MARX'S THEORY OF REBELLION:  
A CROSS-NATIONAL ANALYSIS OF CLASS EXPLOITATION,  
ECONOMIC DEVELOPMENT, AND VIOLENT REVOLT*

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Despite extensive criticism, Marx's theory of rebellion has not been analyzed directly in cross-national research. The failure of proletarian revolutions to occur in the most developed countries has discredited Marx's predictions. Recent cross-national studies of rebellion and political violence have discovered a perplexing positive effect of economic development on rebellion, net of income inequality and political democracy. We show that a proper understanding of Marx's theory can explain this finding. Economic development fosters revolt because of its impact on proletarianization and class exploitation. We offer a Marxist interpretation of rebellion research and develop a novel measure of class exploitation in a cross-national regression analysis of violent rebellion in 61 countries. Our results conform to Marx's expectation that the effect of class exploitation on revolt is conditioned by market crises. Although some findings are consistent with alternative theories, we suggest that the findings provide new empirical support for Marx's insights.

Perhaps the most often stated example of a fundamental error in Marx's social theory is his prediction that proletarian revolts would occur in the most developed countries. Explaining the failure of this prediction has generated two distinct research agendas. One literature looks at proletarians and asks why they do not rebel. The answers usually cite a combination of working-class divisions, false consciousness, or class compromise with democratic states (Sombart [1906] 1976; Lenin [1916] 1939; Hobbsawm 1962; Edwards 1979; Lipset 1981; Korpi 1983; Przeworski 1985). Another literature looks at revolutions and asks why they occur in less developed countries. This research focuses on peasant revolts against disruptions of the moral economy caused by world capitalist development (Hobsbawm 1959; Wolfe 1969; Paige 1975; Walton 1984).

Surprisingly, cross-national research has found a perplexing positive net effect of economic development on rebellion (Muller and Seligson 1987; Timberlake and Williams 1987; London and Robinson 1989; Boswell and Dixon 1990). That is, in models that include central causal factors like repression, inequality, and economic decline — all of which are negatively associated with economic development — the net effect of economic development is positive. That economic development increases rebellion net of these factors remains an enigma that prompts a renewed look at Marx's theory.1

Most critics of Marx's theory (including many Marxists) concentrate on his faulty prediction about where rebellions will occur. However, exploitation is the fundamental source of class struggle and rebellion in Marx's theory, not economic development. In Marx's terms, class exploitation refers to the expropriation of surplus (net) value from its producers. Therefore, industrial development leads to rebellion only to the extent that it increases the size of and the exploitation of the working class.

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1 Modernization theory (Huntington 1968) may also expect economic development to breed revolt, although whether the expectation holds after controlling for the effects of modern institutions, like liberal democratic states, is unclear. Zimmerman (1983) offers a thorough review and critique of modernization theory. Also see Tilly (1972).
Cross-national research has focused on the related topics of income inequality and regime repression, but has not directly examined class exploitation (Russett 1964; Gurr and Duvall 1973; Hibbs 1973; Muller 1985, 1986; Muller and Seligson 1987). This lacuna is partly a result of Marx’s failure (and the failure of most contemporary Marxists) to define exploitation in a manner analytically distinct from development that would permit empirical inquiry. Because Marx’s prediction was rejected long ago, many researchers assumed that further analysis was unwarranted.

We transform Marx’s theory into propositions and variables that can be tested empirically in a cross-national study. Of course, many of Marx’s arguments and variables overlap with those used by other theories, differing only in genealogy or interpretation. The most distinct variable is class exploitation. We expect high levels of exploitation to produce rebellion, especially during economic crises. Net of the rate of exploitation and the size of the industrial working class, the positive effect of economic development on rebellion is expected to dissipate.

MARX’S THEORY OF REBELLION

The Marxist literature on rebellion and revolution is replete with relevant quotes from Marx and Engels. Draper’s (1978) four volume study and Padover’s (1971) edited collection provide extensive documentation of Marx and Engels’s published and unpublished works. The most explicit theoretical statements by Marx and Engels occur in essays about the revolts of 1848 (Marx and Engels [1848] 1969; Marx 1850a, 1852; Engels 1851–1852) and the Paris Commune (Marx 1871). While their historical essays reveal nuances, the Manifesto is the most theoretically explicit work, and Marx often returned to it when discussing revolution even in his mature work. The following passage from Capital is perhaps the best summary of Marx’s theory of rebellion:

Along with the constantly diminishing number of the magnates of capital, who usurp and monopolize all advantages of this process of transformation, grows the mass of misery, oppression, slavery, degradation, exploitation; but with this too grows the revolt of the working-class, a class always increasing in numbers, and disciplined, united, organized by the very mechanism of the process of capitalist production itself. The monopoly of capital becomes a fetter upon the mode of production, which has sprung up and flourished along with, and under it. Centralization of the means of production and socialization of labor at last reach a point where they become incompatible with their capitalist integument. Thus integument is burst asunder. The knell of capitalist private property sounds. The expropriators are expropriated. (Marx [1887] 1967, vol. 1, p. 763)

Marx’s theory of revolt is an extension of his analysis of class conflict. Note that the theory does not explain when rebellion (extensive violent actions against the state) will result in revolution (the overthrow of the state). Marx analytically separated revolts from “successful” revolts (although he used the term revolution for both) and held that proletarian revolts will recur despite setbacks (Marx 1850a, 1852, 1871). Revolts are a necessary but not a sufficient cause of a revolution’s success. Revolts are uncommon, but revolts that overthrow the state and transform the social structure are even rarer. More potent rebellions should be more successful, but the rebellion is only one component of a revolution, the other component being resistance by the state. The vulnerability of the state is affected by its strength, internal divisions, and foreign entanglements, a subject that has been the focus of recent research (Tilly 1978; Skocpol 1979). Studies of only successful revolutions shift the focus to the state and away from the sources of revolt. If the factors that turn a rebellion into a revolution are not directly determined by the same underlying structural factors that ferment rebellion, a focus on revolutions truncates the dependent variable by eliminating failures. A focus on revolution may also mask the impact of structural factors, which are overshadowed by the significance of events, and conflate the outcomes of rebellions that topple a state with the sources of rebellion in general (Walton 1984). Theory and research must distinguish between the structural causes of rebellion and the prediction of successful revolutions.

Our model of Marx’s theory differs from those of Hobsbawm (1973), Friedland (1982), Goldstone (1982), Jessop (1990), and other secondary sources whose studies depict only the essence of Marx’s theory. We disaggregate Marx’s theory in order to identify an array of causal factors and to make explicit the often
assumed causes, relationships, and scope conditions. The initial important relationship is between economic development and class exploitation.

**Economic Development and Class Exploitation**

Economic development leads to class conflict and social rebellion by creating, expanding, and organizing the proletariat. Marx and Engels (1848, pp. 116–17) summarized five basic results of capitalist development. (1) Capitalist expansion exprioprates peasants, artisans, and other producers, which creates a proletariat that owns no productive property and must work for wages. Commodification of labor eventually erodes the basis for alternative laboring classes based on coercion, e.g., slaves, serfs, and peons. (2) Concentration and centralization of production reduce the number of small businesses and merchants (the petty bourgeoisie) and reduce the size of or even existence of alternative modes of production (e.g., petty-commodity or slave). Society becomes polarized between a small bourgeoisie and a growing proletariat. (3) Large scale industrialization concentrates workers at work sites and in surrounding communities, which facilitates their organization and joint action. (4) Improvement of communication among unions, strikers, and rebels allows them to turn local struggles into national issues. (5) Mechanization reduces craft and artisan production. The resulting homogenization of skills and wages increases working-class solidarity.

The total result is a more polarized class structure, and a working class growing in size and power. With industrialization, workers are better able to resist exploitation, but economic development does not incite revolt directly. Although the growth and organization of the proletariat are necessary for action, they do not explain why the proletariat is organizing or why it rebels. An explanation of revolt requires a theory of exploitation.

**Class exploitation** is the extraction of surplus value from its producers. The rate of exploitation is the ratio of surplus value to the total value of labor power.\(^2\) Although often unstated in Marxist political writings, exploitation is the fundamental source of class conflict in Marx's theory (Marx and Engels 1848, p. 120). In capitalist societies, class conflict is manifested in two moments in the production process. The first conflict occurs at the production site — on the shop floor, fields, docks, offices — and concerns the amount of work effort and productivity and the quality of working conditions. It is at this moment that the numerator for the exploitation rate is set, i.e., the value added in the labor process above that paid to labor.

The second conflict takes place between workers and employers over wages and salaries. Wage's and salaries are the denominator for the rate of exploitation. Workers organize in unions and political parties to set minimum wages, restrict competition, and enforce standards. Class conflict involves not only strikes and other job actions, but also the state. Because ownership of capital is a legal relationship, the determination of work effort, work conditions, wages, etc., is an inherently political process involving property rights.

