The theoretical framework used to derive these estimating equations leads to an additional set of predictions. If capital is fixed in the short term and insurgent groups cannot instantaneously adjust by substituting more capital intensive types of violence, then estimating equation (6) or (7) for labor intensive forms of violence should produce a consistent estimate of the true elasticity of insurgency labor supply with respect to legal sector wages. Moreover, estimating equations (6) and (7) for capital intensive forms of violence production should produce *no* change in the number of attacks. Thus, we advance three main predictions about improving the legal labor market: (1) the overall level of insurgent violence should decline, although the magnitude of that decline is ambiguous; (2) conditional on a given level of attacks, the fraction of labor intensive types of attacks should decline, and (3) conditional on a given level of attacks, the fraction of capital intensive forms of violence should rise.

3. DATA DESCRIPTION

To measure violent civilian fatalities, we use data compiled by the IraqBodyCount.org (IBC) organization.[10] The IBC records violent civilian deaths independently confirmed by at least two major new organizations.[11] For each incident the data records the location, the perpetrator (Coalition forces or insurgents), a description of the method of attack, and the target of the attack (civilian, political leader, police, or Iraqi military forces protected by non-combatant immunity). Once there are two news sources reporting an incident, the IBC constructs two measures, *reportedminimum* and *reportedmaximum*. If multiple numbers are reported, the lowest is entered as *reportedminimum*. This can be zero if "zero deaths" is reported. However, wording like "unable to confirm any violent civilian deaths" is not a report of zero deaths and thus is not entered in either column. Moreover, when the report does not mention civilians specifically, this number is entered in the *reportedmaximum* variable but zero is entered

[10] The principal researchers are Hamit Dardagan and John Sloboda.
[11] For a complete description of the IBC methodology, see http://www.iraqbodycount.org/about/methods/

into the *reportedminimum* variable unless the proportion of violent civilian deaths is given or a similar detail is given.) If a "family" is reported killed, this is entered as three deaths.

For the purposes of addressing our specific questions, we made a series of additional coding changes to the IBC data. First, we dropped all incidents in which U.S. or coalition forces were responsible for the harm to non-combatants, such collateral damage during aerial bombings, accidental shootings, or escalation of force incidents at checkpoints. We also excluded observations based on large numbers of unidentified bodies reported by morgues in large cities such as Baghdad, Kirkuk, and Mosul. These bodies could not be linked to any specific attacks or causes, but represented incidents with the highest reported deaths in the dataset.[12] Based on the description given for each incident, we also coded both the province and district where the incident took place.[13] We also re-coded the method of attack using a more consistent set of categories: bombings, small arms fire, indirect fire, and torture and executions. We further coded each incident according to several sub-categories within each attack type. Table 1 reports the fraction of incidents attributed to each attack type over the period in question.

An important issue for our analysis is a theory of which attack methods are likely to be labor-intensive. In particular, we are interested in the degree to which the attack requires personnel who participate in both the insurgency and the legal labor market. Personnel who only participate in either the insurgency or in the legal labor market should not be affected by changes in labor market conditions. With thought about which positions in attack cells are likely to use people who participate in both the insurgency and the legal labor market, we can develop predictions about which attack methods should be sensitive or insensitive to variation in the legal labor market.

Bombings in Iraq are virtually all either improvised explosive devices (IEDs) or landmines. Due to the deployment of advanced Coalition force countermeasures against IEDs, as well as the danger of accidental detonation while assembling a device, bombmakers are believed to be skilled personnel who have a high opportunity cost of

[12] The origins of these deaths are often unclear, but media accounts suggest they are frequently the result of interethnic violence and particularly Shia militia responses to Sunni groups.
[13] A district-level map of Iraq is available from the UN Assistance Mission for Iraq at http://www.uniraq.org/library/maps_geographic.asp.

participating in the legal labor market. These people are virtually never used in actually emplacing the devices due to the opportunity cost. Instead, roadside and suicide bombing IEDs represent a labor-intensive form of attack because of the emplacers required, who are frequently not specialists and are believed to be paid on a per attack basis.[14] However, these characteristics are not shared by vehicle-borne IEDs, which are generally carried out by specialists (and in many cases are suspected to be the work of Al-Qaeda in Iraq), so we consider these to be capital-intensive attacks. Many of the same skills required to emplace a roadside IED are the same as those required for a small arms attack, so we similarly consider these to be labor-intensive attacks. We also include rocket-propelled grenade (RPG) attacks in the small arms fire category. Indirect fire, however, is considered capital-intensive. Some training and expertise is required in order to hit a target with a rocket or mortar, and the actual act does not require a large number of personnel – one well-trained individual can conduct an effective indirect fire attack. The main constraint is in the munitions available, since these must be good-quality military-grade munitions (ideally that have not been in storage for a long time). These types of attacks are therefore likely to be relatively insensitive to variation in the legal labor market. Torture and executions can be done by virtually anyone with weapons; these forms of attack should respond to variation in the legal labor market.

