
The Enterprise of Fire Safety Services in Lagos, Nigeria

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JOHN M. COBIN

Lagos State must surely rank among the ugliest large urban centers in the world. The city is filthy and dingy. Litter is strewn on nearly every street and roadway, and almost everyone litters without shame. Smoke rises incessantly from vehicle exhaust and trash fires. Rusty signs, often badly in need of repainting, are commonplace. A clean bathroom with soap and running water is considered a marvel.¹ On top of all of this, the area is incredibly hot and humid, especially in the dry season, with 100 percent humidity and temperatures of 30 to 35 degrees Centigrade, making life very unpleasant. Fans and air conditioners are wonderful, at least when there is electricity to run them. The power goes out many times during the day because the state-run facility simply cannot cope with demand. Nigeria is still plagued by yellow fever and malaria, too, and is one of

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1. People have little concept of sanitation and the importance of refrigeration. Indeed, inhabitants' ignorance is one of the more pernicious parts of life in Lagos. I found a woman selling gutted rats and mice tied on little sticks, which she said were good as medicine, although I am not sure exactly how. Whole vermin are apparently taken internally. Bathrooms are a hygiene hazard and are very filthy almost without exception outside of five-star hotels and a few of the decent miniature malls. Even though Lagos has no shortage of water, bathrooms usually do not provide any running water. Some have small barrels or tanks of water near the toilet bowl. There is certainly no soap in the bathrooms. Houses, not surprisingly, are bug ridden and have their occasional resident lizards as well. Lizards probably do well in keeping down the bug population, and the foot-long orange-headed ones add occasional flair to otherwise dull walls, so some might consider them to be a positive externality.

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the few countries left in the world that continues to have a problem with polio. Nigeria is certainly part of the Third World.

Most Lagos State buildings are dingy and poorly built, especially outside of the relatively better Ikoyi, Victoria Island, and Lekki Peninsula sections that house the upper class. Even the downtown area on Lagos Island is grimy, with largely deteriorated buildings surrounded by hordes of shantytown markets. But even in the nicer sections, there seems to be scant concept of neighborhood cooperation. More often than not, filth and ugliness surround even the nicer homes. Upper-class people find a haven in their homes and gardens, which serve as islands in an otherwise pathetic and intolerable city. These nicer areas have standard supermarkets; I visited exactly five decent ones (if the new Goodies store in Ikeja is counted). There are a couple of miniature malls with clean bathrooms that are reminiscent of those in the First World. It is a drop of the First World in the midst of the Third World, yet prices are at least double those found in the First World.

Unlike in many large cities, the streets in Lagos are not generally lined with trees and grass, even though it is equatorial and thus has plenty of rainfall and could easily support plant life. The few parks that exist are found next to noisy and congested off-ramps. Many unfinished cement block buildings add to the overall ugliness, standing several stories tall and blighting every area of the city. If one word can be used to describe market activity and residential and business neighborhoods, it would be *disorder*. That is not to say that markets do not work. It means rather that the state has failed to provide services properly, distorting the benefits of markets that one sees in other places, and that the markets that do exist have produced unsavory results owing to intervention and corruption.

Traffic jams and general congestion are the worst I have experienced in visits to sixty-eight countries. A thirty-kilometer commute can take as much as three hours in the morning and require the same penalty again in the evening. Highways are lined with informal salesmen who vend phone cards, water, bacteria-laden meat and shrimp (simmering in the hot sun), snacks, watches, mirrors, cushions, irons, sunglasses, cotton swabs, magazines, beverages, and almost anything else you can imagine. These obstacles, along with untold numbers of people scampering across the highway, make one's driving experience highly stressful. Horns are used at least as much as brakes so that cars can pass safely without being rammed. In sum, driving is pure chaos.²

Wastewater ditches line nearly every street, and men can often be seen urinating into them. Otherwise, the men find a convenient wall, many of which are painted with instructions not to urinate there. Temporary huts and older buildings are infested with small businesses on nearly every road in the metropolitan area. The government supplies power, but the power can easily go out ten to twenty

2. There mercifully are hardly any stray dogs and cats, as is the case in many underdeveloped cities—simply because, I was informed, some Nigerians eat dogs and cats.

times per day. When the lights fail, people start up myriad portable generators to keep computers, phones, lights, and refrigerators working, even if irons and air conditioners cannot function.

In short, Lagos is a chaotic, trash-ridden, ugly, dirty, smoky, and incredibly congested metropolitan area of more than 7 million people. Akaehomen Ibhadode, a renowned author and professor of manufacturing engineering at the University of Benin, hit the nail on the head when he said: “I weep for Nigeria each time I visit foreign countries” (Aliu 2011). Lagos is not a desirable place to live, so it has attracted little or no foreign immigration from the First World (other than that required by work), although it has received a massive influx of Nigerian poor.

In this essay, I examine one of the central concerns of such overwhelming congestion characterized by out-of-control development, high population, and extreme poverty: fire. More specifically, I look at the enterprise of fire safety services in Lagos: Who provides them, and how well are they provided? At the heart of these questions is the issue of who can best provide them: the government or private enterprises? My research indicates that private initiatives seem to have had more success.

Ignorance of Building Rules in Lagos

Many people I spoke to mentioned that Nigerians do not follow the rules for building. Yet the critics themselves admit that they do not know what the rules are. How can a citizen be expected to know the legislation and follow the rules when he has no idea what they are? A copy of the national building code is *not* available in libraries or online. It can only be special ordered at an exorbitant cost of nearly U.S.\$80. The state rules are scarcely available, but copies can be obtained by visiting the Gazette Office (printing office) in the state government building complex. The state code is certainly not within easy reach of common citizens, either. Furthermore, professional organizations do not have a copy of either of these codes. Even nine places in the Lagos area that one might expect to have copies of the national and state building codes do not have them:³

1. Nigerian Society of Engineers⁴
2. Nigerian Institute of Building⁵
3. Council of Registered Builders of Nigeria⁶

3. I personally visited these places and consulted their managements between January 27, 2011, and February 8, 2011.

4. Located at Engineering Close, off Idowu Taylor Street, Victoria Island, Lagos.

5. Located at Games Village, off Bode-Thomas Street, Surulere, Lagos (note: the director did have a personal photocopy of the 2005 *Lagos State Code* and the draft of proceeding that would later be used to produce the 2010 regulations).

6. Located at Games Village, Bishop Thomas Street, off Bode-Thomas Road, Surulere, Lagos.

4. Lagos State Development and Property Corporation⁷
5. Nigerian Institute of Architecture⁸
6. Council for the Regulation of Engineering in Nigeria⁹
7. National Library of Nigeria, Yaba, Lagos¹⁰
8. Nigerian Law School, Victoria Island, Lagos
9. British Council Library (for preindependence codes)¹¹

Quality of Buildings and Fire Hazards in Lagos State

The quality of construction in Lagos State generally is not up to par with First World standards. Although this fact may not be surprising, one might presume that the number of fires in buildings depends on the quality of construction and the type of elements used for heating, cooking, and lighting. Tables 1, 2, 3, 4, and 5 provide basic building data for 2006.¹² Lagos homes use significant amounts of materials and fuels that presumably increase fire danger. Thus, one might expect to see more fires in Lagos relative to First World cities. For instance, 3.9 percent of Lagos homes use dangerous roofing materials (for example, thatch, leaves, bamboo, sticks, or rough-cut wood boards), 6.5 percent cook with firewood or animal dung as fuel, and 2.1 percent use candles, coal, or other nonstandard fuels for lighting. Moreover, 3.5 percent have earthen floors, casting doubt on the quality of the home's construction in general. When we observe what is found in the city, these percentages seem surprisingly low. Many of Lagos's "homes" would be considered shacks and shanties by visitors from the First World. Perhaps the way the tabular statistics are collected fosters a sort of generosity in classification for particular items, but when a home is taken as a whole, reasons for concern about quality are evident. Offices and shops, including some fire stations, are hardly any better. At any rate, using the tabular data or simple observation, one might think that Lagos would have more building fires per capita than many other large metropolitan areas.

7. Located at 2/4 Town Planning Way, Ilupeju, Lagos.

8. Located at 22B Itolo Street, off Eric Moore Road, Surulere, Lagos (I found no codes there, but a staff member told me that the director keeps a copy of the national building code of 2006 with her, but that neither she nor the institute had a copy of the Lagos State codes).

9. Located at 29 Onikoyi Road, off Alexander Avenue, P.O. Box 5892, Ikoyi, Lagos.

10. Address given is 4 Wesley Street, Lagos; the National Library Board is located on Elipitala Mohammed Way, Ebonte-Meta, Lagos.

11. Located at 20 Thompson Street, Ikoyi, Lagos (the library section closed down in late 2010).

12. Source: *2006 Population and Housing Census of the Federal Republic of Nigeria*, National and State Housing tables, Priority Tables, vol. 1, National Population Commission. Tables HC4, HC5, HC6, HC11, and HC12, pp. 68, 93, 118, 263, and 290.