Although work effort and subsistence requirements have physical limits, "an immense scale of variations is possible. The fixation of its actual degree is only settled by the continuous struggle between capital and labor . . . . The matter resolves itself into a question of the respective powers of the combatants" (Marx 1865, p. 72–73). Skill, knowledge, and organization are workers' chief resources in both conflicts. The outcomes of the two conflicts determine the distribution of the product values

(\(^{\text{1988, p. 218}}\)) Surplus value is the difference between the total value produced and the costs of production, which include labor costs (mainly wages and salaries). The total value is a function of current labor and past labor as embodied in capital. Profitability requires that workers be exploited, i.e., paid less than the value of what they produce (Roemer 1982, 1988). Although capital, which is a function of past labor, contributes to product value, the same is not true of capitalists (although managers may contribute valuable labor). It is not necessary to assume a traditional labor theory of value, in which prices are proportional to labor values (which is erroneous in all but trivial cases), for capitalist ownership of the surplus to be considered exploitative (Roemer 1988, pp. 47–52; 1982; Elster 1978). As such, Marx's theory of exploitation should not be rejected because of the faulty logic of a superfluous theorem.
between earned income (wages, salaries, and benefits) and unearned property income (profit, interest, dividends, and rent). The societal total also includes what Marx called secondary exploitation of the petty bourgeoisie, peasantry, and artisans through rents, mortgages, and loans (Marx 1850a, pp. 214, 277; 1852).

Overall, the relationship between capitalist development and class exploitation is contradictory. On the one hand, development creates the proletariat by expropriating other classes, which increases capitalist exploitation. Capitalist development of the forces of production may increase the rate of exploitation by raising labor productivity, but only if an increased labor supply restrains wages. The remaining noncapitalist propertyed classes must then increase their exploitation rates to compete with capital. On the other hand, development shapes the proletariat into a potent force in class conflict. As Marx and Engels (1848) put it, what the “development of Modern Industry, therefore, . . . produces, above all, are its own grave-diggers” (p. 119). Workers use their growing strength to reduce their exploitation, i.e., to raise wages, shorten the work day, eliminate overwork. Through the experience of class struggle, labor and capital forge self-conscious political classes (Marx and Engels 1848, pp. 116–19; Marx 1887, vol. 1, p. 762–63).³

Much of Capital is devoted to explaining how development creates an exploited working class, while Marx’s political essays focus on episodes of resistance to exploitation (1850a, 1852, 1871). An explicit version of the complete dialectic appears only in the Manifesto, which is summarized in Capital (1887, vol. 1, pp. 761–64).

The progress of this dialectic process is uneven because economic development is continually driven by market competition while political struggles are indeterminate and often require mass organization and violent outbursts to succeed. Marx expected revolts that fell short of socialist revolution to produce only temporary reductions in exploitation which would be outstripped over time by capital’s drive to increase exploitation, even if living standards rise (1887, vol. 1, pp. 508–648; 1865).⁴ Although we disagree with this expectation for industrial democracies, the key point is that an analytic distinction between economic development and class exploitation is essential for explaining rebellion. While high rates of exploitation intensify class conflict, industrialization makes the working class a potent combatant in the struggle to reduce exploitation. Class exploitation is most salient during periodic market crises.

Market crises are short term periodic overproductions of commodities relative to buying power that result from what Marx called the contradiction between the forces and the relations of production, i.e., when bourgeois property relations fetter the development of production. Although Marx and Engels used the term “crisis” broadly, in their political essays they describe what we commonly refer to as economic recessions (Marx and Engels 1848, pp. 113–14; Marx 1850a, pp. 289–90; 1852, p. 456; 1859, p. 504).

During a market crisis, jobs and wages are lost until the profitability of increased production is restored. The downturn intensifies class conflict at both moments — over the need for increased work effort with fewer workers in production, and over wage or job losses in the labor market. Most class conflict is manifested in individual day-to-day struggles on the job or in the labor market, not in revolt. Collective struggles, even if organized, usually involve a

³ Marx’s discussion of the length of the work day begins with the history of its extension with the early development of capitalism as the property of artisans and yeomen was expropriated Marx (1887, pp. 231-302). He then explained that with industrial development, workers successfully organized to compel the state to restrict working hours. The English were first because England was the most developed (Marx 1887, pp. 278, 299). Marx used the struggle for a bill mandating a 10-hour day, which he examined at length, as a prototype for the struggle against exploitation (Marx and Engels 1848, p. 117; Marx 1864, p. 16; 1887, pp. 231–302).

⁴ Although some Marxists hold to this latter thesis (Braverman 1974), others point to the union movement and other social movements that have reduced exploitation in the industrial democracies, at least since World War II (Gordon, Edwards, and Reich 1982). However, Marx sometimes implied an absolute increase in “immiseration” despite his own historical evidence of declines in expropriation of small property owners, increases in productivity, increases in unionization, and a shortening of the work day. Our interpretation is consistent with the logic of his dialectical argument, even if Marx was not always consistent.
single work site, or at most, an industry. During a market crisis, however, these conflicts become nationwide events directed at the state. Market crises also generate revolts among the peasantry and other classes facing secondary exploitation, which leads to alliances among the exploited classes (Marx 1852, p. 456). If a market crisis spreads rebellious conflict to all classes and sectors of society simultaneously, the situation becomes revolutionary (Marx 1850a, pp. 209, 289; Marx and Engels 1848, pp. 113–14). The state and its policies, rather than the economy, become the site and goal of class conflict, because only the state is held responsible for the economy as a whole.

A market crisis also increases support for rebellion by shortening the period in which the net benefits of a revolution might be realized relative to the current crisis. Physical destruction and capital flight during a rebellion can worsen living standards in the short term. As living standards deteriorate during a market crisis, the opportunity costs of revolution decline and the benefits of victory increase for the foreseeable length of the crisis. The lack of growth renders distribution more zero-sum, making class conflict more difficult to ameliorate and raising the revolutionary issue of property ownership.

Economic growth is equally important. Given the costs of rebellion and the uncertainty of victory, even highly exploited workers and peasants are unlikely to rebel if economic growth promises to improve their lives. A growing economy provides increased employment and wages, so that conflict is more likely to occur over income distribution rather than property ownership. Even if the exploitation rate should increase, employers can make concessions out of the growth dividend. Thus, workers are unlikely to trade immediate well-being for the risky long-term gains of revolt (Marx 1850a, pp. 289–90; [1850b] 1971; Engels 1895, pp. 187). For example, Marx (1850b, pp. 51–52) attributed the lack of revolt during 1848 in England, the most developed country, to its comparatively robust growth.

The contradiction between the forces of production and relations of production that underlies market crises is the key to understanding the theory as a whole and unifying its dialectical elements. During periods of market crises, workers are vulnerable to the whip of increased exploitation and the specter of unemployment. As the market deteriorates, zero-sum economic conditions forge class alliances and make exploitation politically salient.

The effects of market crises are only temporary, however. They dissipate once inventories clear and production accelerates. Revolutionary situations are thus brief but recurring periods when market crises combine the motivating force of intense class conflict with the latent capabilities of a powerful but accommodating working class — a potent combination that tends to be neutralized in the long run by capitalist development.5

Corollary Factors: Divisions, Class Consciousness, and Democracy

Marx’s theory of rebellion centers on the growth of the proletariat and the increased rate of exploitation during market crises. In his historical studies, however, Marx drew on numerous other factors to explain revolts (or the lack of revolt) in particular instances. We examine three: working-class divisions, a rebellious class consciousness, and liberal democracy. These factors are particularly important for applying a theory of secondary exploitation to peasants and other classes.

Working class divisions are ethnic or other internal differences that create conflict and impede solidarity class action. For instance, the conflict between the English and the Irish, which Marx likened to the conflict between blacks and poor whites in the southern United States, inhibited class cohesion and rebellion by the English proletariat (Marx 1870, pp. 176–77).6 Although contemporary research on

5 The historical argument should apply cross-nationally, with some qualification. An unorganized and weak industrial proletariat, such as is found in undeveloped countries, should be highly exploited. Exceptions may be those ex-colonies with legal or union traditions inherited from their former colonizers. Developed countries and some transnational corporations may also impose minimum labor standards on wages and working conditions across borders. Nevertheless, the possibility of high exploitation rates attracts capital to underdeveloped countries.

6 A division also exists between the mass of workers and the “aristocracy of labor,” i.e., craft workers who have reduced their exploitation rate by raising wages through restrictions on the labor market. Although active unionists, they are less likely to rebel because they are less exploited. They
split labor markets supports the negative effect of
ethic divisions on class solidarity (Bonacich 1976; Boswell 1986), studies of internal
colonialism (Hechter 1975) and other competitive
ethic relations (Olzak and Nagel 1986) suggest that ethnic divisions increase revolt if
they produce national separatist movements. The difference is the unit of analysis — the la-
bor market in the case of class solidarity, and internal nations in the case of separatist move-
ments. Separatist movements have no place in the traditional Marxist theory of rebellion, but
they must be incorporated in an overall model of revolt in order to circumscribe and highlight
the locus of class exploitation.

Rebellious class consciousness results from a
tradition of political conflict. Past conflict, ini-
tially from joining the conflicts of the bourgeo-
sie (Marx and Engels 1848, p. 117), indicates that
workers are politically conscious and will-
ing to “fight it out” (Marx 1859, p. 504). To some extent, Marx assumed that class con-
sciousness would follow directly from the expe-
rience of class struggle. The form and content of
this consciousness is mediated by the national
traditions of conflict, which are inherited by
each generation of the working class. Marx cites
France’s revolutionary heritage, for instance, to
explain the greater rebelliousness of the French
proletariat (Marx 1852, pp. 398–99).