The distribution of these attacks are shown in Table 1. The included attack categories, in panel A, are labor-intensive bombing (landmines, roadside, and suicide bombing) and capital-intensive bombing (car bombs and multiple explosive devices). The other labor-intensive categories are small arms fire (accounting for nearly half of all attacks) and torture and execution (accounting for only 5 percent in the early part of the insurgency but growing to nearly 20 percent in recent months). The capital-intensive category of indirect fire is relatively smaller than either small arms or bombing related attacks accounting for only 6-8 percent of attacks but still relatively substantial in generating fatalities. The excluded categories, shown in panel B, include uncategorized hospital deaths—a higher fraction in early periods but reduced over time as IBC reporting improves. The recoding of these morgue deaths poses somewhat of a problem since we

[14] See G. Grant, "Behind the Bomb Makers," from Defense Technology International January/February 2006, available at http://www.nxtbook.com/nxtbooks/mh/dti0206/index.php?startpage=30.

are uncertain as to the number of incidents generating these deaths but as a fraction of reported incidents these account for a small part of the sample (they account for a much larger fraction of the total fatalities). Coalition-generated and Iraqi Security Forces-generated attacks are excluded because of the complicated issues regarding classifying the attack type and predicted effect of reduced insurgent activity on these sorts of attacks.

The IBC data has several advantages. There has been substantial controversy over attempts to measure excess violent civilian deaths in Iraq since the 2003 invasion. Most disagreement, for example over a 2006 study reported in the medical journal *The Lancet* which placed this figure around 601,000, concerns attempts to estimate this number through samples of household surveys administered directly in Iraq. The IBC avoids these sampling and estimation problems by compiling a direct count of violent civilian deaths.[15] It is also important to note that although the organization is partisan in its anti-war views, their methodology is transparent and conservative in seeking to provide an accurate lower bound for the number of violent civilian deaths reported.[16] Finally, unlike even U.S. government data, the group has used a consistent methodology since the beginning of the conflict.

However, the IBC data also has several weaknesses that may reduce confidence in any findings. There is often ambiguity in the description given for some incidents regarding the target or method of attack. This is particularly true for observations based on new reports of bodies found with gunshot wounds or signs of torture, but where the circumstance of the deaths are unclear.[17]

On the independent variable side, we measure CERP spending using data provided by the U.S. military.[18] According to the law authorizing the funds, CERP

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[15] G . Burnham , R . Lafta , S . Doocy , L . Roberts. "Mortality after the 2003 invasion of Iraq: a cross-sectional cluster sample survey," *The Lancet*, Volume 368, Issue 9545, pp. 1421-1428. For a discussion of the quality of the estimates produced by these household surveys, see Colin Kahl, "In the Crossfire or the Crosshairs? Norms, Civilian Casualties, and U.S. Conduct in Iraq," International Security, Vol. 32, No. 1 (Summer 2007), pp. 7-46.

[16] The data can be downloaded from http://www.iraqbodycount.org/database/.

[17] On the improved ability of insurgent groups to conceal killings from Iraqi authorities, see for example Babak Dehghanpisheh, "The 'Body Contractors,'" *Newsweek*, December 15, 2007.

[18] We thank Jacob Shapiro and the Empirical Studies of Conflict (ESOC) project at Princeton University and the United States Military Academy for providing similar data used for an earlier version of this paper.

money can be spent on one of 18 project areas.[19] For each project recorded in the dataset, these data report the location, amount spent, duration, and project area. The dataset also reports the fraction of construction-related spending for each project. We therefore create an additional variable distinguishing whether a project area represents labor-intensive spending or not. Project sectors such as repairing and reconstruction schools and hospitals or civic cleanup were coded as employing labor, while other funding categories such as condolence payments, detainee release payments, and rule of law/governance programs were coded as not labor intensive.[20] We define construction-intensive projects as those in which greater than half of the total project disbursement is devoted to construction costs. In addition, we identify five dates when the amount of total funds allocated to the Iraq CERP program legislated by Congress changed (corresponding to each fiscal year between 2004 and 2007, with an additional supplemental funding bill in FY 2006).[21] Table 2 reports the distribution of spending, project starts, and total project stock. Although a unit of observation is a district-week, we report averages at the governorate level for ease of presentation. The project categories span a wide range of infrastructure and social service areas including agriculture, education, health care, transportation and sanitation. In each category, projects are classified as construction intensive based on the fraction of total project expenditure allocated to construction. By far Baghdad has the largest number of projects starts, project stock and expenditure (panel A). However, Baghdad does not have the highest fraction of labor-intensive projects (column 4).

Information on division-level unit rotations in Iraq for the period May 2003 to June 2008 was compiled primarily from press releases issued by DOD, MNF-I, and Multinational Corps-Iraq (MNC-I) announcing a transfer of command, and supplemented

[19] For a full list of authorized CERP project areas, see Appendix D of SIGIR-07-006, "Management of the CERP in Iraq for Fiscal Year 2006," April 26, 2007.

[20] Several U.S. agencies have conducted independent audits of CERP program spending; see Office of the Special Inspector General for Iraq Reconstruction, "Management of the Commander's Emergency Response Program in Iraq for Fiscal Year 2006," SIGIR-07-06, April 26, 2007; Office of the Special Inspector General for Iraq Reconstruction, "Management of the Commander's Emergency Response Program in Iraq for Fiscal Year 2004," SIGIR 05-014, October 13, 2005; and U.S. Government Accountability Office, "The Department of Defense's Use of Solatia and Condolence Payments in Iraq and Afghanistan," GAO-07-699, May 23, 2007.