Table 1
Lagos Homes by Type of Walls, 2006

Type of Walls	Percentage of Homes	Number of Homes
<i>Mud/Reed</i>	2.3	51,520
<i>Wood/Bamboo</i>	3.2	69,485
<i>Stone</i>	0.7	15,963
<i>Cement Blocks/Bricks</i>	91.8	2,015,697
<i>Metal/Zinc Sheet</i>	1.4	31,670
<i>Other</i>	0.5	11,507
Total	100.0	2,195,842

Table 2
Lagos Homes by Type of Cooking Fuel, 2006

Type of Cooking Fuel	Percentage of Homes	Number of Homes
<i>Electricity</i>	3.5	76,995
<i>Gas</i>	6.4	141,104
<i>Kerosene</i>	80.7	1,771,036
<i>Firewood</i>	6.4	140,651
<i>Coal</i>	2.4	51,679
<i>Animal Dung/Sawdust/Coconut Bark</i>	0.1	3045
<i>Solar</i>	0.0	965
<i>Other</i>	0.5	10367
Total	100.0	2,195,842

Table 3
Lagos Homes by Type of Lighting Fuel, 2006

Type of Lighting Fuel	Percentage of Homes	Number of Homes
<i>Electricity</i>	86.1	1,891,540
<i>Gas</i>	0.8	17,618
<i>Kerosene</i>	10.9	240,355
<i>Candle</i>	1.6	34,462
<i>Coal</i>	0.1	2,635
<i>Other</i>	0.4	9,232
Total	100.0	2,195,842

Table 4
Lagos Homes by Type of Roofing, 2006

Type of Roofing	Percentage of Homes	Number of Homes
<i>Thatch/Palm/Leaves</i>	1.4	29,955
<i>Wood/Bamboo</i>	2.5	54,875
<i>Earth/Mud/Mud Bricks</i>	0.7	14,578
<i>Corrugated Metal/Zinc</i>	31.5	692,204
<i>Slate/Asbestos</i>	45.1	990,871
<i>Cement/Concrete</i>	15.8	347,111
<i>Roofing Tiles</i>	2.5	55,055
<i>Other</i>	0.5	11,193
Total	100.0	2,195,842

Table 5
Lagos Homes by Type of Flooring, 2006

Type of Flooring	Percentage of Homes	Number of Homes
<i>Earth</i>	3.5	76,030
<i>Wood/Bamboo</i>	2.0	43,278
<i>Concrete</i>	84.8	1,863,080
<i>Stone</i>	0.8	17,735
<i>Burnt Brick</i>	0.4	7,943
<i>Vinyl Tile</i>	2.5	54,163
<i>Ceramic/Marble</i>	2.7	59,393
<i>Terrazzo</i>	3.0	66,972
<i>Other</i>	0.3	7,248
Total	100.0	2,195,842

Using Privatized Fire Services

Negative externalities are compounded in cities, and fires are perhaps their most egregious and terrifying form. For that reason, urbanization leads to restrictions on the use of land and real property. The government's stated role ideally is to guarantee security of private-property ownership (Pipes 2000, 117), "to make possible the operation of a definite system of social cooperation under the principle of the division of labor" (Mises [1988], 1991, 34), without which entrepreneurship and even civilization itself cease to exist (Mises [1949] 1996, 264). Good institutions reduce transactions costs, increase available information, and enhance social cooperation. But is government-sponsored building regulation the best alternative?

Privatization is now widely recognized as a laudable social-welfare-maximizing paradigm, especially “spontaneous privatization,” which occurs when state assets come under private control with little or no government coordination (Zygmunt 1994, 452). Volunteer fire departments are a good example of such spontaneity. By way of comparison, the National Fire Protection Association Web site indicates that 71 percent of the total number of firefighters in the United States (812,500 out of 1,148,100) were volunteers in 2011, with the great majority of them (73 percent) working in small towns and rural areas.¹³ Of course, not having to pay 812,500 people even part-time wages represents a substantial cost savings, especially when one considers that wages are 90 percent of the total cost of a paid department (Poole [1980] 1988, 307, 308).

Fire safety bureaus can contract services out to the private sector either by privatizing completely or by implementing a model that combines public and private provision, thus serving as a conduit for more efficient provision of safety. For example, Rural/Metro Corporation, a private company in Scottsdale, Arizona, with shares trading on the NASDAQ, produced high-quality fire protection services for almost one-half the cost of its bureaucratic counterparts in neighboring towns (Ahlbrandt 1973, 1, 3, 6, 14). Regardless of the form and manner in which these efficiencies were achieved, market provision has demonstrated its ability to reduce the overall costs of a service that is often a publicly provided. Scottsdale has achieved further fame in the past two decades by employing building codes that establish widespread use of sprinkler systems in homes, thereby saving many lives and averting much property damage. Thus, Scottsdale’s safety record, which has become the envy of other cities, shows how public–private partnerships can be effective.¹⁴ Rural/Metro, after a big fight with the firefighter labor union in 2003 and surviving a referendum to replace the company with a public department, officially ended its more than fifty-year relationship with Scottsdale in 2005 (Lane 2003). The company nevertheless continues to thrive, providing private fire services. In 2009, it contracted to handle fire safety service in Tucson. As of that year, the company provided ambulance services and private fire protection services in twenty-two states and approximately four hundred communities throughout the

13. See <http://www.nfpa.org/search.asp?query=volunteer+firefighters&%26lid%3DSearch.x=5&%26lid%3DSearch.y=9>. The site states: “[T]here were approximately 1,148,100 firefighters in the U.S. in 2009. Of the total number of firefighters 335,950 or 29% were career firefighters and 812,150 (71%) were volunteer firefighters. Most of the career firefighters are in communities that protect 25,000 or more people. Most of the volunteer firefighters (73%) are in departments that protect fewer than 2,500 people. There are an estimated 30,165 fire departments in the U.S. Of these, 2,457 departments are all career, 1,752 mostly career, 5,099 are mostly volunteer and 20,857 are all volunteer.” The U.S. Bureau of Labor Statistics confirms that, “[a]ccording to the U.S. Fire Administration, about 70 percent of fire companies were staffed entirely by volunteer fire fighters in 2007.” It also notes that “[p]rivate fire fighting companies employ a small number of fire fighters” (<http://www.bls.gov/oco/ocos329.htm>). According to Poole, in the United States around 1980, 91 percent of all firefighters were volunteers in 24,500 fire departments. Thirty years later the percentage had dropped significantly.

14. See <http://www.ci.medford.or.us/page.asp?navid=923>.

United States. This fact suggests that private provision is possible and can be profitable and successful.

A Danish case study likewise indicates that substantial cost savings are available through using private production of fire protection services (Kristensen 1983, 1). Robert Poole finds strong evidence that private fire services are more efficient than and just as effective as their public counterparts (1980, 309, 310, 314–15, 325). He contends that “[t]he public good argument can be rhetoric that disguises a large and unnecessary subsidy” (315) and that private departments and even contracting out many fire department services to the private sector have resulted in considerable cost reductions (319). Harvey Rosen states that about 37 percent of fire protection services in the United States are contracted out to private firms (2005, 58). Thus, evidence shows that privatizing fire safety services can provide more efficient provision.

Nevertheless, the prevailing paradigm in public policy today is that direct government regulation is needed, along with public enterprises such as building and fire inspection services. Such activities supposedly foment the public interest by improving quality and safety standards. They might also provide public goods, although some scholars question the legitimacy of public-goods theory, arguing that it may be merely a farce used to justify government provision and regulation (Holcombe 1997, 21–22). If the farce view is accepted, then fire safety regulation would have to be justified by reasons other than the public-goods argument. In that case, the evidence from Lagos provides a reason to doubt the effectiveness of the current regulatory apparatus.

Justifying Fire Safety Regulation

Regulation is justified only if it can really improve quality or safety effectively. In the case of regulation aimed at preventing structural fires, which pose grave dangers to life and property, effectiveness is of paramount importance. The number of fires in Lagos State has fallen considerably over the past three decades, but, curiously, private fire services have increased significantly during this period. Explaining this outcome requires consideration of a number of prominent theories related to institutions, incentives, knowledge, and human behavioral constraints.

The most fundamental question that a researcher must ask is, “Does building safety regulation prevent fires?” One would like to presume so, although regulatory failure is a possibility. Fire safety regulation has been a key concern in urban areas for many years. “Fire represents the greatest single danger to buildings in most jurisdictions” (Arnold 2005, 9), and, accordingly, “[f]ire safety was one of the earliest issues addressed by building regulations” (Visscher, Meijer, and Sheridan 2008, 216). Yet these regulations have had dubious success, at least in terms of “the public interest.” Previous studies of fire safety regulation in Baltimore, Santiago, and Turin (Cobin 1997, 2000, forthcoming) have raised doubts about its effectiveness in these cities. In Lagos, government failure (or at least worries about its potential

failure) has been so great that private companies have decided to form their own fire departments at considerable expense. The purpose of this article is therefore to evaluate the irrelevance and effectiveness of fire safety regulation in Lagos and to elaborate on its unique characteristic of implementing private fire departments.