The development of an explicitly revolution-
ary consciousness involves acceptance of theo-
etical and political positions beyond those pro-
duced by working-class conflict alone. Revo-
lutionary consciousness “may, of course, arise
among the other classes too through the con-
templation of the situation of this class” (Marx
such positions was a major purpose of Marx’s
writings. Yet we must point out that having an
explicit revolutionary consciousness, or even
class consciousness, is not a prerequisite to re-
belling. A “heritage of conflict” (Gurr and
Duvall 1973) may be interpreted in nationalist,
religious or other terms and still contribute to
rebellion by making violent conflict an ex-
pected event. The interpretation may, however,
have a tremendous effect on the rebellion’s
consequences.

Liberal democracy is perhaps the most im-
portant corollary factor. Marx’s theory was a
reaction to the Continental revolutions of
1848–1849 when workers did not have the
right to vote. He declared that the “first step in
the revolution by the working class” was “to
win the battle of democracy” (Marx and Engels
1848, p. 126). Once established, liberal demo-
cracy becomes a weapon that workers can use
against bourgeois rule (Marx 1850a, pp. 435–
36; 1852, p. 440). Marx left open the possibil-
ity of socialism by election in the United
States, Britain, and Holland, countries in which
at least white male workers had unencumbered
suffrage (Marx 1872, p. 293). As the franchise
spread, Engels fervently supported electoral
politics. He considered 1848-style “street fight-
ing with barricades” to be “obsolete,” except
when such fighting exerted a moral influence
on the army (Engels 1895, p. 196). Engels left
open, however, the potential of other forms of
fighting (1895, p. 199). Conversely, undemoc-
ocratic regimes incite revolt by combining eco-
nomic and political demands and by eliminat-
ing peaceful alternatives to change.

Marx expected the contradiction between po-
itical democracy and private ownership to
make democratic capitalism a temporary excep-
tion between (elected) socialism or restored tyr-
anny. Neo-Marxist and related research has
since pointed out that in the developed indus-
trial democracies, the “democratic class strug-
gle” over income distribution, work conditions,
and property rights produced class compromise
rather than revolution (Lipset 1981; Korpi
1983; Przeworski 1980, 1985; Przeworski and
Wallerstein 1982; Goldthorpe 1984; Robertson
1990; Sitton 1991). The compromise is an im-
plicit social contract in which workers accept
capitalist profit that produces enough growth to
raise their living standards. Although Marx ex-
pected that increases in exploitation would out-
strip political restrictions, inequality stabilized
or declined in industrial democracies during the
postwar period (until the 1980s, Ross and

Like all contracts, this one is ultimately en-
forced by the state. A secure class compromise
stabilizes class conflict and legitimizes the state, whereas an absence of compromise threatens either capitalism or democracy. Without a compromise each class will seek immediate maximum gains in class conflict as long as no long-term contract is guaranteed.\(^7\) Contrary to the traditional Marxist emphasis on a linear opposition to repression, the most contested states are those between democracy and tyranny, where workers do not have the political rights to guarantee a class compromise and capitalists are unable to impose a fully authoritarian state. The result is a "catastrophic crisis... characterized by high strike intensity and a fair amount of repression: they constitute a tug-of-war. Wages and profits oscillate sharply" (Przeworski and Wallerstein 1982, p. 233; Przeworski 1985).

*Exploitation and Revolts in Agrarian Societies*

Class compromise theory was developed to explain the stability of industrial democracies. Paige (1975) applied a similar logic to explain revolt in agrarian societies (also see Stinchcombe 1961). Paige found more rebellions in areas where zero-sum class relations, like share cropping, made landlords unable or unlikely to compromise. With little or no growth dividend to pacify labor, exploitation is obvious and based entirely on the legality of property ownership. The result is an "intractable zero-sum conflict over landed property" with an accompanying repressive state (Paige, 1975 p. 60). Rebellion is less likely under more capital intensive production, like plantations in which mechanization improves productivity. Here, agricultural labor can struggle for higher incomes without requiring property ownership. This interpretation also applies to the relationship of small farmers and peasants to capitalists in the processing, transporting, or exporting of goods. As with industrial workers, the fragility of the compromise depends on the extent of democratic institutions and economic growth.

Even without a compromise, however, peasants and other agricultural laborers have difficulty organizing. Thus, peasant revolts have often been organized by urban revolutionaries, or even by a leftist state (Paige, 1975 pp. 43–44). Walton (1984) noted that historically, rural and urban revolts have often involved collateral support, e.g., peasant revolts often depend on urban, usually working-class, support. Agricultural production for export depends on processing and shipping in urban areas. Urban and rural exploitation rates should, therefore, mirror one another, and urban class conflict can strongly affect rural class relations. Moreover, incorporation into the world economy, which upsets traditional agricultural relations, also disrupts cities that depend on exports (Timberlake 1985). In particular, peasants who are highly exploited or whose lands have been expropriated may migrate to urban areas rather than rebel in the countryside.

The flow of poor peasants and other poor migrants into the urban labor market lowers wages and intensifies exploitation. This in-migration creates a large informal sector of small-scale extralegal production. For instance, workers in the informal sector in Latin America comprise 20 to 35 percent of the economically active population in many cities, including as much as 20 percent of manufacturing. Wages in the informal sector can be as little as one-half those in the formal sector, and labor regulations and social security benefits, which are a product of the class compromise, are enforced (Portes and Sassen-Koob 1987, pp. 35–40; Portes and Benton 1984, p. 603). Although most workers in the informal sector are self-employed, perhaps one-third are wage workers and the remainder are direct or indirect subcontractors to formal industries (Portes and Sassen-Koob 1987). Interest rates are often extraordinarily high, and loansharking is common. Thus the informal economy is a volatile sector that is highly sensitive to the growth of the economy.

How can exploitation among peasants and other self-employed classes be conceptualized? Marx defined secondary exploitation as indirect exploitation, e.g., through mortgages, loans, and land rents (Marx 1850a, pp. 214, 277). Secondary exploitation explained why revolts by workers often occurred in alliance with revolts

\(^7\) "The only conceivable reason for workers to consent voluntarily not to claim the capital stock is to treat current profits as a form of workers delegated investment" (Przeworski and Wallerstein, 1982, p. 217). If capitalists withdraw from a possible compromise by failing to invest in growth, then labor will also withdraw and seek consumption of the total product or political control of capital investment.
by other groups, especially by peasants, but also by the petty bourgeoisie and artisans (Marx 1850a, 1852; Engels 1851–1852, 1870). Although Marx did not fully develop a theory of secondary exploitation or peasant revolt, the concept is consistent with recent neo-Marxist literature on the relationship between unequal assets and exploitation (Roemer 1982; Wright 1985). 8 Roemer (1982) demonstrated that exploitation is the unequal exchange that results from ownership of alienable assets that yield income independent of one’s own work. Exploitation does not result from inequalities in the ownership of assets per se, but from the increased income assets provide. The amount of capitalist exploitation in a society roughly corresponds to the total income inequality minus the inequality due to individual work, which varies by ability, effort, education, etc. For Marx, income-producing assets other than the means of production — land, credit, credentials, licenses, and so on — are secondary sources of exploitation of peasants and the petty bourgeoisie. Although secondary in Marx’s theory, in agrarian societies these may be the predominant sources of exploitation.

Rebellious conflict by tenants, sharecroppers, independent peasants, and small farmers usually concerns the distribution of land or product. However, land distribution measures have been shown to bear little relationship to cross-national patterns of rebellion independent of income inequality (Muller and Seligson 1987; Dixon, Muller, and Seligson forthcoming). While surprising at first, this simply means that inequalities in land ownership that do not result in income inequality are irrelevant. Therefore, for our purposes, the sources of peasant revolts and of participation by the petty bourgeoisie or artisans are found in the concentration of unearned income by their landlords, merchants, or financiers.

MODEL DESIGN AND MEASUREMENT

Our general model of Marx’s theory of rebellion consists of three basic elements: economic development, class exploitation, and market crisis, along with three corollary factors. The three main elements are linked in a causal chain: (1) The level of economic development determines the class structure of society; (2) the class structure leads to exploitation, which determines the sources and extent of class conflict; (3) class conflict in conjunction with market crises results in rebellious events. That is, economic development indirectly affects rebellion by creating a proletariat, whose exploitation rate determines class conflict. Thus, economic development should have no effect on class conflict net of the size of the proletariat and the degree of exploitation.

Our model encompasses 10 exogenous determinants. The dependent variable is deaths from violent rebellions from 1973 to 1977 divided by the midpoint population (in millions) and logged to correct for skewness (Boswell and Dixon 1990). This is a more restricted measure of aggregate political violence compared to measures used in recent studies (Muller 1985, 1986; Muller and Seligson 1987; Timberlake and Williams 1987; London and Robinson 1989). The exogenous terms are the main elements of the theory, the three corollary factors, and ancillary terms to better control and specify the relationships. The model formally specifies cross-national patterns of deaths from violent rebellion (VR) as the linear function:

\[ VR_t = \alpha_0 + \alpha_1 CE + \alpha_2 II + \alpha_3 MC \]
\[ + \alpha_4 (CE \times MC) + \alpha_5 LI + \alpha_6 IS \]
\[ + \alpha_7 LD + \alpha_8 LD^2 + \alpha_9 VR_{t-1}, \]

where \( CE \) is a direct measure of class exploitation in manufacturing; \( II \) is income inequality, a proxy for secondary exploitation; \( MC \) is mar-

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8 According to Roemer (1982, 1988), exploitation results from an unequal distribution of productive assets in a market economy. People who own productive assets work less time for a given value of consumer goods than do people with few assets. Because most all consumption goods in a market economy are made by others, those who own assets can consume more or work less than those lacking assets, independent of individual ability or effort. The result is unequal exchanges between the asset-rich and asset-poor, which can be expressed in labor time (without relying on the traditional labor theory of value) (Roemer 1988, p. 47–52). Assume an asset-rich landlord works one hour and an asset-poor peasant works nine hours to produce a given value of goods. When they exchange goods, which are worth a combined total of ten hours, the landlord exploits the peasant for four hours of labor time. Wright (1985) pointed out that asset exploitation merges Marx’s theory of property with Weberian concepts of status closure (Parkin 1979) and credentials (Collins 1979).
ket crises; $LI$ is the percentage of the labor force in industry, a measure of the size of the proletariat; $IS$ is intense separatism, a surrogate for divisions in the working class; and $LD$ is liberal democracy. Deaths from past rebellions ($VR_{-1}$, 1968–1972) indicate a heritage of conflict and mobilization that produces rebellious consciousness. This transforms the model to a change specification. Two terms capture nonlinear relationships: the interaction between market crises and class exploitation ($CE \times MC$), and a squared term for liberal democracy, ($LD^2$). We evaluate the adequacy of our model by estimating its parameters over a sample of contemporary nation-states for which data are available.