[21] Dates and amounts from Office of the Special Inspector General for Iraq, SIGIR-08-006, January 25, 2008.

with additional secondary sources.[22] Under Combined Joint Task Force 7 and later MNF-I, the Iraq theater has been divided into several division-sized areas of operation, each with an independent divisional command: MND-Baghdad, MND-Northwest; MND-North Central; MNF-West; MND-Central-South; and MND Southeast. After September 2005, MND-NW and MND-NC were consolidated into MND-North. MND-Center was created around the "belt areas" around of Baghdad in conjunction with the surge in April 2007. The data establishes the incoming and outgoing divisional commands and the date of the transfer. For some MNDs in some periods, the authority was transferred to a "Task Force" comprised of command elements from several different units, but usually dominated by one brigade-level command. AOs controlled by non-U.S. forces (Poland and the UK) are excluded from the sample. Finally, we create a variable for force structure, with a 1 denoting that a "light" division (with fewer large armored vehicles than a heavy division) is operating in an AO, and a 0 if a "heavy" division is operating in an AO. Light units included are the 101st Airborne Division, 25th Infantry Division, 1st Infantry Division, 82nd Airborne Division, the 1st Stryker Brigade of the 25th Infantry Division and the 10th Mountain Division. Heavy Divisions included are the 3rd Infantry Division, the 4th Infantry Division, 11th Armored Cavalry Regiment and the 1st Armored Division. The Marine forces (MEF I and MEF II) were treated as separate for the analysis of heavy-vs-light divisions, included with an interaction term but not compared to the base category of heavy.

4. RESULTS

In order to identify the causal effect of reconstruction spending on violence through labor market channels, we require variation across time, district and military unit in the total number of project starts, the labor intensivity of these projects and the total funds available to units in a given area. To begin, figure 1 shows that over time there has been substantial variation in the total number of new projects started. This variation occurred in addition to the variation, shown in figure 2, of the available funds. In January

[22] These include John J. McGrath, "Boots on the Ground: Troop Density in Contingency Operations," *Global War on Terror Occasional Paper 16*, Combat Studies Institute Press, Fort Leavenworth, Kansas, 2006; and "Order of Battle, Multi-National Force-Iraq," June 2006-June 2008, compiled by Wesley Morgan, Institute for the Study of War.

2004, funding levels for the CERP program were relatively low. In the 2005 fiscal year, funding was more than five-fold from $140 million to $718 million. The support was short lived and in 2006 funding was cut back to around $500 million. A supplemental spending bill increasing funds went into effect increasing total funds by $200 million. That level of funding (about $700 million per year) was maintained in the 2007 budget.

Using variation in which units were in which districts during high and low funding periods, we estimate a first stage of fraction of labor-intensive projects on either the interaction of light-units with the high funding periods (equation 5) or the fully interacted model with each unit-period interaction identifying the predicted fraction of labor intensive projects (equation 5'). While our primary variable of interest is fraction of labor intensive projects, we conduct a parallel analysis on new project starts to determine if the mechanism is new projects rather than the type of project itself. Table 3 reports the results of first stage estimation. The first two columns show the first stage using flow of projects as the variable of interest. The instruments do not significantly predict new project starts and indeed the overidentified models are somewhat week ($F<10$) in these specifications. In columns 3 and 4, we report our preferred specifications using the fraction of labor/construction intensive projects as the variable of interest. We find that as predicted, light units have significantly higher labor intensive projects—even when compared to low-funding periods for the same units. The identifying assumption for this specification is that units that prefer labor-intensive projects increase the fraction of projects that are labor-intensive when additional CERP funds are available but hold fixed all other *unit specific* activities. This assumption allows us to interpret the second stage IV estimates as the effect of the single channel of enhanced labor market on violence. Absent this assumption but assuming units are still as if randomly assigned to areas, the second stage may be interpreted as the effect of labor-preferring units on violence (which may operate through multiple channels, including but not limited to local labor markets).

The OLS, single instrument, multiple instrument and reduced form regressions are presented in Table 4. Panel A presents results using fraction of construction intensive projects as the first-stage dependent variable. Here we find that a 10 percent increase in the fraction of labor intensive projects generates about a 10 percent reduction in violence.

This appears relatively stable in both the single and multiple instrument specifications. The OLS estimates in column (1) indicate that higher violence areas may have slightly higher levels of labor intensive projects masking the gains to implementing these projects. Columns (5) through (8) present results on the deaths per attack. There does not appear to be a significant decline in deaths per attacks (although the reduced form is marginally significant). This may be due to the more complicated substitution of attack types where fewer attacks but more fatalities may be observed.

In contrast to the first stage using construction intensive projects, using total projects produces almost no significant differences. The OLS estimate of log attacks on number of new projects, reported in column (1) of table 4, is marginally significant at the 10 percent level suggesting some negative correlation between starting new projects and the level of violence in an area. Both the single and multiple IV estimates are smaller in magnitude and statistically insignificant. This also suggests that the reduced form estimate is operating through project composition (as in panel A) rather than total number of new projects. Put differently, an increase in projects is not sufficient to generate a reduction in violence levels, but rather it is an increase in the fraction of projects that are labor intensive that affects violence.

As predicted, we do observe differences in the effect of labor intensive projects on the different forms of attacks. Rather than log specifications used in table (4), we rely on per capita measures of attack rates to preserve district-weeks with no attacks in a given category. Labor intensive attacks, reported in table 5, are significantly reduced by construction intensive projects. On average, a ten percent increase in construction intensive projects is associated with at 15-17 percent (9 to 11 percentage point) decrease in labor-intensive attacks. This appears to be generated by reduction in attacks involving small arms fire (guns and rocket propelled grenades). This seems consistent with the idea that the individuals engaged in much of the labor intensive activity have only marginal attachment to the insurgency and substitute away from insurgency related activity given suitable outside options. The notable exception to this is torture and execution in which there is relatively little decline. There does not appear to be a large corresponding increase in more capital intensive forms of attacks, such as car bombs or indirect fire. This may be because capital available for these attacks is relatively constrained. If this is

the case then it may be that the decline in attack rates produced by alternatively labor market options is unambiguously positive since insurgent groups cannot substitute to more capital intensive and potentially more deadly forms of attack.