Theories about Fire Safety Regulation

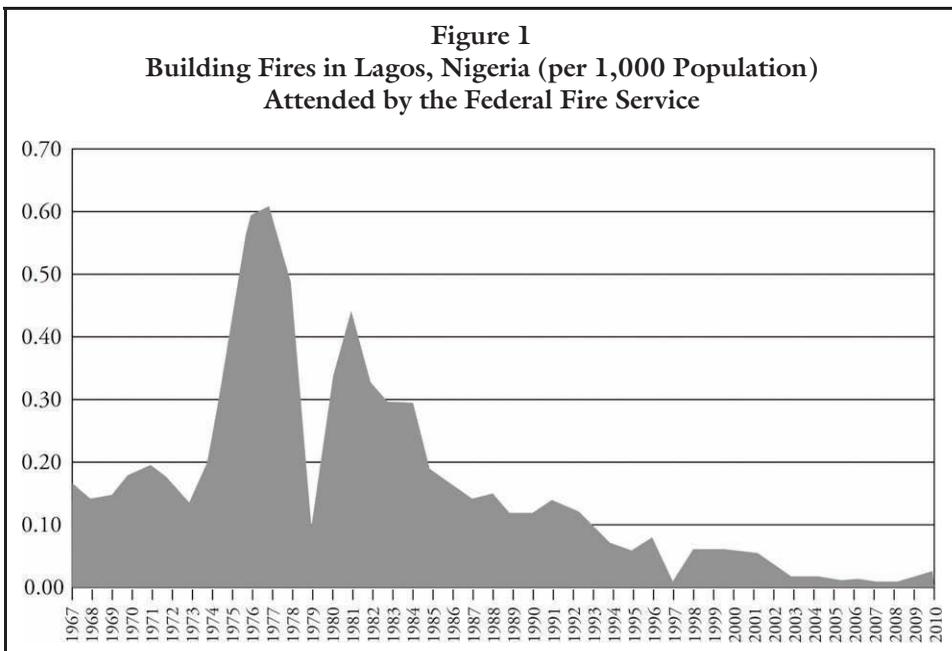
The public interest is served by reducing fires. Urban fires are economic “bads” because they carry a negative price, and the prevention and removal of such “bads”—including fires, noise, crime, dead leaves in autumn, smog, and negative externalities in general—create profitable opportunities for progressive (market) or regressive (governmental) entrepreneurs (Cobin 2009, 285). If markets fail to provide adequate urban fire safety, the door is open for public provision. Jan Brueckner argues that fire protection has the properties of a congestible public good (that is, consumption of the public good by one person reduces the amount available to others, making it nonrival, only when there are few consumers) and that public provision becomes more efficient as a city grows (1981, 45, 57). However, this claim may not always be true. Public-choice theory demonstrates that barriers to efficient government provision may exist. After all, modern fire disasters have occurred even though the affected buildings had been subject to government regulation and inspection. In places such as Baltimore, Santiago, and Turin, more fires per capita occur today than when regulation first began. Yet buildings in these cities passed inspection, and the owners were granted the required building and operating permits. Hence, we might well question the government’s ability to provide fire safety effectively. In short, the market may fail, but the government may fail even worse. Many explanations of the effectiveness of safety regulation exist. Public-policy researchers and practitioners have developed ten prominent theories about safety regulation that can be applied to fires (Buchanan and Stubblebine 1962; Bounds 2010, 15–18; Cobin 1997, 14–34; Weiner 2010, 134; Hayek 1945; Holcombe 1995, 4–6; Pradhan and Ravallion 2003; and, for theories 8 and 9, practitioner speculation asserted during personal interviews).

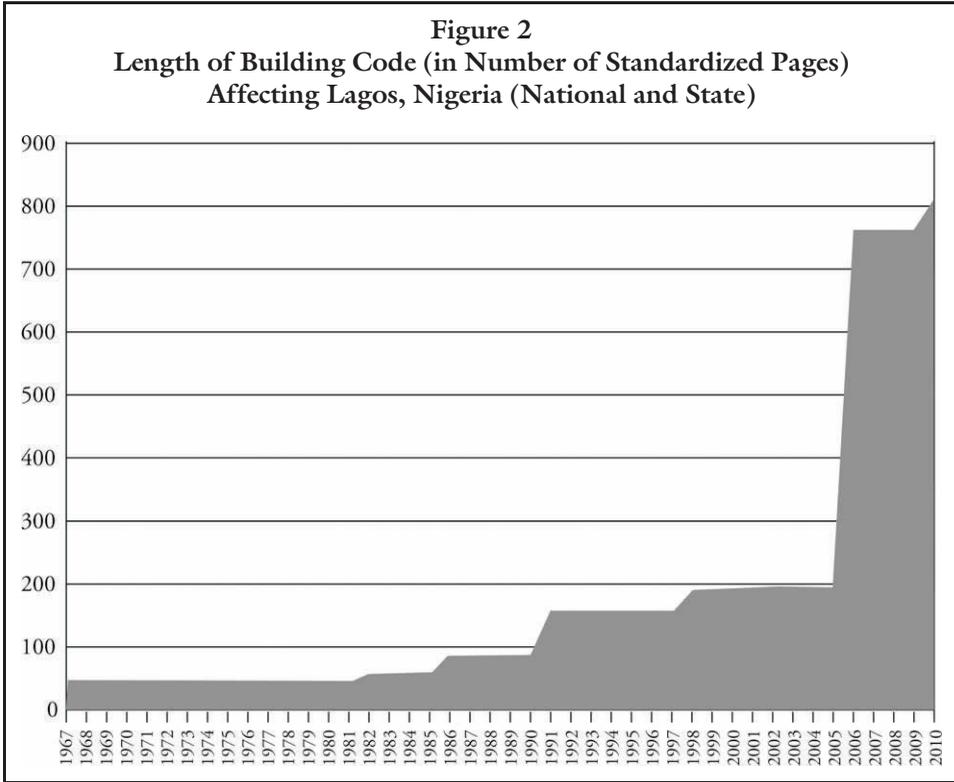
1. Fire safety regulation might be irrelevant if private benefits and costs are so large for fire safety that individuals take the optimal precautions on their own, eliminating any Pareto-relevant marginal externality or related gains from regulation.
2. Regulation increases safety but may do so inefficiently.
3. Regulation is an ineffective but desirable placebo. It creates only a perception of safety, which alleviates public uneasiness. This outcome is valuable to voters, vote seekers, and taxpayers.
4. Regulation is a public-choice phenomenon that serves special interests primarily. Hence, regulation may not promote the “public interest” in safety.

5. Regulation is unlikely to increase safety efficiently—and perhaps may not do so effectively—because it is always constrained by inadequate social knowledge, also known as the “knowledge problem.” Hence, regulation does not work—at least not in terms of enhancing the public interest.
6. Regulation may not be needed because fire safety is a normal good whose demand increases as income increases.
7. Increases in population density decrease fire safety, and regulation must adapt to such trends.
8. In spite of good regulation, immigrants or minorities cause a decrease in fire safety.
9. Use of electricity and related technology in buildings decreases fire safety despite regulation.
10. Moral hazard decreases fire safety, hampering regulators’ efforts.

My study suggests that an ancillary theory can be added to theories 2, 4, and 5, given the findings in Lagos State: *private fire services improve fire safety*. My findings also confirm models of government failure (theories 4 and 5), given the widespread ineffectiveness of safety regulation and much direct evidence of government failure.

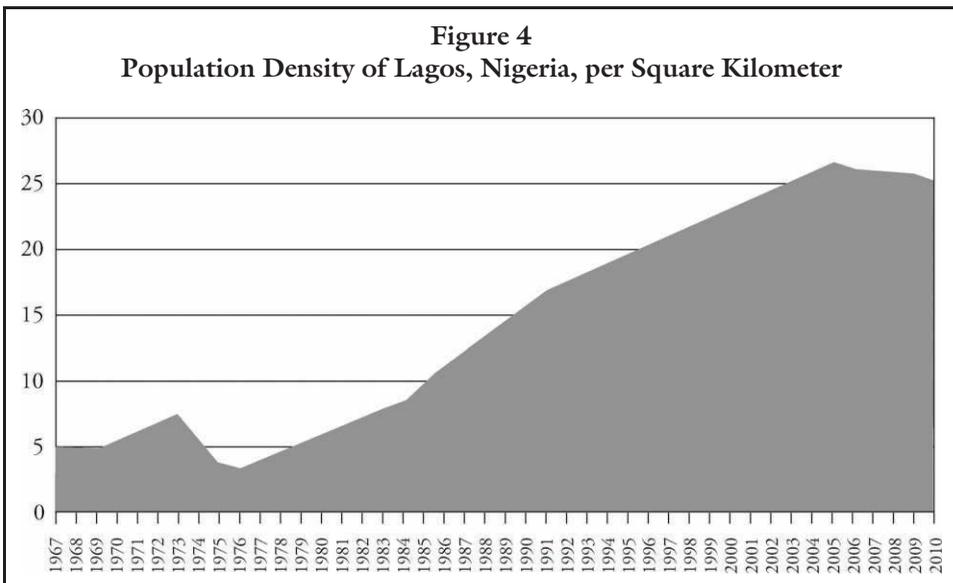
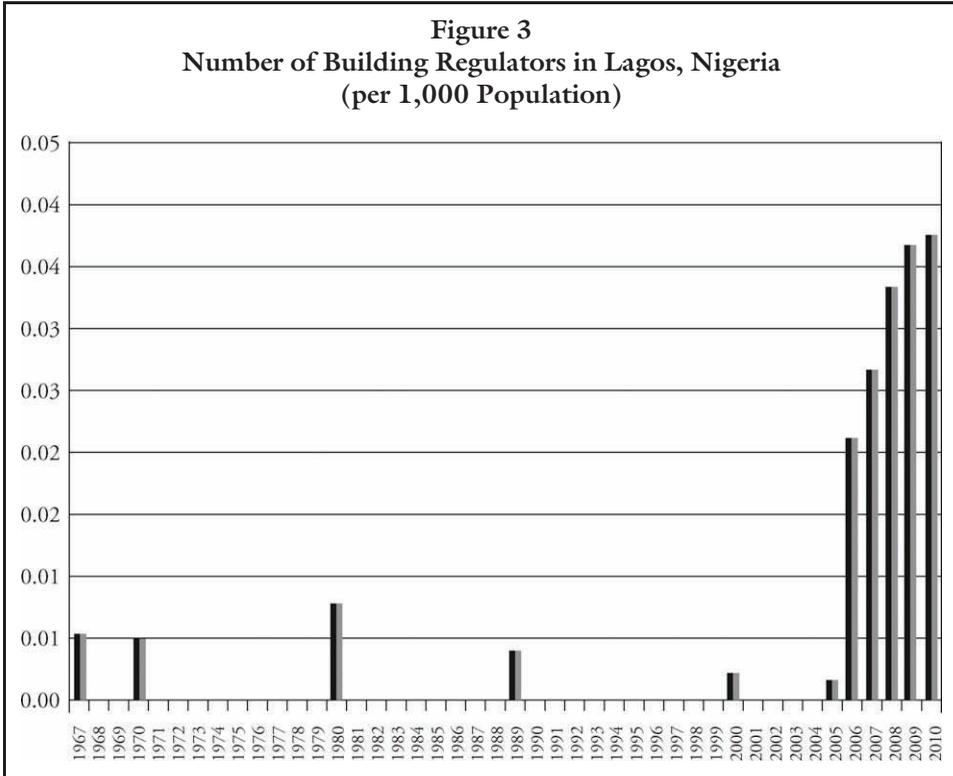
The key comparative data for this study of building fires (figure 1) are the amount of regulation (figure 2), the number of regulators or inspectors (bureaucrats) (figure 3), and the population density in Lagos (figure 4). These data are useful in confirming or rejecting the preceding ten explanatory theories. I do not question