Deaths from political acts against, for, or by the state, or against other groups (Taylor and Jodice 1983) has been the most common dependent variable in conflict studies (Lichbach 1989, p. 443). Rebellious activities range from protests to guerrilla warfare, but per capita deaths is preferred over alternative specifications because deaths are more reliably measured cross-nationally (Weede 1981, p. 651). Protests or strikes that involve violence have a greater potential for delegitimizing the state than do nonviolent protests and strikes. As Hartman and Hsiao (1988) convincingly argued, however, a measure of deaths resulting from all political acts is simply too broad for theories predicting insurgencies from below.

Rather than introduce a control for nonrebellious political violence (Muller 1988, pp. 803–804), we define violent rebellion as only those deaths resulting from proactive political violence against the state (Boswell and Dixon 1990). Deaths resulting from political violence directed at other groups and reactive violence initiated by the state against groups other than insurgents are excluded. Also excluded are deaths caused by military coups. Deaths from protest events were included if the “target” was “the state and its policies,” “overthrow of the government,” or “control of insurgents.” This includes people killed in “peaceful” protests or political strikes as well as deaths of avowed revolutionaries supported by and presumably representing the exploited classes, even if they are not workers or peasants.

A theory of the exploitation producing revolt does not require any particular form of revolt; there are many alternatives to an armed uprising of workers. The theory predicts the conditions under which deadly protests, strikes, and insurrections are likely, but not who will be killed. As Engels (1895) pointed out in the 1890s, mass uprisings can defeat modern armies only through moral influence. Recent examples include the revolutions in Iran in 1979, the Philippines in 1986, and most of Eastern Europe in 1989. However, if the army remains loyal to the state, revolutions require organized political parties with (usually guerrilla) armies, e.g., Nicaragua in 1979, Zimbabwe in 1979, Cuba in 1959. We presume that a principal-agent relationship exists between the exploited and the rebels. These challenger parties (Tilly 1978) typically claim to represent the exploited, such as alliances of workers and peasants. The opposition political parties, which tend to be dominated by intellectuals, and the rebel armies, which often draw from the destitute in rural areas, need not be composed of workers or peasants to represent these groups. Revolutionaries are expected to draw support from the exploited, especially during crises.

by Taylor and Jodice (1983). Deaths were aggregated over the 1973 to 1977 period and weighted by the middle year (1975) population. To reduce the extreme skewness of this indicator, we followed Muller and Seligson (1987) by first establishing a ceiling of 50 deaths per million population and then added an increment of 1.0 to permit taking the natural logarithm (Dixon, Muller, and Seligson forthcoming). The daily events and all other World Handbook data used are from files distributed by the Inter-university Consortium for Political and Social Research (ICPSR). Neither the ICPSR nor the investigators who collected the data are responsible for our use or interpretation of them.

10 Although principal-agent relationships are fraught with problems of mobilization, compliance, and sub-goal optimization, resolving these problems is beyond the scope of this study. Our goal is to determine if the structural conditions of exploitation, crisis, and state repression result in increased rebel actions. Rebels may also claim to represent separatist ethnic or religious groups, which often are composed of workers or poor peasants. Their separatist conflict may also be a class conflict. Where separatism does not involve class conflict, Marx’s theory of rebellion does not apply. Rebellions occurring in countries with low exploitation rates are likely to be of ethnic or other nonclass origin.

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9 Our restricted definition requires that we create a measure from the World Handbook Daily Event collection rather than use the yearly totals compiled
Exploitation produces class conflict in two different ways and thus enters our model in two forms. One is a direct calculation of the exploitation rate for industrial workers for whom its meaning and impact are clearest. This measure is closest to the abstract conception of exploitation developed in Capital. We operationalize class exploitation of the industrial proletariat according to Marx’s formulation for calculating the rate of surplus value. Our measure is the ratio of total value added in the manufacturing sector to wages and salaries in the manufacturing sector. Because total value added includes wages and salaries, we subtract this amount from total value added before taking the ratio. The data is from the World Bank’s World Tables (1989), which list wages and salaries as a percentage of value added (WSPA). We calculated the exploitation rate by taking (1- WSPA)/WSPA for an average of the years 1970 through 1972. If data were not available to calculate a three-year average, we calculated the ratio for one or two years.

Our measure of class exploitation corresponds closely to its theoretical meaning (Elster 1978; Mandel 1975; Cuneo 1978; Wood 1986). Amsden (1981) demonstrated that a similar measure is conceptually consistent with Marxist theory, and Przeworski (1990, pp. 128–29) used a modified conceptualization for related purposes. However, the novelty and importance of the measure for Marxist theory suggest that the measure may be controversial. In some cases, oligopolistic pricing may distort the measure (see Appendix B on oil exporters). Some may consider the measure rather crude in that it does not exclude capital depreciation and investment from the numerator, or the income of unproductive earners and most taxes from the denominator. However, Amsden (1981) suggested that cross-national variation in these factors is probably not meaningful. Although some refinements in the measure may be desirable in principle, they are empirically impractical (Cuneo, 1978; Van Den Berg and Smith 1982, 1984). On the other hand, Elster (1978) argues against excluding investment, pointing out that control over the amount and kind of investment is the key element of owning capital. Even if all the net value added were invested (no capitalist consumption), the extent investment benefits workers is highly variable (such as investment in growth or public goods versus profitable but unproductive, luxury, or wasteful investment). Revolutionary socialist agents of the exploited are explicitly seeking control over investment.

We assume that the exploitation rate in all industries is similar to that in manufacturing. We would prefer a measure for all industries, but this is not available for enough countries. Moreover, because oligopolistic pricing is common in nonmanufacturing industries like oil and mining, the manufacturing rate may actually be a better indicator of labor exploitation.

Although Marx focuses on the industrial proletariat, his historical studies dealt with other proletarians as well as the secondary exploitation of peasants, artisans, and petty bourgeoisie. We have defined exploitation in general as unequal exchange resulting from the unequal

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11 Marx (1887) gives several examples of the calculation of exploitation rates. Compare this detailed example from a Manchester cotton mill to our measure. “First we will take the case of a spinning mill containing 10,000 mule spindles, spinning No. 32 yarn from American cotton, and producing 1 lb. of yarn weekly per spindle . . . . The raw materials therefore costs in round numbers £342 . . . . The wear and tear we put at 10%, or £1,000 yearly = £20 weekly. The rent of the building we suppose to be £300 a year, of £6 a week. Coal consumed . . . . amounts to about £41/2 a week; gas, £1 a week, oil, &c., £41/2 a week . . . . Therefore the constant portion of the value of the week’s product is £378. Wages amount to £52 a week. The price of the yarn is . . . £510. The surplus-value is therefore in this case £510 – £430 = £80. We put the constant part of the value of product = 0, as it plays no part in the creation of value. There remains £132 as the weekly value created, which = £52 var.+ £80 surpl. The rate of surplus-value is therefore 80/52 = 153 111/13%” (pp. 218–89).

Marx determined “value created,” by taking the price of the finished product and subtracting the cost of materials (constant capital). The definition of value added in our data is “the current value of gross output less the current cost of (a) materials, fuels, and other supplies consumed; (b) contract and commission work done by others; (c) repair and mainte-
distribution of assets. Asset income includes unearned income from profits, dividends, rents, and interest, but also salaries, bonuses, and benefits that accrue to capitalists, managers, landlords, administrators, or others above the income earned by contributing directly to production (Wright 1985). In practical terms, income inequality for most of the population in most societies results from individual differences in human capital and other factors — inequality in ownership of assets affects only the upper end of the income distribution. Therefore, we use income inequality measured by the proportion of national income held by the richest 20 percent of a country's population circa 1970 to estimate secondary exploitation. Our primary source of data is Muller and Seligson (1987), supplemented by data for Ecuador, Iran, Israel, Madagascar, Morocco, and Uganda from Chan (1989, pp. 61–62). Data from prior to 1960 was excluded.

Unfortunately, this measure of income inequality includes inequality from sources other than exploitation. Nevertheless, income concentration overrepresents unearned income, especially in agrarian societies — cross-national measures of land inequality and income concentration correlate at .754 (Boswell and Dixon 1990, p. 556). Moreover, exploitation that does not contribute to the concentration of income is less significant politically. Including income inequality in the model also provides a more rigorous test of the effects of the exploitation rate. Conversely, income inequality is purged of the direct effect of the exploitation rate.