5. Conclusions

The growing importance of counterinsurgency policy, in the US and internationally, makes studies of effective counterinsurgency strategies both timely and critical. In just Iraq and Afghanistan, hundreds of thousands of civilian deaths have shattered both the social and economic structure of the countries. Understanding the ways in which rebuilding these countries and communities may contribute to future safety and stability is thus of utmost importance. This paper attempts to identify the effect of such reconstruction on short-term violence levels. The theory suggested is that improved labor market options for potential insurgent recruits, increases the cost of labor to the insurgency and reduces the total labor supply available to engage in insurgent activity. Using a simple model of labor supply and violence production we show that this reduced labor supply can both reduce the total number of attacks and reduce the number of labor intensive forms of violence. Empirically we find that this reduction is substantial—with a 10 percent reduction in attacks, largely driven by reductions in labor intensive attacks. Since many capital-intensive forms of violence production are more lethal, a concern arises that the decline in labor intensive forms of violence may increase total fatalities. Thus while the theory is ambiguous as to the total effect on capital intensive attacks, we do not find any increases in these attacks, due to substitution away from labor intensive forms of production. This is consistent with anecdotal evidence from Iraq that capital supplies for mortar or rocket attacks are limited by the availability of these technologies. Thus the margin along which attacks can be reduced is the labor-intensive forms of violence and we indeed find that labor-intensive reconstruction projects are effective at generating such reductions.

There are several caveats. Most importantly, the causal interpretation of the estimated effects relies on several assumptions. Troop rotations are assumed to be independent of other determinants of violence, including predicted future violence. Units which are labor-intensive project preferring may differ from other units but that

difference is *fixed* over time and labor-preferring units will increase the fraction of projects that are labor-intensive when increased funds are available. These three assumptions together allow us to instrument for project spending using the interaction between unit type, location, and time period. If any one of these assumptions is violated, our instrument will fail the exclusion restriction and the causal interpretation is problematic. In addition, our analysis is limited by the quality of the data provided. While both the IBC and the CERP data have been used in the past, there are some omissions and miscoding which may generate bias. While we have no knowledge of systematic bias in the reporting of CERP project data, given the collection of such information during war time, the results are contingent on the reliability of that data. Issues of classical measurement error bias aside, if project data is missing or misreported in correlation with violence, this will produce additional bias. Finally, we have little information on the quality or management of projects. Again, if this difference in management is associated with project type, violence levels or rotation timing, it will bias the estimates.

Our findings present an important step in linking domestic research on legal sectors and crime to insurgency research. While a range of social scientists of studied the relationship between unemployment and crime, this project contributes an explicit application of this research to counterinsurgency policy in an empirical framework. Given the potential for long-term benefits of reconstruction projects, finding short-term gains should not be surprising. However, given the difficulty in implementing many reconstruction projects and concerns about corruption, management, and specific project types, it is useful to know that the simple labor market effect—common across a range of project types—can produce substantial short-term reductions in violence. Given this, the returns to labor-intensive public goods provision are likely to be substantial both in terms of current and future stability. This paper does not explicitly provide a cost-benefit analysis of reconstruction, and the precise returns to a given level of funding are left as a future direction for this project. Understanding the dynamic response of both marginally attached insurgents and the insurgent groups facing a restricted labor supply are left as areas of future research.

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APPENDIX 1. DETAILS ON THE CERP PROGRAM

A key aspect of the program is that unlike other reconstruction funds allocated for Iraq, CERP delegated spending authority to division- and brigade-level commanders with responsibility for a particular area of operation, outside the normal appropriations process.[23] By placing reconstruction funds at the discretion of U.S. military commanders, the goal of the program is to fund low-level projects that quickly inject money into the local economy and generate employment. The advantages of this structure are that it is decentralized, flexible, closer to the ground, and avoids the bureaucratic hurdles associated with other reconstruction programs.[24] In contrast, money spent through other aid agencies is slower, less efficient, requires more overhead for security, and is limited when conditions are too dangerous for civilian agencies to operate.[25] CERP money has typically been spent on small-scale projects that respond to local needs, and in areas where civilian aid agencies may not have access.

CERP has also been specifically cited as one of the most successful U.S. programs in Iraq.[26] According to Secretary of Defense Robert Gates, CERP is "the single most effective program to enable commanders to address local populations' needs and get potential insurgents in Iraq and Afghanistan off the streets and into jobs."[27] The U.S.

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[23] See Lieutenant Colonel Mark Martins, "The Commander's Emergency Response Program," *Joint Forces Quarterly* 37 (2005), pp. 46-52; FM 3-24 D 29-3; Captain Karin Tackaberry, "Judge Advocates Play a Major Role in Rebuilding Iraq: the Foreign Claims Act and Implementation of the Commander's Emergency Response Program," *The Army Lawyer* (February 2004), pp. 39-43; Lieutenant Colonel Mark Martins, "No Small Change of Soldiering: The Commander's Emergency Response Program (CERP) in Iraq and Afghanistan," *The Army Lawyer* (February 2004), pp. 1-20. On the relevant orders, see CJTF-7 Fragmentary Order (FRAGO) 89, MNF-I FRAGO 087. On the legislation funding the program after June 2004 from Congressional appropriations, see Sec. 1110, FY04 Emergency Supplemental Act (180 million); Sec. 9007, FY05 DOD Appropriations Act (300 million); FY 2006 National Defense Authorization Act, Section 1202(a), Jan. 2006 (500 mil each for 2006 and 2007). On the rules and accountability procedures surrounding projects funded with CERP money, see the *2006 Operational Law Handbook*, Chap. 11 (Fiscal Law), paragraph IX.C.4 (pp. 273-4).