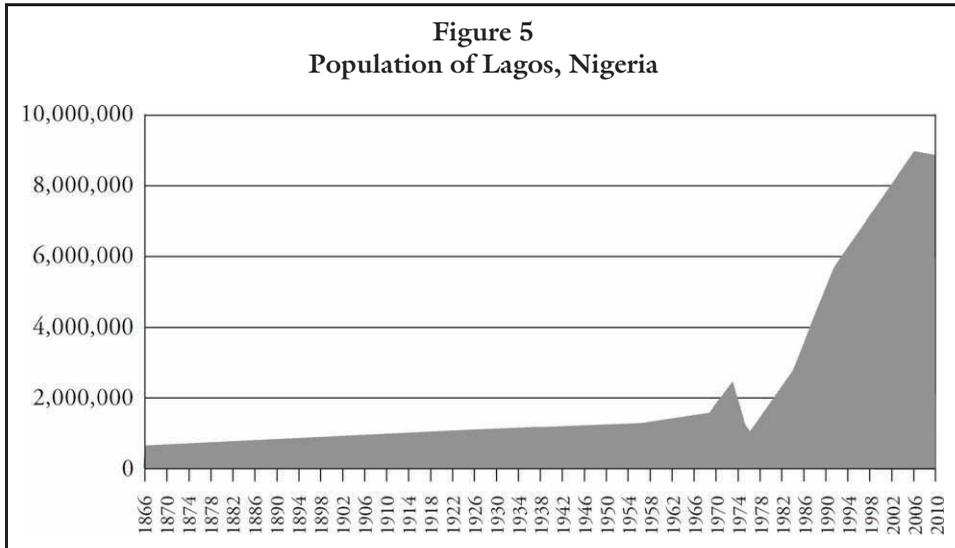




how regulators hoped or planned to meet their objectives or what difficulties they might have encountered along the way. Public-policy researchers want to know only how well government functionaries have met their objectives. Figure 1 indicates that the number of building fires per capita in Lagos has tended to decline in recent decades. Note that the data in figure 1 were obtained from the Federal Fire Service (the Nigerian national fire service).

Lagos State also has a fire department that attends fires, but the head officer in 2011, Mr. Ajose, refused to provide legitimate data or time-series data. Instead his personal assistant sent along a summary statement that claims that “the total number of fires that Lagos State Fire Services attended from 1972 to 2010 is equal to 6,868,000.” Even if one excludes the 459,000 false alarms reported, the adjusted figure (6,409,000 fires) would mean that the service went on a fire call 462 times per day for the thirty-eight-year period, 19 times per hour or once every three minutes (on a twenty-four/seven basis). Even if one assumes there were ten fire stations on average (the maximum number of fire stations during the thirty-eight year period was thirteen), it is hard to imagine that one of its ten units had to respond every thirty minutes around the clock, year after year. That figure seems unlikely, to say the least. Furthermore, the Lagos State Fire Service claims to have extinguished all 6.41 million fires without the help of the Federal Fire Service,





which also seems unlikely, especially considering that the great majority of all fire calls is attended by both services, according to the Federal Fire Service.

The building fires figure that the Lagos State Fire Service provided—42,120 from 1972 to 2010 (equal to three building fires per day on a twenty-four/seven basis)—is much more believable, but it casts doubt on the integrity of the overall data received because it would be too small a percentage of the total number of fires claimed (0.61 percent), considering that in other parts of the world the number of building fires is more than 50 percent of total fires. And one has no idea how the fires were distributed through the years. A lump figure was provided instead of a time series, even though I requested the latter many times. The Federal Fire Service, which did provide time-series data, attended 9,584 building fires from 1976 to 2010, three building fires every four days, or four times fewer than Lagos State Fire Services claims to have attended. This Lagos State Fire Service statistic, too, seems unlikely, though. Thus, I have largely disregarded the apparently exaggerated Lagos State Fire Service data for the purposes of this study. It is reasonable to believe that the data on building fires per capita should have been similar for the parallel services. And so the time-series data received from the Federal Fire Service will suffice for this article's purpose.

Figure 2 shows that the scant building regulation that Lagos once had was fairly constant until 2005, yet the frequency of fires was declining, as shown in figure 1. Although the frequency of fires continued to decline after regulation became more serious, there are too few data points to confirm that regulation caused the decline. In addition, it is likely that the building code has a lagged effect on actual safety, so that a code implemented in 2006 might not yet have had its full effect on the number of building fires. The more interesting story may pertain to a 50 percent

increase in the number of private fire departments in 2005 and a 20 percent increase in public-enterprise fire departments in 2010. More private firefighters and fire departments may have accelerated the improvements in safety.

Most of the code sections that existed before 2006 were administrative in nature, stating rules and processes rather than specifying actual building standards. Of the 45 pages of the June 1986 state code, one or two pages at most might be said to deal with fire safety regulation (for example, mandating the width of escape exits and the quality of fireproof shutters and setbacks). The same is true regarding the 39 pages of the 1956 regulations (“Town and Country”). None of the 2 pages of the 1959 code, the 1 page of the 1964 code, the 5 pages of the 1967 code, the 26 pages of the January 1986 code, or the 34 pages of the January 1998 code had anything to do with fire safety and, indeed, little to do with how buildings are to be constructed. The same is true of the 124 pages of the “Town and Country” act of 1974. It is hard to believe that any of them could have had any real effect on fire safety.

Thus, when considering figure 2, one should bear in mind that the amount of regulation in effect before 2006 that might have affected fire safety is miniscule. Given that the regulation from 1956 to 2005 was widely unknown and largely unenforced (because there was little in it to enforce), it could not have done much to improve fire safety or alleviate building fires. The period was effectively without significant building regulation. Precursor discussions and goals were set as early as 1990 for what would eventually result in the National Building Code in 2006, but nothing was implemented as legislation before 2006. For all intents and purposes, no significant building code affected fire safety in Lagos prior to 2006. About half of the 2006 code is dedicated to architectural design, building materials, and construction, with significant regulations in these chapters pertaining to fire safety. Without a doubt, a new day dawned for Lagos building regulation in 2006, and the increased type, scope, and quality of building regulation after this point, as indicated on the right side of figure 2, differ greatly than the data for prior years.

Widespread conjecture in Lagos lends support to theory 9 (electrical appliance use causes fires) because many fires in Lagos have been caused by the lack of regular electric power and the subsequent use of generators (which are often misused and thus lead to fire tragedies). But the data do not support this notion. In fact, following theory 1, the number of fires per capita has declined in spite of a more comprehensive building code, perhaps indicating its irrelevance. Furthermore, although the population and density have risen dramatically in Lagos since 1967, as seen in figure 4 and figure 5, the number of fires per capita has nevertheless declined, leading one to reject theory 7.

Theories 2 and 3 are either not applicable or unsupported by events in Lagos: a decline in the number of fires per capita even in the absence of regulation. There does not seem to be any income effect, per theory 6, that has caused fires per capita to decline because people’s incomes are not much greater now than they were thirty years ago. Sixty percent of Nigerians live on less than a dollar per day. Moreover,

the absence of significant foreign immigration to Lagos makes theory 8 irrelevant, unless we conclude the opposite: that lack of poor foreign immigrants has been responsible for the decrease in fires in Lagos. But that conjecture would be difficult to prove, especially because most Nigerians themselves tend to be poor and ignorant. Indeed, one might conclude that Lagos has enjoyed *greater* fire safety *in spite of* moral hazard, greater population density, stagnant incomes, and the virtual absence of regulatory enforcement.

Analysis of the Fire and Safety Regulation Data for Lagos

Nigeria was a British colony until achieving independence in 1960, and its initial fire safety services and some rudimentary building regulation began under British rule. Today, Lagos has four sources of fire safety services. First, the Federal Fire Service started in 1901, initially in joint operation with the police department but attaining independence in 1963. It has fire stations throughout the country, including four in Lagos State. Second, the state government established the Lagos State Fire Service in 1984, which now has more fire stations (thirteen) in Lagos State than the Federal Fire Service. Public-enterprise fire services have six fire stations, and private firms provide yet another six fire stations.

Provision of Fire Services in Lagos

The data for this study were collected from many different government and private offices as well as from libraries in Lagos. Note that private departments make up a significant part of Lagos's fire safety infrastructure. Table 6 summarizes data on Lagos firemen in 2011 (the term *firemen* is still in vogue in Lagos rather than the more modern, gender-neutral term *firefighters*). The 2011 data on number of fire stations, shown in table 7, are more striking because they show a much higher percentage of overall fire stations being provided by the private sector.

Table 6
Lagos Firemen, 2011

Organization	Number of Firemen	Percentage of Total	Firemen per Station
Federal Fire Service	387	33.5	96.8
Lagos State Fire Service	597	51.7	45.9
Public-enterprise fire services	78	6.8	13.0
Private-firm fire services	92	8.0	15.3
Total	1,154	100.0	

Note: The 2011 data on number of fire stations, shown in table 7, is more striking because it indicates a much higher percentage of overall fire stations being provided by the private sector.