The measure of market crisis is derived from estimates of real GDP per capita based on purchasing power parities. These estimates are expressed in 1980 international prices (dollars) and are adjusted for exchange rate irregularities and inflation. Our measure is the country's deviation from the mean GDP per capita growth rate for all countries between 1965 to 1975. This indicator is linearly equivalent to the economic growth rate (Boswell and Dixon 1990); we simply adjust its parameter estimate to conform to the interpretation of market crisis. That is, market crisis is the linear inverse of economic growth, with zero set at the international average. Of course, a crisis develops in the world-system over a longer term than our data allow. However, system-wide crises are highly uneven, and the effect on rebellion should be greatest in countries in which the crisis is severest; and vice versa, prosperity deter revolts, so variation above and below the worldwide mean is theoretically relevant.

The size of the proletariat is measured by the proportion of the workforce employed in industry in 1970 (World Bank 1989). Our measure of economic development is real GDP per capita in 1970 (Summers and Heston 1988) logged to correct for skewness. This measure reflects economic conditions as they are experienced by the population better than do input factors like energy consumption. Of course, the relative size of the industrial labor force and economic development are highly correlated (.88), and both variables are negatively correlated with rebellion. In previous research, development has an anomalous positive association net of inequality and repression, with which it is inversely associated. When variables are highly correlated, the choice of indicator involves a theoretical consideration (which variable has the best explanatory logic) and an empirical consideration (which variable has the greatest explanatory power). Marx's theory suggests that the larger the industrial labor force, the greater the effect on rebellion, net of the impact of industrial workers in increasing democracy and in reducing inequality and exploitation (especially during market crises). Empirically, then, the size of the industrial labor force is expected to have a positive association with rebellion, while economic development drops to insignificance after the exploitation measures are included in the equation.

Thus far, the model is additive, although the theory it tests makes nonadditive assumptions. Recall that the effects of the exploitation rate are expected to be severest during market crises, and market crises are most likely to precipitate rebellion if exploitation is high. This interactive relationship means that no single parameter estimate can summarize the overall effect of either variable because the effect of one variable varies according to the value of the other variable. Thus, we include an interaction term for market crises and class exploitation, which captures situations in which economic growth diminishes class conflict by increasing relative well-being and situations in which recessions intensify and politicize class conflict by making it more zero-sum.

We now turn to the three corollary factors. Working-class divisions play a complicated role.
in our model because our measure confounds two theoretically distinct and opposing influences on rebellious activity. We gauge the presence or absence of intense separatist movements (based largely on ethnic or tribal divisions circa 1975) by using the procedure developed by Muller and Seligson (1987) to transform the ordinal scale from Taylor and Jodice (1983) to a dummy variable. Intense separatism is not identical to working-class divisions, but the measure exposes the type of societal divisions that Marx expected to have a constraining effect on class-based rebellions. In addition, we expect intense separatist movements to foster ethnic or geographic rebellious activity, but for reasons external to Marx's theoretical concerns. Although these countervailing arguments suggest an empirical stalemate, previous research indicates that, on balance, separatism contributes to political violence and rebellion (Muller and Seligson 1987). Nevertheless, the confounding of these two theoretical arguments in a single indicator works to our advantage because we can control for the direct effect of separatism on rebellion while ensuring that those rebellions that satisfy the model's assumptions do so for the right reasons.

The second corollary factor controls for the deflection of class rebellions by the establishment of liberal democratic forms of government. Much has been written about the cross-national measurement of democracy so we need not discuss it in great detail (Bollen 1980; Bollen and Jackman 1989; Muller 1989). For our purposes, democracy must be measured broadly enough to encompass institutionalized political participation and the protection of civil rights and liberties because both dimensions have the inhibiting effect on rebellion discussed by Marx. Accordingly, we employ the 1973–1977 average annual rating on Gastil's seven-point scale of political exclusion and civil rights (Taylor and Jodice 1983). We reverse the scale so that high values represent greater democracy. Following Muller (1989), we also include a squared term to tap the mobilizing effect of limited democracy at the low end of the scale. This produces an inverted U-shaped relationship for the total effect. Although not part of traditional Marxist theory, this curvilinear relationship is predicted by the neo-Marxist theory of class compromise. Democratic states enforce a peaceful class compromise, authoritarian states enforce a repressive class paternalism, and states between these extremes face a violent "tug-of-war" (Przeworski 1985).

Finally, a heritage of revolt indicates experience, tradition, and an implicit consciousness of previous conflicts that contributes to current rebellions. It also indicates where stable class relations, such as a class compromise concerning economic growth or the establishment of democratic institutions, have not been easily implemented. The measure used is past (1968–1972) levels of the dependent variable, which of course also controls for the continuation of conflicts over time. Animosities from past conflicts may perpetuate violence into the current period, especially if the violence is mobilized by rebellious organizations, whether or not the original sources of conflict have dissipated. Direct measures of rebellious consciousness and organization and of the influence of organizations and revolts elsewhere are not available.

Some of our measures — income inequality, liberal democracy, working-class divisions, heritage of revolt — have been used by other scholars to support different theoretical interpretations. We give a Marxist interpretation to measures that may equally well support alternative interpretations, such as relative deprivation or resource mobilization. Nevertheless, our measures are adequate indicators of Marx's concepts. In any case, the various theories converge on some concepts. By including variables central to most previous research, our analysis can focus on the unique measures of class exploitation and market crisis that are central to Marx's theory. Means, standard deviations, and correlations for all variables in the analysis are presented in Table 1. Values of the exploitation measure for the 61 countries are presented in Appendix A.

ESTIMATION RESULTS

All analyses are ordinary least squares regressions over a sample of 61 nations for which all measures were available. Because our sample is limited to countries with available data, it
overrepresents industrialized nations and underrepresents Third World countries. Nevertheless, we believe the sample permits a direct comparison of Marx's theory with more conventional perspectives. It is with such a perspective that we begin.

Table 2 presents unstandardized coefficients and associated statistics for five ordinary least squares estimations. Model 1 estimates equation 1, excluding size of the industrial labor force, the exploitation rate, and the exploitation-market crisis interaction term. This abridged version of the model, apart from inconsequential scaling changes, represents the empirical core of an ongoing research program on political conflict. Model 1 is nearly identical to Boswell and Dixon's (1990, p. 548, Table 1) final result. It represents orthodox theories, and thus serves as a baseline for comparing estimations based on Marx's theoretical principles. Model 1 also exposes the key theoretical difficulty with past research — a substantial positive coefficient occurs for economic development.

Our main task, of course, is not replication of conventional models, but a new analysis in which class exploitation is the key component. Model 2 adds the size of industrial labor force and the exploitation rate to Model 1. With an estimated t-ratio of 1.7, exploitation alone is not a particularly robust addition to this model. Neither labor in industry nor economic development is significant. This is not surprising given their correlation with each other. All other estimates remain virtually unchanged.

Model 3 adds the interaction term for class exploitation and market crisis to Model 2. The interaction term is significant in this specification with an estimate well over the customary standard of twice the magnitude of its standard error (t-ratio = 3.0). Market crisis reverses signs with the introduction of the product term, though such dramatic effects are not common for constituent variables. Model 3 also reveals a substantial decline in the estimate for economic development to a level well below its standard error (t-ratio = 0.2), while it is the standard error that declines for industrial labor force (t-ratio = 1.4). This supports our speculation that previous analyses showing a positive contribution of economic development to rebellion and other political violence may have been tapping the effects of the size of the industrial proletariat when taking proper account of its negative association with exploitation and the nonadditive effects of class exploitation and market crises.
Table 2. Unstandardized OLS Coefficients for Regression of Deaths from Violent Rebellion, 1973–1977, on Selected Independent Variables: 61 Countries