[24] On the advantages of CERP spending over other reconstruction funds, see Cha 2003; Martins 2005; and England 2007.

[25] On these criticisms of the conventional reconstruction process, see Bowen 2008.

[26] Robichaud 2007, 5. There is some criticism of military-led reconstruction efforts, particularly from the professional development aid community, for being ad hoc, not integrated with other development programs, or more likely to use poor contracting and oversight procedures. See, for example, Coyne 2007.

[27] Roxanne Tiron, "Pentagon Leaders Press for Jobs Program in Iraq, Afghanistan," *The Hill*, May 20, 2008. See also Robert M. Gates, "Opening Statement to the Senate Appropriations Committee for Defense," May 20, 2008, accessed at http://www.defenselink.mil/speeches/speech.aspx?speechid=1244; and Staff Sgt. Robert R. Ramon, "Construction Program Improves Afghans' Lives," *Armed Forces Press Service*, April 14, 2006. For news accounts of the CERP program, see Dana Hedgepeth and Sarah Cohen, "Money as a Weapon," *Washington Post*, August 11, 2008, p. A1.

COIN Field Manual (FM 3-24) specifically cites the benefits of placing economic development funds in the hands of commanders because they are closer to the situation "on the ground."[28] Journalistic accounts have focused on CERP as one of the few successes throughout the U.S. occupation, and the program often figures prominently into major success stories, such as those surrounding the experience of David Petraeus and the 101st Airborne Division operating in Mosul early in the war.[29] According to one journalist, "To the extent that U.S. armed forces have been able to keep order and build good will—to pay the bribes and rev up the projects that make many Iraqis tolerate or even welcome the occupation—it is because of a special fund called the Commanders' Emergency Response Program."[30] U.S. military commanders cite the unique benefits of a decentralized structure in which spending decisions are delegated to the on-the-ground unit. Lt. Col. David Couvillon, the provisional military governor of the Wassit province in 2003, describes the availability of CERP money as "essential to our success" and credited it for the fact that not a single Marine in the province died under enemy fire.[31] According to LTC DeFrancisci, CERP money was a "force multiplier" in the second battle of Fallujah beginning in November 2004.[32] Petraeus similarly writes that the "Money is the most powerful ammunition we have," and as MNF-I commander issued guidance encouraging U.S. forces to "employ money as a weapons system."[33] According to a 2008 report by the Office of the Special Inspector General for Iraq Reconstruction, CERP funds now account for approximately 10% of all development spending in Iraq, and by other estimates over a quarter in Afghanistan.[34]

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[28] See FM 3-24 5-49 and Appendix D.
[29] On the success of the 101st Airborne in Mosul, see Ariana E. Cha, "Military Puts Funds to Swift Use Rebuilding," *Washington Post*, October 30, 2003, p. A1; Martins, The Commander's Emergency Response Program (CERP) in Iraq and Afghanistan," pp. 8-9; and David H. Petraeus, "Learning Counterinsurgency: Observations from Soldiering in Iraq," *Military Review* (January/February 2006), pp. 2-11.
[30] Fred Kaplan, "More Dinars, Please," *Slate*, December 2, 2003.
[31] Quoted in Fred Kaplan, "More Dinars, Please," *Slate*, December 2, 2003. See also Martins, "The Commander's Emergency Response Program (CERP) in Iraq and Afghanistan." Martins: "The significance of the CERP is that by authorizing and funding a program for discretionary humanitarian projects of brigade and division commanders, Congress has acknowledged the need for new and different tools to conduct major stability operations." Martins 2004, 15.
[32] Ltc Leonard J. DeFrancisci, "Money as a Force Multiplier in COIN," *Military Review* (May-June 2008): 21-28.
[33] Petraeus, "Learning Counterinsurgency;" and Petraeus, "Multi-National-Force-Iraq Commander's Counterinsurgency Guidance."
[34] SIGIR, Report to Congress, January 30, 3008, p. 17.