Table 7
Lagos Fire Stations, 2011

Organization	Number of Fire Stations	Percentage of Total
Federal Fire Service	4	13.8
Lagos State Fire Service	13	44.8
Public-enterprise fire services	6	20.7
Private-firm fire services	6	20.7
Total	29	100.0

These data indicate that the private sector plays a significant role in fire safety in Lagos. They also suggest that the private sector and public enterprises have more efficiently run fire stations, with fewer firemen per station. Private firefighters are much better paid, perhaps because they are better qualified and more efficient than their public-employee counterparts. Further, the data suggest that capital quality may be better in these stations than in the larger organizations, where labor seems to be substituted for capital. The capital assets of the private fire stations are of much higher quality than assets in their public counterparts. Together, the private- and public-enterprise sectors have 41.4 percent of the fire stations in Lagos but only 14.8 percent of the firemen.

Would Lagos Have Been More or Less Safe with Greater Regulation?

One might argue that Lagos already survives *without* regulation. What little regulation exists is either widely unknown or sporadically enforced. Moreover, considering figure 1, there is little compelling evidence that fire safety has improved in Lagos under regulation since 2006. If anything, the number of building fires per capita has risen slightly since that year. However, we are left to speculate as to whether even fewer fires would have occurred in Lagos had significant fire safety regulation been in effect before 2006. It seems that the little building regulation that did exist in Lagos from 1985 to 2005 might actually have had something to do with fire safety, even though the overall trend was for the number of building fires per capita to decrease after 1977. One conclusion might be that small doses of little-known and little-used regulation tend to produce safety benefits. But this conjecture is surely debatable. It seems much more likely that market forces have caused the impressive improvements in Lagos.

Without regulation, people have to take greater care for their own safety, especially in the building of their homes and offices. We expect the market to provide both private inspection services, made efficient by competition and the desire to maintain a good reputation, and multiple means of fire and property insurance to transfer risk of loss. However, neither of these things has existed on a significant scale in Lagos. Such consumption is costly, so most of the relatively poor people of Lagos cannot afford either thing, even though its cost is very low. People earning from \$50 to

\$300 per month are probably not going to purchase inspection services or insurance when they have trouble feeding themselves and paying for shelter with what they earn. Fire departments that operate without significant regulation would tend to be completely private, funded by donations or out of company budgets. This scenario is partly confirmed in Lagos, which has formed, besides the government fire services, several private fire services. In addition, the de facto nonexistence of a building code and fire safety code in most people's minds has in fact led them to undertake private and personal measures to ensure greater safety.

Although one cannot be certain that almost complete reliance on market forces will reduce the number of building fires, economists have shown that competitive markets tend to be efficient and effective and, as such, might tend to facilitate such a result. The data for Lagos indicate that relatively fewer building fires occurred as the city grew to have more than 7 million people. The number of building fires per capita has dropped steadily since 1981: by more than 93 percent as of 2008 and more than 76 percent as of 2010.

How much better results should we have expected if Lagos had instead installed a modern regulatory bureaucracy to promote fire and building safety? No one can reasonably expect perfection, and the results in Lagos leave little room for improvement over what the market and very limited regulation have provided. The grading of building quality is certainly a service that markets can provide (Cobin 1997, 81–114), just as they provide property and casualty insurance. Both private building inspectors and fire insurance companies exist today and are a means of improving safety. So why should we expect that government provision of safety codes would have done a better job in making Lagos safer?

In Lagos, dramatic improvements in fire safety came without such provision. Moreover, except perhaps in the upper class, which is a tiny proportion of the Lagos community, private grading (inspection) services and insurance have not been widely used. Judging from the hoops that private firms jump through in the face of criticism from rating agencies and ranking companies such as Moody's and Standard and Poor's, it is plausible that the pressure that grading firms and insurance companies places on builders and homeowners would produce a high degree of fire safety. Insurers already provide incentives for people to behave more safely, rewarding them with lower premiums or other benefits. There is little reason to believe that such incentives would not exist normally in the absence of regulation. However, in Lagos, these things are scarce on account of the relative poverty. When people have difficulty eating and buying shelter to begin with, they will not have money left over to buy insurance and grading services. So we have no convincing reason to believe that these market forces have been instrumental in reducing the frequency of building fires in Lagos.

Another important factor to consider is that removing regulation also removes, by definition, public-choice and knowledge problems (theories 4 and 5). No bureaucratic inefficiencies or perverse incentives exist when no regulation occurs. This fact

alone might lead us to believe that safety levels would be at least somewhat higher because removal of any inefficiency should increase safety, *ceteris paribus*. And in Lagos this result seems to have been the case. Although the data are not conclusive for the mere five-year period since significant fire safety regulation began (up to 2011), they show an upward trend in the number of fires per capita, more than tripling from 2008 to 2010 and adding weight to the supposition that public-choice and knowledge problems tend to make regulation less effective.

Furthermore, without regulation, people have slightly more net income because taxes to pay for regulation are eliminated. They would be able to spend a bit more on private means of attaining greater safety and on additional insurance. However, in Lagos, only the relatively wealthy can afford such things, making any income effect implausible (theory 6). So we have to return to the puzzling fact that despite severe income and budget constraints, fire safety improved in Lagos.

It is difficult to conclude that the relatively unregulated situation from 1960 to 2004 would be a good proxy for how a Lagos without fire safety regulation would look in the future. But it is perhaps a question worth considering. Many changes have occurred in Lagos over the past six years besides the increase in regulation, including technological changes, new insurance products, better tools and ideas for building, changes in population density, and capricious migration trends. In these circumstances and considering the data in figure 1, the notion that the market would have failed more than public policy fails seems less convincing. With a new era of regulation comes an opportunity to compare results across decades to see whether government failure or market failure is greater. In the meantime, the available evidence supports the idea that market-based alternatives without government regulation, most notably private fire departments, have helped provide greater safety in Lagos.

Interviews with Private Fire Departments

Union Bank

The Union Bank of Nigeria's fire service started in 2005 because the firm wanted to protect its thirty-five-story skyscraper built in 1993.¹⁵ Although the number of fires per capita had been declining and was relatively low in 2005, the bank still feared the threat of fire enough to invest considerable resources in a fire protection service. The private fire department has one fire engine with a ladder system capable of reaching a height of fourteen stories and one tanker filled with water. There are thirteen full-time firemen, all bank employees, two of whom are supervisors—one chief and one deputy (called noncommissioned officers). Each of these supervisors

15. Interview conducted on January 31 2011, with Fire Chief Cole Orloanyi and Chief Security Officer Samuel Agbanusi, Union Bank, 36 Marina, P.M.B. 2027, Lagos Island, Nigeria (fire department across the street). Data for fires and firemen were prepared and given to me on February 7, 2011.

Table 8
Union Bank Fire Service Data

	Number of Firemen	Number of Building	
		Fires Attended	False Alarms
2005	16	2	6
2006	15	5	8
2007	13	17	0
2008	13	11	0
2009	13	12	0
2010	13	7	0
Total		54	14
Average	13.8	9.0	2.3

covers one of two daily shifts. (For specific data on the Union Bank's fire service, see table 8.)

The fire service was started because the bank's management worried that state and federal fire fighters would not be able to respond in time, especially if they were engaged elsewhere, and that their equipment was inadequate. For example, government fire companies' equipment cannot reach to the fourteenth floor. There are many high-rise buildings on Lagos Island and Victoria Island, including the Union Bank building, and many other buildings of more than fourteen floors. The nearby United Bank of Nigeria's building has twenty-three floors, for instance.

The Union Bank of Nigeria Fire and Rescue Unit is willing to help other businesses with fires (at no charge) and to work in conjunction with the state and federal fire services, along with other private services.¹⁶ Chief Security Officer Samuel Agbanusi (a retired military colonel) stated that fewer fires occur now because people are more fire conscious. Fire Chief O. B. Cole added that the firemen are considered to be in the middle class, given their job and pay level with the bank's fire service. Indeed, it is considered a promotion over a government firefighter position to work for the bank's fire department. He also stated that the firemen undergo regular training in courses provided by consultants to refresh their skills, and before coming to work for the bank they were trained by federal, state, or military fire services, which means that the bank's firefighters have relatively superior experience in comparison with firefighters elsewhere.

16. The Union Bank of Nigeria Fire and Rescue Unit provided the following information about other private and public fire services in Lagos, highlighting that only Union Bank has a long-reaching ladder on its truck: (1) United Bank for Africa PLC has a regular fire engine but no ladder; (2) Julius Berger Construction Company (civil engineering and highways) has a regular fire engine but no ladder; (3) Nigerian Port Authority has a regular fire engine but no ladder; (4) Eko Le Meridien Hotel and Suites has a regular fire engine but no ladder; and (5) Chevron, although located far away from Lagos Island, does have excellent equipment.

Table 9
Sun Newspaper Fire Service Data

	Number of Firemen	Number of Building Fires Attended	False Alarms
2005	6	3	0
2006	7	2	0
2007	7	3	0
2008	5	1	0
2009	5	1	0
2010	2	2	0
Total		12	0
Average	5.3	2.0	0

Sun Newspaper

The Sun Newspaper's fire service began in May 2005, when the firm bought a fire service truck.¹⁷ The newspaper already had fixed fire extinguishers throughout its property. As in the Union Bank case, Sun's worries about building fires led the management to invest considerable resources in fire protection services even though the frequency of fires has been declining and was relatively low in 2005. The company does not have a regular fire department, but rather "security men." Out of its twenty trained men, only two are currently *employed* as firemen (although three more previously were). The others perform their fireman's job function only in an emergency. Supervisors are chosen from among these men. They have one good-quality fire engine and two service extinguishers. Sun Newspaper offers to help out at any other Lagos fire its firefighters can reach (free of charge) and has done so on two or three occasions. In 2010, when a fire broke out at the plant, the Lagos State Fire Service came to help extinguish the blaze. (For specific data on Sun's fire service, see table 9.)

