

Beyond bans: A political economy of used vehicle dependency in Africa

Festival Godwin Boateng

Center for Sustainable Urban Development
Columbia Climate School/Earth Institute
Columbia University
bfsvl1988@gmail.com

Jacqueline M. Klopp

Center for Sustainable Urban Development
Columbia Climate School/Earth Institute
Columbia University
jk2002@columbia.edu

Abstract: African countries serve as used vehicle dumping sites for advanced capitalist countries, undermining global and local goals to move toward safe and low-emissions transport. Africa's used vehicle dependency is commonly explained in terms of push-pull factors linked to demand for new cars and stringent environmental policies in wealthier countries that make available used vehicles for export, the limited purchasing power for less-polluting new safer vehicles, and weak regulation of vehicle emissions in Africa, all of which sustain used vehicle import on the continent. Drawing on the Ghanaian case, we present an enhanced explanation that brings in the role of historical underinvestment in public transport and larger processes that channel public resources toward car-oriented transport and land use, marginalizing other modes of transport used by the majority. Using historically informed political economy analyses and drawing on interviews and grey literature including media and institutional sources, this paper makes two contributions. First, it advances used vehicle research by moving beyond the push-pull approach to incorporate the historical institutional drivers of used vehicle and automobile consumption generally in Africa. Second, it provides insight into why used vehicle import bans on their own are unlikely to lead to sustained environmental and public health benefits and instead recommends more holistic policies for shifting toward cleaner, safer and affordable public transport in Africa. Transport and land-use planning reforms and investment prioritizing public transit including minibus recapitalization programs, as well as mixed land use and transit-oriented development can help reduce used vehicle dependency and the harms it brings.

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1 Introduction

Given the climate and air pollution crises and, hence, the urgent need to reduce emissions from transport, clunkers programs—the trade of older vehicles for cash—are increasingly becoming popular in the United States, Europe and parts of Asia as a measure for dealing with used vehicle-related environmental and other challenges (see e.g., Delorenzo, 2021; Sulemana, 2012). However, the majority of the vehicles that are brought in for exchange are often not destroyed or recycled but instead shipped to Af-

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rica and other low-income regions of the world for re-use (Coffin et al., 2016; Plumer, 2020; Sulemana, 2012; UNEP, 2020). For instance, according to the United Nations Environment Programme (UNEP, 2020), around 80% of the 14 million used cars, vans and minibuses exported between 2015 and 2018 from Europe, the United States, and Japan went to low and middle-income countries, with more than half ending up in Africa.

The continuing use of Africa as the dumping site for obsolete, unsafe, dirty, and, often, faulty used vehicles by advanced capitalist countries deserves more attention. The global on-road vehicle fleet is set to rise to 2.5 billion by 2050, with most future vehicle purchases (two out of every three) projected to occur in Africa and other low-income economies (UNECE, 2017). This growing motorization heralds trouble especially since the majority of vehicles exported to Africa are often over-aged, highly polluting and prone to malfunctioning and crashes (Akerlof, 1970; Coffin et al., 2016; Plumer, 2020; Sulemana, 2012; UNEP, 2020).

The continent already has a serious problem with vehicular pollution and road traffic crashes (RTCs). For instance, according to the World Health Organization, about 650 deaths occur on Africa's roads every day (WHO, 2018, p. 4). With a fatality rate of 26.6 deaths per 100,000 people, Africa remains the global locus of road injury deaths (Boateng & Kwame, 2022; WHO, 2018). Sub-Saharan Africa also experienced a 75% rise in transport emissions between 2000 and 2016, with transport emissions increasing 153% in Ghana, 73% in Kenya, and 16% in Nigeria (AASA, 2020). Vehicular emissions are a major cause of chronic respiratory-related illnesses and premature deaths in African cities. For instance, air pollution, to which vehicular emission contributes significantly, is estimated to kill 600,000 people every year in Africa (Bonsu et al., 2020; UNEP, 2016).

Governments in Africa often impose bans and higher penalties on used vehicle imports as a way to deal with the environmental and other problems associated with their use. For instance, Ghana introduced the Customs, Excise and Preventive Service (Management) (Amendment) ACT, 1998 (Act 552) in June 1998 to ban the importation of all vehicles older than 10 years. The ACT was replaced four years later with the Customs, Excise and Preventive Service (Management) (Amendment) ACT, 2002 (ACT 614) that imposed penalties on over-aged vehicles exceeding 10 years (EPA, 2017; Kombat & Wätzold, 2019).