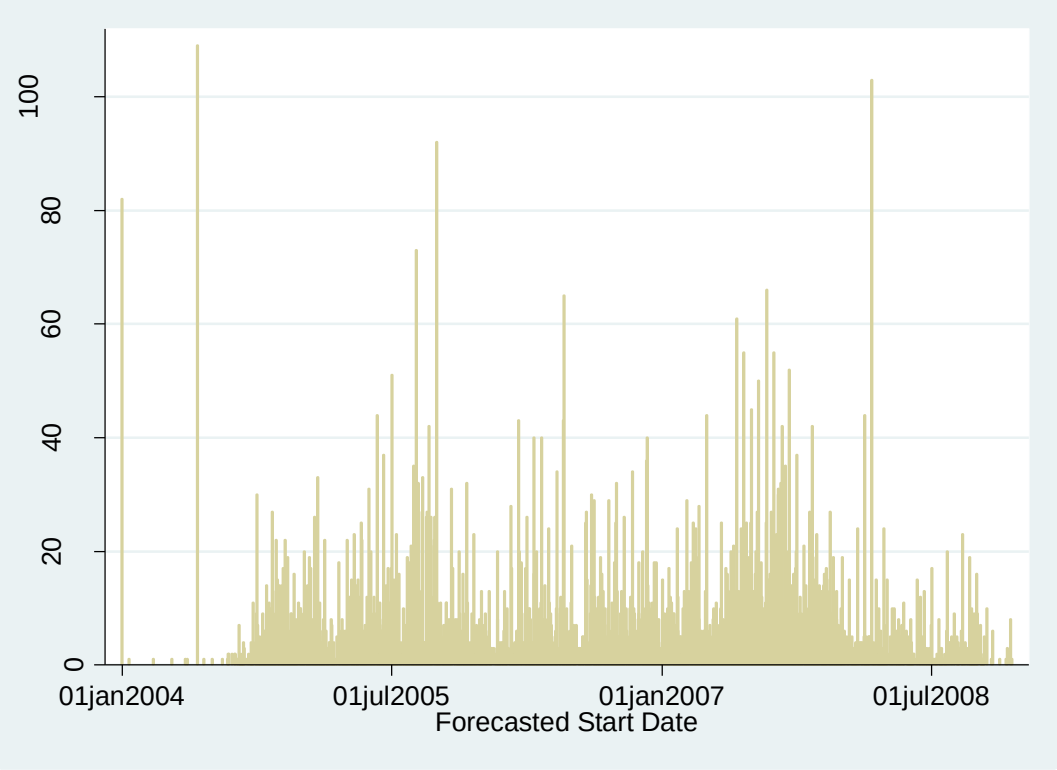

Figure 1. Number of New Project Starts and Project Compositions Each Week
Notes: Average flow of projects is the number of new projects begun in that district week. Fraction of projects that are construction intensive are projects with greater than 50% of total project expenditures spent on construction.

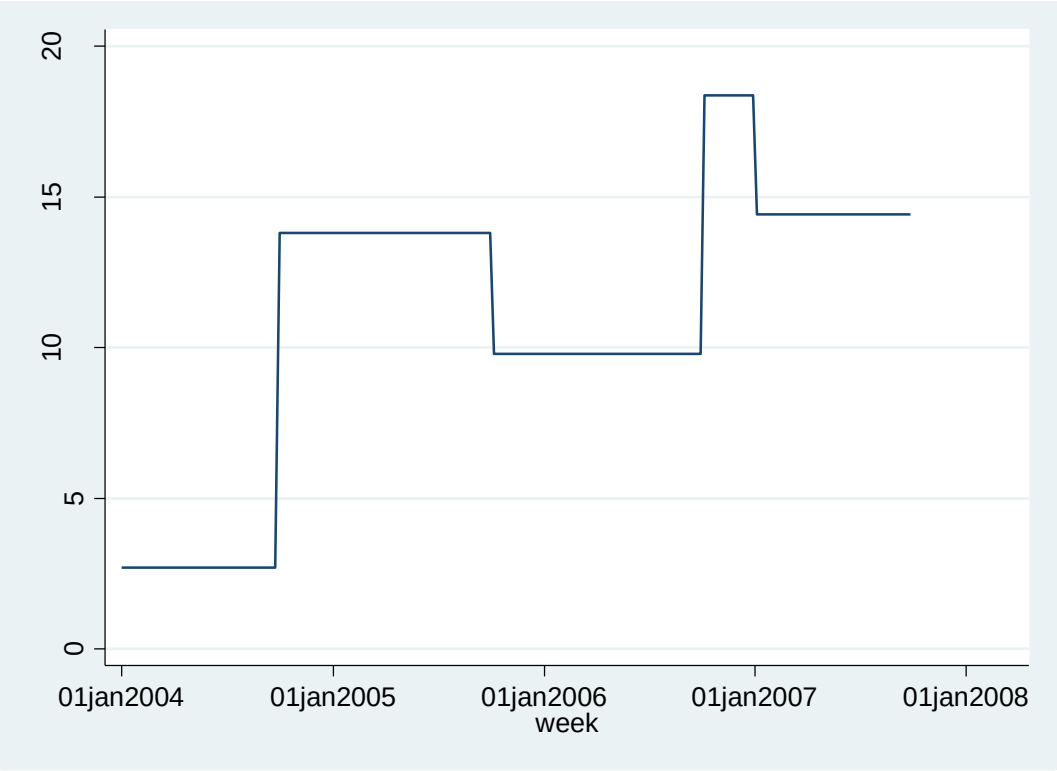

Figure 2. Funding Rates based on Federal Budgetary Allocation
Notes: Dates and amounts from Office of the Special Inspector General for Iraq, SIGIR-08-006, January 25, 2008.