<table>
<thead>
<tr>
<th></th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
<th>Model 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class exploitation</td>
<td>-.24</td>
<td>.24</td>
<td>.25</td>
<td>.27</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(1.7)</td>
<td>(1.8)</td>
<td>(2.0)</td>
<td>(1.8)</td>
<td></td>
</tr>
<tr>
<td>(Class exploitation $\times$ market crisis)</td>
<td>- -</td>
<td>.18</td>
<td>.19</td>
<td>.15</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(3.0)</td>
<td>(3.1)</td>
<td>(2.2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percent of labor in industry</td>
<td>-.02</td>
<td>.03</td>
<td>.03</td>
<td>.03</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(1.1)</td>
<td>(1.4)</td>
<td>(2.6)</td>
<td>(1.9)</td>
<td></td>
</tr>
<tr>
<td>Income inequality</td>
<td>.04</td>
<td>.04</td>
<td>.04</td>
<td>.04</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(2.2)</td>
<td>(2.4)</td>
<td>(2.7)</td>
<td>(2.8)</td>
<td>(2.0)</td>
</tr>
<tr>
<td>Market crisis</td>
<td>.08</td>
<td>.09</td>
<td>-.35</td>
<td>-.36</td>
<td>-.23</td>
</tr>
<tr>
<td></td>
<td>(1.6)</td>
<td>(1.7)</td>
<td>(-2.3)</td>
<td>(-2.4)</td>
<td>(-1.4)</td>
</tr>
<tr>
<td>Economic development (log)</td>
<td>.49</td>
<td>.22</td>
<td>.05</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>(2.7)</td>
<td>(0.8)</td>
<td>(0.2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Liberal democracy</td>
<td>.93</td>
<td>.75</td>
<td>.93</td>
<td>1.07</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(2.2)</td>
<td>(1.8)</td>
<td>(2.3)</td>
<td>(2.3)</td>
<td>(2.4)</td>
</tr>
<tr>
<td>(Liberal democracy)$^2$</td>
<td>-.12</td>
<td>-.09</td>
<td>-.11</td>
<td>-.11</td>
<td>-.12</td>
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<tr>
<td></td>
<td>(-2.5)</td>
<td>(-1.9)</td>
<td>(-2.3)</td>
<td>(-2.3)</td>
<td>(-2.4)</td>
</tr>
<tr>
<td>Intense separatism</td>
<td>1.06</td>
<td>1.00</td>
<td>1.06</td>
<td>1.38</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(3.3)</td>
<td>(3.1)</td>
<td>(3.5)</td>
<td>(3.6)</td>
<td>(4.3)</td>
</tr>
<tr>
<td>Deaths from violent rebellion, 1968–1972 (log)</td>
<td>.35</td>
<td>.36</td>
<td>.42</td>
<td>.42</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>(3.1)</td>
<td>(3.1)</td>
<td>(3.9)</td>
<td>(3.9)</td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>-.641</td>
<td>-.548</td>
<td>-.494</td>
<td>-.466</td>
<td>-.406</td>
</tr>
<tr>
<td></td>
<td>(-3.7)</td>
<td>(-2.9)</td>
<td>(-2.8)</td>
<td>(-4.4)</td>
<td>(-3.4)</td>
</tr>
<tr>
<td>Adjusted R$^2$</td>
<td>.465</td>
<td>.477</td>
<td>.548</td>
<td>.556</td>
<td>.434</td>
</tr>
<tr>
<td>F-ratio</td>
<td>8.43</td>
<td>7.09</td>
<td>8.27</td>
<td>9.36</td>
<td>6.75</td>
</tr>
</tbody>
</table>

*Note: Numbers in parenthesis are t-ratios.*

Model 4 omits the economic development indicator to get an unobstructed view of our theoretical landscape. After examining various diagnostic indicators, we are generally satisfied with the stability of these estimates (see Appendix B). Coefficients for the corollary factors — liberal democracy, intense separatism, and prior violence — are relatively stable. More important, in the absence of the economic development variable, the coefficient for the industrial labor force achieves significance. The interaction term remains significant (t-ratio = 3.1), indicating a nonadditive relationship consistent with Marx's argument that the effects of exploitation on rebellion are exacerbated by market crises. The estimate for the class exploitation rate also becomes robust. The negative coefficient for market crises is inconsequential, because the introduction of a product term necessarily changes the interpretation of these estimates so that they now describe conditional relationships.

The conditional effect of exploitation depends on market crisis and is given by the expression $.25 + .19$(of a value on the market crisis measure). Similarly, the effect of market crisis now is $.36 + .19$(of a value for class exploitation). Clearly, the estimated coefficients for each of these variables in Model 4 apply only when the other variable assumes a value of zero. For exploitation, the estimated parameter of $.25$ is substantively meaningful. Our market crisis measure is scaled such that a value of 0 is roughly equivalent to economic growth at the international average; under conditions of average growth or better (i.e., negative values on the market crisis measure), the impact of exploitation on rebellion is marginal. But what of slower than average growth rates? At one standard deviation above the mean for market crisis (i.e., one standard deviation below the average growth rate), the conditional estimate for exploitation is $.73$ (t-ratio = 3.7). Thus, exploitation is an important determinant of rebellion during severe market crises.

Similarly, the coefficient for the market crisis variable (−.36) in Model 4 applies only when the exploitation rate is 0 (no nations in our sample have 0 rates). When class exploitation is low, a market crisis has a slightly conservative or negligible effect on rebellion. As class exploitation increases, however, the estimate for market crisis switches signs and becomes positive. At one standard deviation above the mean exploitation rate, the coefficient for the market crisis variable is $.19$ (t-ratio = 3.2). Again, this result is consistent with theoretical propositions derived from Marx's theory of class rebellion: The larger and more exploited the working class, the more people killed while rebelling against the state — an effect that is multiplied during times of economic crisis.

Finally, Model 5 drops the lagged dependent variable, our measure of a heritage of rebellion. Theoretically, this term captures a source of rebellious consciousness. Statistically, the inclusion of the lagged number of deaths establishes a panel model that focuses attention on changes in rebellion over time rather than the levels prevailing during the 1973–1977 period. Failure to include it opens the analysis to suspicions of
reverse causality. Model 4 thus provides both a statistically conservative estimation and a theoretically appealing emphasis on change. Nevertheless, it is also reasonable to examine a level-based specification, particularly in light of the consistently strong estimates found for the lagged term. Model 5 shows the expected decline in overall fit, but all other estimates are comparable to our main results (Model 4). Moreover, estimations omitting lagged deaths from Models 1 through 3 (not shown) reveal the same general patterns as those shown in Table 2.

DISCUSSION

Does our measure of violent rebellion — deaths from political protests against the state — adequately capture rebellions of political significance? Although space does not permit a detailed discussion of historical circumstances, we can offer a few observations. Nations with the highest levels of rebellion in the 1973–1977 period include Nicaragua and Zimbabwe, which were soon engulfed in revolutions; Bolivia, the Philippines, and Peru, which faced violent rebellions by explicitly revolutionary socialist organizations; and Argentina and Chile, where resistance to the state was particularly deadly. Other countries with high numbers of deaths include the Sudan and Sri Lanka, which endured separatist civil wars.

Of these countries, Nicaragua, Peru, the Philippines, and Chile are among the top five on the measure of class exploitation (see Appendix A). Class exploitation in Argentina is not as high, but it has a relatively large industrial labor force. Iran has a conspicuously high exploitation rate and although the number of deaths is not especially high in our observation period, it subsequently underwent a significant social revolution. Also note that in our model, the impact of class exploitation on rebellion depends on the state of the market. Sudan and Sri Lanka, which have relatively small industrial labor forces, experienced separatist revolts not predicted by Marx’s theory.

Amongdeveloped countries, Japan has a relatively high exploitation rate, but Japan has a lower level of income inequality than most industrialized countries. The Scandinavian countries and the British Commonwealth, which have strong labor movements, have some of the lowest exploitation rates. As Amsden (1981) noted, exploitation appears to have a curvilinear relationship with economic development — exploitation is highest among the industrializing countries that must absorb peasants into the labor market and whose workers lack unions and political rights.

Surprisingly, Hungary has an exceptionally high rate of exploitation (over twice that found in the United States). Although missing data on other variables excludes Poland from our data set, its exploitation rate for the mid-1970s was similar to Hungary’s. In principle, these state socialist countries could return the surplus value to workers, thus claiming not to exploit workers in the long run — a claim workers found dubious at least by the 1980s. While the state socialist countries had low income inequality and an absence of mobilizing liberal democracy, their high exploitation rates may indicate an underlying unrest that only surfaced during the economic crisis of the late 1980’s (Boswell and Peters 1990)

Income inequality, when taken net of the exploitation rate, roughly captures the exploitation of nonindustrial workers, especially peasants, artisans, and the petty bourgeoisie — what Marx called “the struggle against capital’s secondary modes of exploitation, that of the peasant against usury and mortgages or of the petty bourgeois against the wholesale dealer, banker and manufacturer, in a word, against bankruptcy” (Marx 1850a, p. 214). In many countries, of course, these “secondary” struggles make up the vast bulk of rebellions. Although consistent with Marx’s theory, revolts by peasants and the petty bourgeoisie are not central to his theory. By drawing on Roemer’s (1982, 1988) theory of asset exploitation, we have attempted to construct a more general theory of exploitation and revolt.

Note that the effects of income inequality are robust in all models, despite the inclusion of measures of exploitation, market crisis, and their interaction, along with the effects of a liberal democratic government. This result is the opposite of Lichbach’s (1990) prediction: “If one controls for economic growth and government repression rather than leaving these factors uncontrolled, then one will more likely discover that inequality does not lead people to rebel” (p. 1068). Lichbach expected no effect of inequality, domination or exploitation, because he claimed that rational actors only chose to rebel when rebellion is likely to in-
crease their income or wealth, regardless of the initial level of inequality (p. 1073). Although this is an important insight into the inequality-conflict nexus, his game theory analysis ignores the fact that rebels may increase their income or wealth through the confiscation of property (but see Lichbach 1990, p. 1074, note 9). To the extent that conflict generated by inequality concerns confiscation of income-producing assets, our conceptualization that income inequality reflects secondary exploitation is supported.

Finally, the curvilinear effect of liberal democracy established in previous research is not directly included in Marx’s theory. On the contrary, a linear relationship is more consistent with Marx’s logic, i.e., repressive states should experience more deaths from violent rebellion. The importance of the absence of liberal democracy in explaining revolts against the state is not surprising — by definition, rebels seek to change the state. Numerous authors have argued that the state is more important in rebellions than Marx had assumed (Tilly 1978; Skocpol 1979) and that class struggles over exploitation become electoral issues in democracies (Przeworski 1980, 1985; Korpi 1983). Both points are consistent with the proposition from the theory of class compromise and they are important revisions to the original Marxist model. Nevertheless, our findings regarding exploitation suggest a resilience in the core of Marx’s original model that recent research has neglected.