Sun Newspaper started its fire service to forestall any outbreak of fire. The managers believe that it is easy for a fire to break out in a newspaper company setting, and they stated that they could not rely on the Federal Fire Service or Lagos State Fire Service to arrive quickly. In fact, these services did not arrive on time during the 2010 fire at the plant. Road congestion makes it difficult to get to Sun's plant. The government agencies' services are unreliable, even if it is not their fault. Both the Federal Fire Service and Lagos State Fire Service have been known to come to a fire in a fire truck without water. Nevertheless, like the Union Bank's private fire service, Sun Newspaper's private fire service could not have contributed to the decline in the number of building fires per capita from 1981 to 2005 because it

17. Interview conducted on February 14, 2011, with Mrs. Ify Anyalechi, procurement and general services manager, Sun Publishing Limited, 2 Coscharis Street, Kirikiri Industrial Layout, Apapa, Lagos.

did not exist in that period, but it certainly might have contributed to dampening fire incidents since then. These cases also provide insight into how markets respond when government provision is perceived as inadequate.

Julius Berger Construction Company

Although the exact date was unknown to the current manager, whom I interviewed in 2011, the Julius Berger Construction Company's fire service started before 1996.¹⁸ Millions of dollars have been budgeted for this service. It has Unimarc fire trucks without an extension ladder, one located in Lekki and two located near the Lagos Beachland, as well as two tankers. There are twenty-two full-time firemen, eleven working during the day and eleven at night, plus two supervisors covering any twenty-four-hour period, seven days per week. Both supervisors are on duty or standby with emergency phone numbers. Being a full-time fireman is considered to be a good job, and the firm has many applicants when a position opens. Julius Berger will help others in time of fire emergency out of goodwill (free of charge). The company's fire service helps out with ten to fifteen fires per year, only one of which has been at its own plant since 2007. It also helped with the MTN (telecom) fire and with exploded pipelines. Offering its assistance at other fires provides good training and practice for the company's firemen, and the firm also hopes to get reciprocal help from others in time of need.

The Julius Berger firemen undergo training every week. Caterpillar, crane, and car workshops for personnel are also included in the exercises (so these personnel can also be used as auxiliaries or backup firemen in case of a fire). Thus, an additional ten to fifteen other firefighters are on call. Firemen are also sent to training courses given by the Federal Fire Service, especially when training is given on industrial firefighting. Annual drills take place on designated Saturdays, when time taken to arrive at the scene and other matters are checked.

Why did Julius Berger begin its fire service? First, extraordinary road congestion prevents reliance on the government's fire services. State firemen are competent as long as they are close to the scene, especially after having upgraded personnel and equipment in the past two years, but they often simply cannot get to the fire scene on time. Second, employees are also concerned about safety, and the firm wants to make sure that its employees are safe and feel comfortable. The firm has many employees from Germany and other countries. Third, the firm has expressed concerns over state fire services that arrive at fire scenes without water in their truck or tankers. Such was the case when Port Harcourt federal firemen arrived at an airport fire without water in their tank and without any foam. For Julius Berger, the state is simply not reliable. The firm keeps two 3,000-liter tankers filled and ready on standby.

18. Interview conducted on February 1, 2011, with Jürgen Schildenberger, truck workshop manager, Julius Berger Construction Company. Plot 1, Beachland Estate, Apapa, Lagos, Nigeria.

(Note that this quantity of water is used in five minutes when under pressure, so it alone is not sufficient to quench a major fire.)

United Bank for Africa PLC

The fire service at United Bank for Africa PLC began in 1993, when its high-rise (twenty-three-story) office building was built.¹⁹ The bank employs three supervisors and eleven full-time firemen. In addition, forty-six fire wardens are trained in how to stop fires at the company headquarters (located in the high-rise building), and four wardens are in each of more than five hundred bank branches. The main firefighter core is experienced; all were trained in other places before joining the bank's service. The bank has no problem in finding firemen to hire. When a job opens, many people apply. The bank's main equipment comprises a fire engine and two tankers. Its water pump can shoot water all the way to the top of the twenty-three-story building.

The head of the fire service, who had worked for the Lagos State Fire Service and the Federal Fire Service for twenty years, stated that the bank is concerned about people's safety and cannot rely on state fire services. He pointed out that road congestion is a serious problem and that water piping is also substandard; besides, many hydrants are dry. Men in the Federal Fire Service are very skilled, he said, but their equipment is inadequate, making them less effective. He also noted that the bank's firefighting equipment is more modern than and superior to the state's. Its fire service has been called to approximately five fires per year, including a fire in the bank's headquarters in 2008 and another one in 2010. It has no problem helping out at other fires free of charge.

Eko Le Meridien Hotel and Suites

The Eko Le Meridien Hotel and Suites employs eight firemen, two of whom are supervisors.²⁰ All of them are full-time employees. All of them were trained before coming to work for the hotel. There are no volunteers or part-time employees. They send some of their staff to the Federal Fire Service for additional training. The hotel's fire service began in 1990 (the hotel was built in 1977). In addition, more than one hundred fire wardens among the hotel staff are qualified to help out in a fire emergency.

Why does the hotel have its own fire service? Simply stated, it was established for the hotel's safety and to get faster response to a fire. The Federal Fire Service might be late if its firefighters are working at another fire scene or the roads are congested

19. Interview conducted on February 1, 2011, with Anthony Ezeani, chief fire officer, United Bank of Africa, UBA House, 57 Marina Ave., Lagos Island.

20. Interview conducted on February 2, 2011, with Ogunbode Ezekiel Olukoya, chief fire safety officer, and Adeniyi Fatoyinbo, assistant chief. I also spoke with a fireman (no name given) who used to work for the Federal Fire Service, Fire Service Department, Eko Le Meridien Hotel and Suites, Lagos, Nigeria (Victoria Island).

(which they usually are). At the hotel's inception, the single government fire station was far away (more than ten kilometers), so the hotel decided to install its own service. A Lagos State Fire Service station was later opened nearby. The hotel's chief fire safety officer also pointed out that the hotel has better equipment than the state services. In a recent fire, only the equipment used by the hotel's vehicle could reach the fifth floor; neither the Lagos State Fire Service equipment nor Federal Fire Service equipment could do so. In a word, the state is *unreliable*. State provision is also underfunded and relies on the private sector to provide some equipment. For instance, the hotel bought three small mobile pumps (about the size of a utility trailer) and gave one to the Lagos State Fire Service.

The hotel does not charge to help out at other fires, but most of the time it does expect that a letter of appreciation will be sent. The hotel's fire service has recently responded to twenty to thirty fires calls per year, including two fires in the hotel itself during the past three or four years. The chief pointed out that there are other fire services nearby, too, which help out with other fires: Nigerian Security Printing and Minting Company has its own fire service, as does the National Open University of Nigeria. As in the Julius Berger and the United Bank for Africa cases, the hotel's fire service might have contributed to a good portion of the decline in the number of building fires per capita from 1981 to 2010 through its implementation of preventive measures and training of wardens, which raised fire safety awareness and standards.

Chevron

Private fire safety services are nothing new at Chevron.²¹ Employee safety is a great concern, and security (including the fire safety component) is an important factor in attracting and retaining good employees. The company's service began before 1976, and it probably had some services as early as 1966 (before Chevron owned the plant). The firm has two fire engines on the Lekki Peninsula and several others in Port Harcourt, where the main assets are, and in other petroleum-based Nigerian cities. Chevron employs thirteen firefighters in Lagos, including three supervisors. Some of these firemen came from other services; they also do additional training. Others are trained in-house. The hiring process starts with getting qualified applicants, typically university or polytechnic graduates, and then sending them on for training. Many people seek to work for Chevron, where the pay is more than double the pay elsewhere. Chevron firemen earn approximately 300,000 to 350,000 Naira monthly (U.S.\$1,925 to \$2,250), which is a handsome salary in Nigeria. Moreover, approximately one hundred volunteers (among interested employees) will immediately stop their other work and come to help out in case of fire. Their efforts seem to

21. Interview conducted on February 2, 2011, with Richard Odekunle, chief fire officer, Chevron, Chevron Avenue, off Lekki/Epe Expressway, Lekki Peninsula, Lagos, Nigeria.

have been successful because building fires per capita have been in steep decline ever since Chevron's fire service began.

Unlike other private companies, oil companies are legally required to have a fire department. The chief fire officer pointed out that the Federal Fire Service's capability is substandard. Its facilities and equipment and the quality of its firemen are inadequate, especially in dealing with gigantic fires. Time is a major factor, too. A firm is much better served by having its own fire service than by relying on the Federal Fire Service or Lagos State Fire Service to get through the traffic congestion. The Lekki Peninsula is difficult to reach during most of the day because of heavy traffic. Because the longest-lasting fire is about twenty-five minutes, the state services would likely not arrive in time. Chevron's fire department is willing to help others for free (within a fifty-kilometer radius), but it has had to call on others to help it only once. Chevron also donates equipment to the state fire services once in a while in order to help it keep up with technological improvements and prepare itself better to fight fires.

Chevron's fire service is not unique among petroleum companies. Although Shell Petroleum²² has no fire service in Lagos, it does have fire services near Port Harcourt (on the other end of Nigeria) and elsewhere near the firm's assets. Shell managers confirmed that they cannot rely on the federal or state fire services and therefore have established their own. They also added that Shell has often purchased oxygen masks and other equipment for the state services to make work less risky for their employees and families. The United Bank for Africa's fire chief pointed out that Mobil also has a good fire service, but, like Shell's, it is located in Port Harcourt (with nothing in Lagos). Both Shell and Mobil have their corporate offices in Lagos.