Table 1. Fraction of Attacks by various Weapon Types by Period

	(1) May 2003-Jan 2006	(2) Jan 2006-Jan 2007	(3) Jan 2007-July 2008	(4) Over all Periods
Total Number of attacks	3,080	5,244	5,888	14,212
Panel A: Included Attack Categories				
Bomb	***23.28***	***29.54***	***25.95***	***26.46***
Landmine	1.61	0.34	1.14	1.03
Roadside	46.65	46.39	45.23	46.09
Suicide	18.49	16.04	16.65	17.07
Car	10.92	7.34	11.27	9.85
Multiple/Other	23.28	29.54	25.95	26.25
Small Arms fire	***44.87***	***45.16***	***36.81***	***41.64***
Gunfire	71.79	58.74	55.31	60.55
RPG	28.21	41.26	44.69	39.45
Torture and Execution	***5.49***	***16.04***	***19.16***	***15.04***
Beheaded	11.24	6.9	5.41	6.45
Blunt	2.37	0.24	0.18	0.37
Burning	2.37	0.36	0.98	0.84
Drowning	1.18	0	0	0.09
Gunfire	49.7	77.05	85.02	79.1
Hanging	0.59	0.36	0.35	0.37
Kidnapping	8.28	3.09	1.77	2.81
Stabbing	4.73	0.95	0.8	1.17
Strangling	1.18	0.48	0.53	0.56
Other	18.34	10.58	4.96	8.23
Indirect Fire	***5.88***	***5.09***	***7.37***	***6.21***
Artillery	2.29	0.75	0	0.69
Mortar	84	89.13	90.99	89.13
Rocket	13.71	8.61	9.01	9.83
Mortar	0	1.5	0	0.46
Other/Unknown	3.31	0	0.23	0.79
Panel B: Excluded Categories				
Hospital	***1.1***	***0.27***	***0.17***	***0.41***
Coalition generated	***7.37***	***2.82***	***4.52***	***4.51***
Iraqi Army or Police	***0.16***	***0.27***	***0.22***	***0.23***
Multiple	***2.24***	***1.41***	***1.05***	***1.44***
Ambush	42.03	32.43	29.03	34.63
Mosque	2.9	10.81	0	4.88
Other/Unknown	55.07	56.76	70.97	60.49
Crossfire	***0.75***	***0.74***	***0.59***	***0.68***
Unknown	***3.83***	***5.74***	***5.16***	***5.09***

Notes: Data is based on Iraqi Body Counts (IBC) and uses only attacks which included at least 1 fatality. Non-fatal attacks are not included. Weapon

classifications are based on authors own coding and used the attack method listed by IBC. All deaths listed in morgues with no known cause are excluded.

Table 2. Spending and Project Distribution by District Week

	(1) Avg. Flow of Projects	(2) Avg. Stock of Projects	(3) Average Weekly Expenditures (in $100,000's)	(4) Fraction of Projects Construction intensive
Panel A: By Iraqi Governorate				
Anbar	1.53	89.68	1.82	0.24
Babil	0.81	137.35	1.71	0.65
Baghdad	15.36	1452.12	16.63	0.51
Dahuk	0.50	81.89	0.45	0.58
Diyala	0.66	68.82	0.89	0.38
Erbil	0.24	29.91	0.18	0.59
Kerbala	0.38	78.41	0.69	0.37
Najaf	0.12	156.07	0.37	0.77
Ninewa	0.35	46.40	0.26	0.49
Salah Al-Di	0.58	51.14	1.13	0.32
Sulaymaniya	0.58	64.78	0.36	0.45
Tameen	2.08	270.50	1.49	0.46
Wassit	0.29	79.85	1.27	0.80
Panel B: By Project Subsector				
Agriculture	0.66	0.0091	0.0041	0.0802
Battle Damage	1.26	0.0150	0.0276	0.0353
Civic Cleanup Activities	1.46	0.0398	0.0134	0.0712
Civic Infrastructure Repair	4.53	0.0658	0.0366	0.1409
Civic Support Vehicles	0.01	0.0006	0.0005	0.0171
Economic, Financial, and Management Imp	0.75	0.0126	0.0433	0.0996
Education	34.80	0.3020	0.1970	0.3108
Electricity	6.95	0.0875	0.1608	0.2532
Food Production & Distribution	0.04	0.0028	0.0017	0.0313
Healthcare	2.50	0.0270	0.0405	0.2366
Law & Governance	3.17	0.0412	0.0412	0.1580
Other Humanitarian and Reconstruction P	2.18	0.0268	0.0214	0.1707
Telecommunications	0.46	0.0067	0.0061	0.1049
Transportation	20.39	0.1721	0.2777	0.3100
Water & Sanitation	28.98	0.2447	0.3128	0.3039

Notes: Unit of observation is a district-week within a fully balanced panel. Average flow of projects is the number of new projects begun in that district week. Average stock of projects is the number of projects still ongoing including that week's newly started projects (flow). Fraction of projects that are construction intensive are projects with greater than 50% of total project expenditures spent on construction.

Table 3. First Stage Estimation with Single and Multiple Instrument s

	(1)	(2)	(3)	(4)
Dependent Variable	Avg. Flow of Projects		Fraction of Projects Construction intensive	
Mean	1.05		0.45	
Panel A: Single Instrument for Unit Type				
*(Light Unit)*highfunds* (=1 if infantry division in charge of area)	0.0207	0.2737	0.0764***	0.0904***
	(0.1663)	(0.3590)	(0.0098)	(0.0123)
Panel B: Multiple Instruments				
F-Statistic for *Unit*highfunds*	4.05	3.64	20.64	19.49
District Fixed-Effects	Y	Y	Y	Y
Week Fixed-Effects	N	Y	N	Y
Month-Year Fixed Effects	Y	N	Y	N
Number of observations	10813	10813	7785	7785

Notes: Robust Standard errors reported parentheses. Coefficients marked with ** (*, ***) are significant at the 0.05 (0.10, 0.01) level. A unit of observation is a district-week. Dependent variable average flow of projects is the number of new projects begun in a district week. Fraction of projects that are construction intensive are defined as projects with greater than half of total project expenditure from construction. High funds periods are Sep 30, 2005-sep 29,2006; Dec 31, 2006-Sep 29 2007 and Sept 30, 2007-Jun 2008. Light Unit instrumental variable is 1 if the following units control a district: the 101st Airborne Division, 25th Infantry Division, 1st Infantry Division, 82nd Airborne Division, the 1st Stryker Brigade of the 25th Infantry Division, or the 10th Mountain Division. Light Unit instrumental variable is 0 if the following units control a division: 3rd Infantry Division, 4th Infantry Division, 11th Armored Cavalry, 1st Armored Division. The two Marine units have their own indicator MEF I, or MEF II (not reported). District-weeks controlled by non-US forces (e.g. UK or Poland) are excluded from analysis. Multiple instrument specification includes an indicator variable for each of the listed units and an interaction term between each unit and the high funds periods.