CONCLUSIONS

The first conclusion to draw from this analysis is that based on contemporary standards of scientific evidence it is premature to dismiss Marx’s theory of rebellion. Although our study is not crucial in a scientific sense — we examined a limited sample of countries in the mid-1970s — our evidence is well within accepted standards for cross-national research and the findings are striking.

Marx’s theory and more conventional approaches converge on several points, differing only in nuance. For example, relative deprivation theory has produced solid research on the role of economic inequality in fomenting political violence (Davies 1962; Gurr 1970; Lichbach 1989). Our reading of Marx’s theoretical work also emphasizes inequality, although less as an indication of deprivation than of exploitation. However, our measure of income inequality does not distinguish between a Marxist interpretation and a relative deprivation interpretation (an appropriate agenda for future research).

Similar observations apply to the repression/liberal democracy measure. Muller (1985, 1986) interpreted the inverted U-shaped relationship in terms of resource mobilization theory: Democracy allows the nonviolent expression of grievances while a highly repressive state blocks the opportunities for violence. Marx focused only on the expression of grievances. While his linear prediction can be rejected, the idea that moderately repressive states cannot enforce stable class relations, which derive from neo-Marxist theory, also predicts an inverted U-shaped curve. These differences are important theoretically and require empirical adjudication. Comparison of Marxist theory with alternative theories where the concepts overlap awaits development of more discriminating measures.

We should emphasize that the difference in theories is not all a matter of nuance and interpretation. One point on which Marx differed markedly from other perspectives is on the role of class exploitation. Our analysis of class exploitation distinguishes this study from others in the conflict tradition and indicates that rebellions occur as a result of conditions predicted by Marx more than a century ago — class exploitation produces revolts during market crises.

Contemporary research on class compromise in industrial societies and agrarian societies provides an expanded and updated rationale for the core Marxist argument that class conflict becomes militant and potentially rebellious when exploitation rates are high and rates of economic growth are low. In such cases, compromise is lacking, capitalists will likely be opportunistic, and workers’ best strategy is maximum militancy. Because the state is responsible for enforcing the implicit social contract and maintaining economic growth, this provides an additional rationale for the proposition that class conflict is directed toward the state during market crises. Exploitation in conjunction with market crises not only produces discontent and frustration, the combination mobilizes class actors to make economic claims on the state.
Marx’s theory helps explain the frequent but perplexing finding of a net positive effect of economic development on violent rebellion. Most conventional approaches see economic development inhibiting domestic conflict and regard a net positive effect as inexplicable. Marx, on the other hand, predicted a positive effect because economic development creates the industrial proletariat and the conditions for its organization. Our analysis supports this interpretation — the positive effect of economic development declines while the effect of size of the industrial labor force is enhanced, net of class exploitation and other variables. Thus, revolt in the developed countries was extinguished by the organized power that economic development confers on the working class. Workers use this power to limit exploitation and inequality and to exercise democratic rights. To be sure, market crises may generate dissatisfaction in developed countries, but the crises have an incendiary effect only in countries in which exploitation provides the fuel.

Cross-national research on Marx’s theoretical concerns has been impeded by a tradition that rarely creates operational models or quantitative measures of concepts like exploitation. Research on other possible effects of class exploitation, such as its relationship to inequality, quality of life, economic growth, or state repression, are warranted. Quantitative cross-national research suffers from problems of comparability and aggregation, and it often can only establish the general social parameters within which events occur. Understanding the particular events requires detailed historical research. Yet comparative historical research suffers from small and often biased samples that defy statistical scrutiny, and it often fails to establish general social parameters. Quantitative cross-national research and historical case studies should be complementary. Such complementary research is especially important for connecting middle-range theories to grand theories. It would also open up a little explored but fruitful avenue for examining the contemporary relevance of Marx’s theory. Exploitation was exceptionally high in the state socialist countries of Eastern Europe, so the contemporary relevance of Marx’s theory may be greatest for countries where it is least expected.

**Terry Boswell** is Associate Professor of Sociology at Emory University. Related publications include Revolution in the World-System (Greenwood, 1989). His current research examines the relationship of exploitation to inequality and injustice. Additional research projects include a historical comparison of class and racial conflict in the United States and a time-series analysis of the rise and fall of Dutch hegemony.

**William J. Dixon** is Associate Professor of Political Science at the University of Arizona. His current research interests include domestic political violence and revolution, and international conflict and conflict management procedures. He is currently studying conflict resolution among democratic states.

### Appendix A: Class Exploitation Rate (1970–1972) and Deaths from Violent Rebellion (1973–1977) for Countries in the Analysis

<table>
<thead>
<tr>
<th>Country</th>
<th>Class Exploitation</th>
<th>Deaths From Violent Rebellion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Argentina</td>
<td>2.382</td>
<td>28.25</td>
</tr>
<tr>
<td>Australia</td>
<td>.869</td>
<td>.00</td>
</tr>
<tr>
<td>Barbados</td>
<td>.827</td>
<td>.00</td>
</tr>
<tr>
<td>Belgium</td>
<td>1.120</td>
<td>.00</td>
</tr>
<tr>
<td>Bolivia</td>
<td>1.313</td>
<td>22.74</td>
</tr>
<tr>
<td>Brazil</td>
<td>3.207</td>
<td>.18</td>
</tr>
<tr>
<td>Canada</td>
<td>.908</td>
<td>.00</td>
</tr>
<tr>
<td>Chile</td>
<td>3.225</td>
<td>50.00</td>
</tr>
<tr>
<td>Colombia</td>
<td>3.155</td>
<td>1.85</td>
</tr>
<tr>
<td>Costa Rica</td>
<td>1.394</td>
<td>.00</td>
</tr>
<tr>
<td>Denmark</td>
<td>.753</td>
<td>.00</td>
</tr>
<tr>
<td>Ecuador</td>
<td>2.731</td>
<td>4.80</td>
</tr>
<tr>
<td>Egypt</td>
<td>.942</td>
<td>1.49</td>
</tr>
<tr>
<td>El Salvador</td>
<td>2.917</td>
<td>5.11</td>
</tr>
<tr>
<td>Finland</td>
<td>1.033</td>
<td>.00</td>
</tr>
<tr>
<td>Gabon</td>
<td>1.494</td>
<td>.00</td>
</tr>
<tr>
<td>Germany, W.</td>
<td>1.122</td>
<td>.28</td>
</tr>
<tr>
<td>Ghana</td>
<td>3.511</td>
<td>.10</td>
</tr>
<tr>
<td>Honduras</td>
<td>1.688</td>
<td>4.61</td>
</tr>
</tbody>
</table>

Continued on next page

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13 Przeworski and Wallerstein (1982) claimed that "workers are better off struggling to increase their certainty that a compromise would hold rather than seeking to improve the terms of a less than certain compromise. They are better off competing for political power than making deals with capitalists" (p. 231).
<table>
<thead>
<tr>
<th>Country</th>
<th>Class Exploitation</th>
<th>Deaths From Violent Rebellion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hungary</td>
<td>2.802</td>
<td>.00</td>
</tr>
<tr>
<td>India</td>
<td>.858</td>
<td>.33</td>
</tr>
<tr>
<td>Indonesia</td>
<td>3.103</td>
<td>.07</td>
</tr>
<tr>
<td>Iran</td>
<td>3.050</td>
<td>1.31</td>
</tr>
<tr>
<td>Israel</td>
<td>1.732</td>
<td>2.34</td>
</tr>
<tr>
<td>Italy</td>
<td>1.349</td>
<td>.76</td>
</tr>
<tr>
<td>Ivory Coast</td>
<td>2.827</td>
<td>.00</td>
</tr>
<tr>
<td>Jamaica</td>
<td>1.340</td>
<td>1.97</td>
</tr>
<tr>
<td>Japan</td>
<td>1.970</td>
<td>.08</td>
</tr>
<tr>
<td>Kenya</td>
<td>.984</td>
<td>.00</td>
</tr>
<tr>
<td>Korea, S.</td>
<td>3.179</td>
<td>.23</td>
</tr>
<tr>
<td>Madagascar</td>
<td>1.582</td>
<td>2.62</td>
</tr>
<tr>
<td>Malawi</td>
<td>1.786</td>
<td>.00</td>
</tr>
<tr>
<td>Malaysia</td>
<td>2.405</td>
<td>2.98</td>
</tr>
<tr>
<td>Mexico</td>
<td>1.521</td>
<td>2.38</td>
</tr>
<tr>
<td>Morocco</td>
<td>1.188</td>
<td>.00</td>
</tr>
<tr>
<td>Netherlands</td>
<td>.916</td>
<td>.96</td>
</tr>
<tr>
<td>New Zealand</td>
<td>.608</td>
<td>.00</td>
</tr>
<tr>
<td>Nicaragua</td>
<td>5.072</td>
<td>25.45</td>
</tr>
<tr>
<td>Norway</td>
<td>.882</td>
<td>.00</td>
</tr>
<tr>
<td>Panama</td>
<td>2.122</td>
<td>.00</td>
</tr>
<tr>
<td>Peru</td>
<td>3.878</td>
<td>9.53</td>
</tr>
<tr>
<td>Philippines</td>
<td>3.762</td>
<td>50.00</td>
</tr>
<tr>
<td>Portugal</td>
<td>1.623</td>
<td>1.83</td>
</tr>
<tr>
<td>South Africa</td>
<td>1.165</td>
<td>15.45</td>
</tr>
<tr>
<td>Spain</td>
<td>.933</td>
<td>3.73</td>
</tr>
<tr>
<td>Sri Lanka</td>
<td>2.100</td>
<td>.07</td>
</tr>
<tr>
<td>Sudan</td>
<td>2.337</td>
<td>33.01</td>
</tr>
<tr>
<td>Sweden</td>
<td>.917</td>
<td>.48</td>
</tr>
<tr>
<td>Tanzania</td>
<td>1.437</td>
<td>.00</td>
</tr>
<tr>
<td>Thailand</td>
<td>3.065</td>
<td>18.10</td>
</tr>
<tr>
<td>Trinidad &amp; Tobago</td>
<td>1.469</td>
<td>.00</td>
</tr>
<tr>
<td>Tunisia</td>
<td>1.297</td>
<td>.00</td>
</tr>
<tr>
<td>Turkey</td>
<td>2.745</td>
<td>.30</td>
</tr>
<tr>
<td>Uganda</td>
<td>1.538</td>
<td>2.73</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>.916</td>
<td>7.34</td>
</tr>
<tr>
<td>United States</td>
<td>1.168</td>
<td>.02</td>
</tr>
<tr>
<td>Uruguay</td>
<td>1.941</td>
<td>2.90</td>
</tr>
<tr>
<td>Venezuela</td>
<td>2.250</td>
<td>.74</td>
</tr>
<tr>
<td>Yugoslavia</td>
<td>1.611</td>
<td>.00</td>
</tr>
<tr>
<td>Zambia</td>
<td>2.152</td>
<td>.20</td>
</tr>
<tr>
<td>Zimbabwe</td>
<td>1.347</td>
<td>50.00</td>
</tr>
</tbody>
</table>