Interviews with Public-Enterprise Fire Departments

University of Lagos

The University of Lagos is a public university that established its own fire service in 1983.²³ The service currently employs twelve firemen, including four supervisors. However, the officer in charge stated that the service really should have twenty-one firemen to cope with the demand for services. The fire service is supposed to have three fire stations, but it has only one. Moreover, it has only one fire engine and an SUV to help bring equipment to a fire scene. The university's firemen have, by the time they are employed at the university, experience with the Federal Fire Service, the Lagos State Fire Service, or another fire department in Nigeria. All are full-time employees rather than part-time employees or volunteers. The British used to train the firemen until 1975 (the university's current fire chief was so trained). University

22. Interview (by phone) conducted on February 1, 2011, with Kevin Rowbotham, chief of fire services, Shell Oil, Lagos Island, Lagos Nigeria.

23. Interview conducted on February 3, 2011, with Lasisi Bello, officer in charge of Fire Service Unit, University of Lagos, Akoka, Lagos, Nigeria.

of Lagos firemen are paid more than their counterparts at the Federal Fire Service because their job is riskier (although the officer in charge did not specify why it is riskier). The university's fire chief earns 120,000 Naira monthly (about U.S.\$770, regular firemen earn less) which, though more than the Federal Fire Service's chief receives, is still quite low compared to salaries paid by private-company fire services. (For specific data on the university's fire service, see table 10.)

Table 10
University of Lagos Fire Service Data

	Number of Firemen	Number of Building Fires Attended	False Alarms
1984	2	10	5
1985	2	5	4
1986	4	3	2
1987	10	8	0
1988	9	6	2
1989	9	6	1
1990	9	5	2
1991	9	5	0
1992	9	3	1
1993	9	4	2
1994	9	5	1
1995	9	4	2
1996	8	5	1
1998	14	5	3
1999	13	5	4
2000	13	6	5
2001	13	5	3
2002	12	6	1
2003	12	4	2
2004	12	5	4
2005	10	4	2
2006	10	2	1
2007	12	6	2
2008	12	5	2
2009	12	5	1
2010	12	6	2
Total	263	140	57
Average	10	5	2

The university chose to have its own service because it is separate from other state enterprises. The managers also wanted to make it easier for a fire service to get to the fire on time so that the university would not have to wait for the Federal Fire Service to arrive. The fire service's annual budget is (at least) 5 million Naira (about US\$32,000). The firemen are willing to help with other nearby fires, but they must first receive special permission from the university administration before they go. However, they are able to go off campus to fight a fire without permission as long as the endangered property is related to (or owned by) the university (for example, the medical center) or if the fire is affecting federal government property.

Nigerian Open University

The Nigerian Open University began its fire service in 2010.²⁴ It is small and still developing, having one full-time fireman (the truck operator), but the university hopes to have ten firemen soon. There are no part-time firemen or volunteers. Because the service is still in its startup phase, no budget is yet in place. The service has a fire truck, and a network of fire extinguishers has been installed, along with smoke detectors and fire alarms. To date, the university has had no fires.

The administrators elected to have their own fire service because of the "setup" at the relatively new university, which opened in 2003 and occupies the buildings of the former Ministry of Education complex. Moreover, they hope to be able to contain a fire before the arrival of external assistance. The Federal Fire Service and Lagos State Fire Service, which have good personnel, may not arrive promptly because of roadway congestion.

Yaba College of Technology

The Yaba College of Technology started its fire service in 1986.²⁵ The school maintains one fire engine and employs eighteen full-time firemen, with no part-time firemen or volunteers. All of these firemen were trained previously under the Federal Fire Service. However, none of them actually worked directly for the Federal Fire Service; the college's service simply uses that service's academy. Four of the eighteen men are crew leaders or supervisors. The highest pay for a fireman at the college is 190,000 Naira per month (about U.S.\$1,200), but the lowest recruits make only 20,000 Naira (about U.S.\$125). The federal government pays very poor salaries because of its civil service rules. (For specific data on the Yaba College fire service, see table 11.)

24. Interview conducted on February 7, 2011, with George Biriok, mechanical engineer in charge of fire safety, Nigerian Open University, 14/16 Ahmadu Bello Way, Victoria Island, Lagos, Nigeria.

25. Interview conducted on February 7, 2011, with Akinyemi Amos, deputy chief fire officer, Yaba College of Technology, P.M.B. 2011, Yaba, Lagos.

Table 11
Yaba College of Technology Fire Service Data

	Number of Building		
	Number of Firemen	Fires Attended	False Alarms
1990	4	7	0
1991	4	9	0
1992	5	4	0
1993	4	5	0
1994	4	7	0
1995	5	3	0
1996	5	3	0
1997	4	5	0
1998	4	2	0
1999	4	4	0
2000	5	7	0
2001	4	4	0
2002	5	4	0
2003	5	2	0
2004	4	2	0
2005	4	3	0
2006	4	2	0
2007	5	9	0
2008	5	3	0
2009	4	4	0
2010	4	5	0
2011 (Jan.–Sept.)	4	6	0
Total	96	100	0
Average	4.4	4.5	0.0

The college chose to establish its own service in view of the highway congestion and as a means to nip any fire in the bud (via easier accessibility). The college fire service had to attend to two fires in early 2011 (one at the college). More than two fires have occurred in some years, but the college fire service has never attended more than five fires in a single year. It is permitted to help out in neighboring community fires and to join forces with the Federal Fire Service and Lagos State Fire Service. According to the fire chief, the college does a great deal of night patrolling and prevention so that fire incidents are few during the year. The fires are normally caused by faulty fluorescent bulbs or electrical issues. Air conditioners may explode. Putting these risks in check with proactive measures eliminates outbreaks of fire.

If such vigilance is effective, whether at Yaba or at the other two university cases, it might in part explain why the frequency of building fires per capita has declined since 1983.

Nigerian Port Authority

The Nigerian Port Authority's fire service started in the late 1950s.²⁶ The Federal Fire Service had insufficient facilities and manpower to handle the needs at ports and thus was considered unreliable to handle container fires and occasional oil fires. The Nigerian Port Authority employs more than two hundred full-time firemen, some of whom are located in Lagos, but no part-time or volunteer firemen. Unlike other services in Lagos, the Port Authority does not hire its firemen out of the Federal Fire Service. Indeed, its firefighters are often inexperienced men who are trained in-house. Starting pay for a Port Authority fireman ranges from 100,000 Naira to more than 200,000 Naira per month (about U.S.\$640 to \$1,280), depending on qualifications. The pay is about twice as much at the private companies, and firemen often leave the Port Authority to join private companies in order to get better pay. On Lagos Island, the Port Authority has one fire engine and one tanker. Six ports across the country maintain similar fire services, each with one or two fire engines.

Central Bank of Nigeria

The Central Bank of Nigeria has a branch office in Lagos that used to be the head office when Lagos was the capital of Nigeria. It is still a very secretive organization and refused to give me a formal interview (I did obtain answers to several key questions informally). The bank also prohibited the taking of photographs on the premises.²⁷ The bank's fire service began in the 1980s. It has ten firemen, including at least two supervisors, and four fire engines or vehicles in two separate locations.²⁸ The main fire service for the bank is now located in Abuja, the capital of Nigeria. The bank's fire service helps out at other fires on a humanitarian basis. The bank chose to start its fire service because the Federal Fire Service was not reliable either because of roadway congestion or because it might not arrive promptly if occupied in fighting another fire.

26. Interview conducted on February 1, 2011, with Damian Onah, senior fire executive, Fire Service Department, Nigerian Port Authority, Marina, Lagos Island, Lagos, Nigeria.

27. Informal interview conducted on February 9, 2011, with Bartholomew Otaba, fire officer, and Robert Arogundade, assistant to the fire officer, at the Lagos branch (Tinubu Square), Security Operations Office, Central Bank of Nigeria, Lagos Island, Lagos.

28. I saw one of these engines, an older one parked in front of the bank. I was able to view the equipment in almost all of the other interviews except at the United Bank for Africa PLC, which sent me photographs.

Nigerian Security Printing and Minting Company

The Nigerian Security Printing and Minting Company's fire service began in 1980.²⁹ This public enterprise employs four firemen, including two supervisors, along with forty-five fire wardens (known as the "safety team"). This service does not have a fire engine but does have fire equipment. The safety manager held much information close to the vest, saying that he could not give information on salaries or budget, nor would he provide historical statistical data.

The service helps out only with building fires, doing so on average five times per year (free of charge). A fire service used to be located near the naval dockyard on Victoria Island, but the organization chose to have its own fire service because of the highly sensitive nature of its product (paper money); the managers did not want outsiders to come in and help with a fire unless it was burning uncontrollably. They also have a concern about roadway congestion and the Federal Fire Service's ability to arrive in time. The safety manager also stated that the Federal Fire Service has inadequate equipment.

In sum, the fire services of these dozen private companies and public enterprises might have helped the prevention of fires, but the evidence is not conclusive. Many of them were not even established until well after the decline in the frequency of building fires began. However, private fire services are certainly an example of safety provision that emerges in the market when regulation is irrelevant, ignored, unknown, or unreliable. We certainly have no reason to believe that they made Lagos less safe in terms of building fires, and it is plausible that their vigilance and prevention services have been a boon to safety.

Multivariate Analysis

Fairly complete data exist for the number of structural fires per capita, 1967–2010 (Y); building regulations, 1967–2010 (X_1); number of inspectors per capita—with data estimates to fill gaps, 1967–2010 (X_2); and population density, 1967–2010 (X_3). These data are used here in a regression analysis. The inspector data would have been more problematic had I not been assured by several people I interviewed that the number of inspectors, once set, stayed fairly constant until the next change. Data prior to 1967 were not available for most variables. Data on personal income per capita by region were not available from any reliable source other than guesses by relevant bureaucrats, but it was apparently quite low. The gross domestic product per capita for Nigeria is presently estimated to be a meager U.S.\$1,389 annually. It is hard to imagine a positive income effect on fire safety when people are so

29. Interview conducted on February 8, 2011, with Leonard Aligbe Aikharialea, safety manager (also in charge of fire safety), Nigerian Security Printing and Minting Company, 26 Ahmadu Bello Road, Victoria Island, Lagos.