Table 4. Two-Stage Least Squares Estimates of the Effect of Reconstruction on Attacks

	(1) OLS	(2) IV (Single Instrument)	(3) IV (Multiple Instruments)	(4) Reduced Form	(5) OLS	(6) IV (Single Instrument)	(7) IV (Multiple Instruments)	(8) Reduced Form
Dependent Variable	Log(attacks)				Deaths per Attack			
Mean	Ln(0.88) = -1.66				0.45			
Panel A: Construction Intensive Projects								
Fraction of Construction Intensive Projects	0.0011 (0.0552)	-1.0916* (0.6173)	-0.9702*** (0.3410)		-1.3641 (1.3058)	-3.7675 (3.5729)	-3.6699 (7.0449)	
Infantry (=1 if infantry division in charge of area)				-0.1196*** (0.0354)				-2.9947* (1.5999)
Panel B: Number of New Projects								
Number of New Projects	-0.0011* (0.0006)	-0.0442 (0.0394)	-0.0157 (0.0196)		-0.0162* (0.0092)	-1.1121 (1.1042)	-0.3235 (0.5816)	
Infantry (=1 if infantry division in charge of area)				-0.1196*** (0.0354)				-2.9947* (1.5999)
District FE	Y	Y	Y	Y	Y	Y	Y	Y
Month-Year FE	Y	Y	Y	Y	Y	Y	Y	Y

Notes: Robust Standard errors reported parentheses. Coefficients marked with ** (*, ***) are significant at the 0.05 (0.10, 0.01) level. A unit of observation is a district-week. Dependent variable average flow of projects is the number of new projects begun in a district week. Fraction of projects that are construction intensive are defined as projects with greater than half of total project expenditure from construction. Infantry instrumental variable is 1 if the following units control a district: 25th infantry Division, 3rd Infantry Division, 42nd Infantry Division, 4th Infantry Division. Infantry instrumental variable is 0 if the following units control a division: 101st Airborne Division, 11th Armored Cavalry, 1st Armored Division, 1st Stryker Brigade of the 25th Infantry Division. District-weeks controlled by non-US forces (e.g. UK or Poland) are excluded from analysis. Multiple instruments includes an indicator variable for each of the listed units. Violence data is based on Iraqi Body Counts (IBC) and uses only attacks which included at least 1 fatality. Non-fatal attacks are not included. Weapon classifications are based on authors own coding and used the attack method listed by IBC. All deaths listed in morgues with no known cause are excluded. Coalition generated attacks and fatalities are excluded from analysis.

Table 5. Estimates of the Effect of Reconstruction on Type of Violence

	(1)	(2)	(3)	(4)	(5)	(6)
		Labor Intensive per 1,000			Capital Intensive per 1,000	
Dependent Variable	Attacks that are labor intensive per 10,000	Small Arms Fire (including Guns and RPGs)	IED, Suicide and Landmine	Torture and Executions	Car and Other implanted Explosives	Rocket, Mortar and other Indirect Fire
Mean	0.646	0.181	0.443	0.022	0.261	0.094
Fraction of Construction Intensive Projects (OLS)	0.0025	0.0059	0.0108	-0.0075**	-0.0003	-0.0030
	(0.0051)	(0.0084)	(0.0105)	(0.0036)	(0.0031)	(0.0025)
Fraction of Construction Intensive Projects (Single IV)	-0.1148***	-.7029**	13.2298	-0.4857	0.4382	1.5785
	(0.0415)	(0.1105)	(59.1011)	(0.8534)	(0.3898)	(1.1534)
Fraction of Construction Intensive Projects (Multiple IV)	-0.0932**	-0.0768**	-0.1559*	-0.0139	0.0338	0.0484*
	(0.0453)	(0.0423)	(0.0886)	(0.0348)	(0.0297)	(0.0256)
Infantry (=1 if infantry division	-0.0611*	-0.0084*	-0.0587***	-0.0060	0.0012	0.0078**
	(0.0322)	(0.0050)	(0.0131)	(0.0052)	(0.0051)	(0.0038)
District FE	Y	Y	Y	Y	Y	Y
Week FE	Y	Y	Y	Y	Y	Y

Notes: Robust Standard errors reported parentheses. Coefficients marked with ** (*, ***) are significant at the 0.05 (0.10, 0.01) level. A unit of observation is a district-week. Dependent variable is listed in the first row. Fraction of attacks that are labor intensive includes all attacks in columns (2), (3), and (4). Dependent variable in column (2) is small arms fire includes gunfire and rocket-propelled grenades (RPGs). Dependent variable in column (3) includes improvised explosive device (IED) and landmines are labor intensive forms of explosive attacks. Also included in this category or suicide attacks of any type Torture and executions includes all kidnapping and torture-related gun attacks. Car and other implanted explosives which did not require suicide of the attacker are included in column (5). Fraction of projects that are construction intensive are defined as projects with greater than half of total project expenditure from construction. District-weeks controlled by non-US forces (e.g. UK or Poland) are excluded from analysis. Multiple instruments includes an indicator variable for each of the listed units.