Appendix B: Regression Diagnostics and Specification

Regression on cross-national samples such as ours requires careful consideration of collinearity, influential cases, and other potential problems. In this appendix we detail our diagnostic procedures and, where appropriate, present alternative estimators.

Excessive collinearities among independent variables can hinder interpretation by producing large variances for OLS estimates. Consistently high t-ratios for key variables in Models 4 and 5 indicate little problem with collinearity degradation. One possible exception occurs in the overlap between economic development and labor in industry, both of which fail to achieve stable estimates in Model 3. When development is dropped in Model 4 the labor term becomes significant; likewise, in an estimation not shown, when labor is dropped and development retained the latter also becomes significant (t-ratio = 2.1). Although there is some improvement in fit with the labor specification (R² = .556 rather than .538), ultimately the choice between these terms must be made on theoretical grounds rather than statistical ones. For reasons argued in the text we believe that labor in industry is appropriate from a theoretical perspective emphasizing exploitation.

Another problem commonly encountered with cross-sectional data is heteroscedastic disturbances. Using a battery of standard tests, we did detect the presence of some heteroscedasticity in Model 4. To correct for this problem we carried out a Weighted Least Squares (WLS) estimation with a weight diagonal consisting of the square-root of the absolute OLS predicted values. Results are displayed in the first column of Table B-1. The WLS residuals show little sign of any remaining heteroscedasticity (all χ² tests are below the critical value of 16.9 for 9 d.f.). Moreover, the WLS estimates and t-ratios retain the same general pattern seen in the OLS results in Model 4.

To ensure that final estimates were not determined by just a few influential observations, we also examined partial plots and DFFITS diagnostics (Belsely, Kuh, and Welsch 1980; Bollen and Jackman 1985). Although assessment of partial plots is necessarily judgmental, the DFFITS index requires an apriori cut point. A case was considered potentially influential if its omission yielded a change in fit greater than the standard error of fitted values (i.e., a DFFITS value of 1.0), a criterion about midway between other recommended cut points (Vellman and Welsch 1981). Three countries exceeded the DFFITS criterion: Chile, Ghana, and Sri Lanka. Examination of residuals and data values for these cases and a few others identified on the partial plots revealed no obvious cause for concern, though some do exhibit extreme values on at least some variables. Having no theoretical or substantive reason to remove these cases, however, we elected to retain them in the main analysis of Table 2 (Bollen and Jackman 1985).

The usual corrective to potentially influential cases is to remove them from subsequent estimations. Although we did experiment with this approach (finding no consequential changes in our estimates) we do not regard it as an entirely satisfactory method since it typically results in new sets of influential cases, tempting one to simply iterate the
procedure until influential cases finally disappear. An alternative response is to constrain the influence of cases within acceptable bounds using WLS, thus creating a bounded influence estimator (BIE). A simple two-step version uses the DFFITS value from an OLS estimation to construct a weight of 1 for \(|\text{DFFITS}| \leq i\) and equal to \(i/\text{DFFITS}\) for \(|\text{DFFITS}| > i\). For our bounded influence estimates we follow Welsch (1980) by setting \(i = .34\) to establish a fairly conservative bound on potential influence. (This procedure diminishes the influence of 26 cases with weights ranging from .144 to .986. Note that higher values of \(i\) reweight fewer cases and produce results closer to the unbounded OLS estimates). Bounded influence estimates for Model 4 are displayed in the second column of Table B-1 under the label BIE. These estimates remain consistent with the OLS results in every respect and show no sign of any persisting influential cases.

Another alternative for dealing with influential cases is to apply a "robust" estimator such as the Least Absolute Error (or Least Absolute Deviation) procedure. Robust estimators also accommodate nonnormal distributions of residuals, a property that Dietz, Frey, and Kalof (1987) identify as common to many cross-national samples. (OLS estimation does not require normally distributed residuals, though this assumption is often made to facilitate hypothesis testing.) Accordingly, we reestimated Model 4 using the LAE procedure. In every case the robust LAE estimates in the third column of Table B-1 parallel the parametric estimates.

Finally, we considered whether oligopolistic pricing of oil might artifactually inflate value added in petroleum related industries, thus over-estimating the rate of exploitation. This concern was reinforced by discovering several oil producing countries among those identified as potentially influential cases. To explore this issue in at least a provisional way, we added a dummy variable to Model 4 coded one for countries judged to be heavily reliant on petroleum related exports (Gabon, Iran, Trinidad, and Venezuela). This specification, which is presented in the fourth column of Table B-1, produced a significant negative coefficient for the dummy variable though the estimates and \(t\)-ratios for exploitation, and the exploitation-crisis interaction term were not strongly affected. While our conclusions are not affected, these results do suggest the need for a method to deflating the value added for oil producers.

In summary, none of the diagnostic procedures or alternative estimators examined here suggest that our main results or the substantive conclusions drawn from them are based on serious violations of standard OLS assumptions.

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**Table B-1. Alternative Estimates (\(t\)-ratios) for Model 4 in Table 1**

<table>
<thead>
<tr>
<th>Variable</th>
<th>WLS</th>
<th>BIE</th>
<th>LAE(^a)</th>
<th>Oil</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class exploitation</td>
<td>.35</td>
<td>.29</td>
<td>.32</td>
<td>.31</td>
</tr>
<tr>
<td>(Class exploitation (\times) Market crisis)</td>
<td>(.26)</td>
<td>(.27)</td>
<td>(.53)</td>
<td>(.26)</td>
</tr>
<tr>
<td>Percent of labor in industry</td>
<td>.05</td>
<td>.03</td>
<td>.02</td>
<td>.05</td>
</tr>
<tr>
<td>Income inequality</td>
<td>(3.0)</td>
<td>(2.7)</td>
<td>(3.7)</td>
<td></td>
</tr>
<tr>
<td>Market crisis</td>
<td>(-4.7)</td>
<td>(-3.7)</td>
<td>(-3.4)</td>
<td>(-2.2)</td>
</tr>
<tr>
<td>Liberal democracy</td>
<td>1.12</td>
<td>.82</td>
<td>1.19</td>
<td>.94</td>
</tr>
<tr>
<td>(Liberal democracy(^2))</td>
<td>(-2.4)</td>
<td>(-2.6)</td>
<td>(-5.9)</td>
<td>(-2.5)</td>
</tr>
<tr>
<td>Intense separatism</td>
<td>1.17</td>
<td>1.23</td>
<td>1.56</td>
<td>1.23</td>
</tr>
<tr>
<td>Deaths from violent rebellion, 1968–1972 (log)</td>
<td>(.40)</td>
<td>(.49)</td>
<td>(.11)</td>
<td>(.43)</td>
</tr>
<tr>
<td>Oil exporters</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>-1.22</td>
</tr>
<tr>
<td>Constant</td>
<td>(-6.82)</td>
<td>(-4.23)</td>
<td>(-4.43)</td>
<td>(-4.98)</td>
</tr>
<tr>
<td>Adjusted (R^2)</td>
<td>.452</td>
<td>.654</td>
<td>.564(^b)</td>
<td>.607</td>
</tr>
</tbody>
</table>

\(a\) \(t\)-ratios may not conform to the standard \(t\) distribution. They are presented to facilitate comparison of estimates to standard errors.

\(b\) Defined as correlation between predicted and actual values, not adjusted for degrees of freedom.

**Estimators:**

- WLS = Weighted Least Squares (weights based on OLS predicted values)
- BIE = Bounded Influence Estimates (weights based on OLS DFFITS values)
- LAE = Least Absolute Error estimates
- Oil = OLS including oil exporter dummy variable

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**REFERENCES**


MARX’S THEORY OF REBELLION