Table 12
Results from Multivariate Analysis, 1967–2010

<i>Regression Statistics (1967–2010)</i>						
Multiple R	0.775230214					
R Square	0.600981885					
Adjusted R Square	0.571055526					
Standard Error	0.100997868					
Observations	44					
ANOVA						
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>	
Regression	3	0.614544263	0.204848	20.082025	4.2362 • e ⁻⁸	
Residual	40	0.40802277	0.010201			
Total	43	1.022567033				
	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	0.401609728	0.056462255	7.112889	1.307 • e ⁻⁸	0.28749525	0.515724
X ₁ Length of Building Code	0.000236555	0.000329967	0.716905	0.4775983	-0.0004303	0.000903
X ₂ Inspectors & Staff	-3.8361644	6.340674882	-0.60501	0.5485903	-16.651146	8.978817
X ₃ Population Density	-0.017264718	0.004414855	-3.9106	0.0003477	-0.0261875	-0.00834

Table 13
Results from Multivariate Analysis, 1980–2010

<i>Regression Statistics (1980–2010)</i>						
Multiple R	0.932251968					
R Square	0.869093732					
Adjusted R Square	0.854548591					
Standard Error	0.04379095					
Observations	31					
ANOVA						
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>	
Regression	3	0.343746804	0.114582	59.751482	4.7878 • e ⁻¹²	
Residual	27	0.051776477	0.001918			
Total	30	0.395523281				
	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	0.439527686	0.041892638	10.49176	5.019 • e ⁻¹¹	0.3535711	0.525484
X ₁ Length of Building Code	0.000176535	0.000168535	1.047468	0.3041703	-0.0001693	0.000522
X ₂ Inspectors & Staff	-2.566815744	3.151844307	-0.81439	0.4225493	-9.033866	3.900235
X ₃ Population Density	-0.018585544	0.002837602	-6.54973	5.039 • e ⁻⁷	-0.0244078	-0.01276

poor. Data for the number of firemen were too scant to be included. The results of the analysis, for data starting in 1967, appear in table 12.

Unfortunately, a relatively poor fit was obtained ($R^2 = 0.6$); t and p values for structural fires inversely related to density are statistically significant at the 99 percent confidence level. This result is counterintuitive because it suggests that higher population density reduced overall fires. The other variables curiously have little statistical explanatory power. The amount of regulation does not seem to have had much to do with the number of building fires ($t_1 = 0.71$, $t_2 = -0.61$ for 1967–2010), as already noted. The regulations that existed from 1967 to 2005 were unknown, irrelevant, or too unsophisticated to have done any good. Even the major organizations that should have known about the building codes had no knowledge of the meager codes that existed from 1967 to 2005. Furthermore, even though a complete and relevant building code has been in place since 2006, it remains widely unknown, ignored, and unenforced. Thus, the low t values are hardly surprising.

The results are a bit better if only data from 1980 onward are included (building fires per capita started to decline rapidly after 1980), as summarized in table 13. A much better fit was obtained ($R^2 = 0.87$); t and p values for the effect of density ($t_3 = -6.54$ for 1980–2008) are significant at the 99 percent confidence level. The density findings remain curiously counterintuitive, however, and, not surprisingly, code regulation and inspectors still seemed to play an insignificant role. Once again, we have no reason to believe that the reduction in fires has coincided with greater regulation. Because the influences of insurance and private inspections seem to be unlikely market-forces candidates for explaining the decline in building fires per capita, we are left with private initiative through individuals and companies as the most compelling reason for the decline. All of this improvement occurred, too, in spite of a booming population of mostly poorer people, which produced greater population density.

Theoretical Analysis

The explanatory power of population density leading to increased fires (theory 7) cannot be accepted. If anything, greater population density has led to fewer building fires per capita. Perhaps more hands and eyes generate more net prevention. The hypothesis of an income effect (theory 6) cannot be accepted because incomes for the vast majority of Nigerians have risen little over the past thirty years. However, the hypotheses that government might have failed because of perverse incentives or bureaucratic problems (theory 4) or because of inadequate social knowledge to regulate well (theory 5) cannot be rejected with the present data. The same is true for the hypothesis that regulation can be irrelevant (theory 1).

The immigration hypothesis (theory 8) cannot be accepted because Lagos has received little foreign immigration (except that in the general absence of immigration the number of fires per capita might have decreased). The hypothesis that fire

safety regulation has been working in Lagos, albeit inefficiently (theory 2) is rejected. The same is true for the useful placebo theory (theory 3). Lagos did not have significant regulation during most of the period examined. In the past two years, the number of building fires in Lagos has spiked in spite of increased regulation. Again, it seems that regulation in Lagos has been irrelevant (theory 1) because fire safety in Lagos has improved without it. The theories that surmise that technological changes have accounted for more fires (theory 9) or that fires are a result of a strong presence of moral hazard in Lagos (theory 10) cannot be accepted because neither technological sophistication nor a developed fire insurance market has existed in Lagos.

In regard to theories 4 and 5, the past few years of data show, if anything, that increases in regulation preceded increases in the number of fires, suggesting causality in the opposite direction, although there are too few data points to be conclusive. At the very least, we can conclude that Lagos did well to prevent fires prior to implementing strong fire safety regulation, that building codes have been either irrelevant or ineffective in alleviating fires, and that this failure might have reflected public-choice or knowledge problems. Our hats must go off to the firemen who, in spite of trying circumstances and intense vehicular congestion, have evidently done a reasonably good job of putting out fires.

But the first-place trophy has to go to markets, which might have provided a means for prevention and certainly showed how private solutions emerge and rise to the occasion when government provision fails. The existence and emergence of private fire companies—spontaneous privatization—may well provide a significant reason why building fires have either declined or remained low. Perhaps they provide better safety training and awareness in their own firms and adjacent ones, reducing the frequency of fires. It makes sense that firms that spend considerable scarce resources to maintain private fire departments would utilize the influence of such fire teams and wardens to their greatest advantage. Although this conclusion is conjecture, we have no reason to believe that private fire services have been detrimental to fire safety in Lagos.

Aside from the plethora of accolades due to the market and private firms, perhaps the most amazing part of the story is how well Lagos's firefighters perform, despite being so ill equipped. As shown in table 6, there are currently (2010–11) 387 firefighters in the Federal Fire Service (33.5 percent), 597 firefighters in the Lagos State Fire Service (51.7 percent), 92 firefighters in private companies (8.0 percent), and 78 firefighters in public enterprises (6.8 percent).

No one claims that markets bring perfection. The issue is simply whether government provision and regulation can serve the public interest *better* than markets can. Public-choice and knowledge theories tend to discredit the rosy view of government provision. Market-based solutions are sometimes superior to public-policy ones. So far the data from Lagos seems to support this hypothesis.

Whereas government provision has often left something to be desired, markets have more often succeeded in safety provision. Lagos is not the only example of

this phenomenon. There is evidence that firms, which have an incentive to please customers en route to maximizing profits, establish their own technical and safety standards and maintain their own inspection teams. Such is the case with Hilton International (Webster 1995, 45) and Walt Disney World (Foldvary 1994, 123–32; Cobin 1997, 112–13). Following these examples, private fire protection services may be the best means of improving fire safety in the public interest.

Market provision, imperfect as it may be, will eliminate public-choice problems arising from bureaucracy as well as from perverse incentives, knowledge problems, and economic distortions caused by regulations that drive up costs and encourage inefficient or dangerous human behavior. Therefore, this study lends support to policies that promote private, market-based building and fire safety regulation.

Conclusion

In a country plagued with chaos, the market has risen to the occasion to provide greater fire safety in Lagos. Part of the chaos is manifest in federal and state fire services, which have outdated and inadequate equipment and are hampered by government planning and provision of roadways that have given rise to massive congestion problems. Many Nigerian firms believe that government provision of fire safety services has failed, has been irrelevant, and has been unreliable, obliging them to form their own private fire services.

Building fires are a function of increased urbanization and industrialization, and few people have ever doubted the need for government to provide at least some fire safety regulation. However, the existence of such regulation does not mean that it has been the optimal means of serving the public interest. Indeed, the evidence in this study suggests that the opposite may be true. Furthermore, stagnant, meager incomes and greater population density notwithstanding, building fires per capita have declined dramatically since 1981 in Lagos. Even though one city's experience may be insufficient to support a general theory, this case certainly has interesting theoretical implications. Without significant, known, enforced, or relevant regulation, the number of structural fires per capita peaked in 1981 and then dropped more than 93 percent to 2008 and more than 76 percent to 2010.

Thus, although fire safety regulation in Lagos has *not* been successful in reducing the number of structural fires or improving fire safety, it appears that private provision of fire safety services has been a positive influence. The evidence from Lagos certainly provides little reason to believe that regulation has much of anything to do with alleviating fire danger, and it suggests that a greater role for markets in providing fire safety should be sought. The formation of private fire companies and public-enterprise companies, with fire warden training programs and preventive activities, might have played a leading role in reducing fire danger and, more plausibly, in keeping the incidence of building fires low. Likewise, the private initiative of individuals, even though poor and packed tightly together

and with widespread use of personal generators during frequent power outages, cannot be ignored. The evidence from Lagos shows that market alternatives and private firms have been responsible for the best successes in improving building fire safety, whereas government measures to improve safety have been irrelevant or unreliable.

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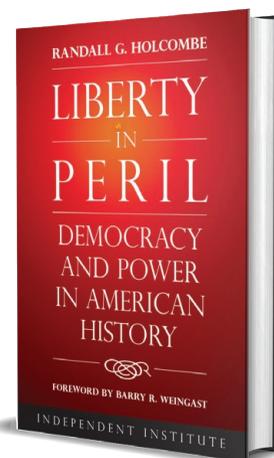
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