Also, as part of an industrial policy aimed at creating a local manufacturing industry, Ghana's parliament recently passed the Customs (Amendment) 2020 (ACT 1014) to proscribe the importation of all used vehicles over 10 years of age and all salvaged vehicles of any age into the country. The mechanics, sprayers, and other garage operators whose livelihoods depend on used vehicles strongly protested against the passage of the ACT. Nevertheless, the President assented to it. Passed in April 2020, the ACT came into force in October 2020 (Dontoh & Dzawu, 2020; Larnyoh, 2020).

Ghana, however, is not the only African country that has restrictions on the importation of used vehicles. Nigeria has a ban on the importation of vehicles that are more than 8 years old (Ayeter et al., 2021). In 2019, Libya set a 10-year age restriction for light and heavy-duty vehicles (ILT, 2020). Similar regulations exist in various forms in Algeria, Kenya, Senegal and other countries in the continent (Ayeter et al., 2021; ILT, 2020).

The puzzle, however, is that while such measures often result in some reductions in the number/quantity of used vehicle import (see Ayeter et al., 2021; Sulemana, 2012), they seldom translate into public health gains in terms of reduced crash injuries, vehicular pollution, and a shift towards new less polluting eco-friendly vehicles. Consider, for instance, the outright ban and high penalties Ghana imposed on used vehicle imports in 1998 and 2002, respectively (EPA, 2017; Kombat & Wätzold, 2019). It has been documented that the ban resulted in a sharp reduction in used vehicle imports from 15.35% in 1998 to 5% in 2003 (Obeng-Odoom, 2010, p. 43).

Strikingly, however, the reductions did not translate into public health gains in terms of meaningful, sustained reduction in road injuries or vehicular pollution. For instance, in 1998, Ghana's RTC injury per 100,000 people was around 28.54. It reduced slightly to 28.18 in 1999 and then rose to 35.72 in the year 2000. The figure reduced slightly to 34.57 in 2001 and then to 32.57 in 2002 before jumping again to 33.34 in 2003. These figures could be much higher given the inadequate reporting of RTCs in Ghana (Salifu & Ackaah, 2012).

Table 1. Road traffic crash injuries in Ghana: 1998–2006

Year	RTC injury	Population of Ghana	RTC injury per 100,000 people
1996	4,964	17, 462, 504	28.43
1997	5,634	17, 908, 977	31.46
1998	5, 239	18, 357, 159	28.54
1999	5, 302	18, 812, 369	28.18
2000	6, 886	19, 278, 850	35.72
2001	6,829	19, 756, 929	34.57
2002	6,594	20, 246, 376	32.57
2003	6,919	20, 750, 308	33.34
2004	6,348	21, 272, 328	29.84
2005	5,645	21, 814, 648	25.87
2006	7,137	22, 379, 057	31.89

Source: Obeng-Odoom (2010: 40) and World Bank (2021)

Furthermore, Kanyoke (2004, p. 35) found that between 1999 and 2003, at a time the ban and penalties were still being enforced, carbon monoxide, carbon dioxide, volatile organic compounds, nitrogen oxides and PM emissions even went up in the Accra-Tema area where the majority of the vehicles in Ghana are also concentrated (Adjei Appiah, 2020). More generally, Ayetor et al. (2021) have shown that the imposition of bans and penalties on used vehicle import in Africa do not yield a commensurate increase in the purchase of *brand-new* vehicles (Ayetor et al., 2021). In sum, the imposition of bans and higher penalties on used vehicle import appear to fail to yield meaningful, sustained public health gains in Africa in terms of reduced per capita crash injuries and vehicular pollution, and a shift towards new less-polluting eco-friendly vehicles.

Yet, policy alternatives like investments in and subsidies for public transport modes used by the majority and reforms of vehicle dependent planning systems and land-use patterns that marginalize non-motorized modes of transport are often not factored into the realm of possibilities. We argue that this state of affairs is linked to the so-called *push-pull approach* to Africa's used vehicle dependency. The approach considers Africa's used vehicle dependency as being driven primarily by the demand for new cars, stringent environmental policies in wealthier countries which make available used vehicles for export, the limited purchasing power for less-polluting new, safer vehicles and weak regulation of vehicle emissions in Africa, all of which sustain used vehicle import in the continent (see e.g., AASA, 2020; Brooks, 2012; Coffin et al., 2016; Davis & Kahn, 2010; Grubel, 1980; Onogwu, 2018; Pelletiere & Reinert, 2006; Plumer, 2020; UNECE, 2017).

Being ahistorical, the push-pull approach does not engage in any meaningful or systematic manner with how the broader historical-institutional factors determining transportation outcomes in Africa also contribute to its problematic heavy dependence on used vehicles. Put differently, questions about the historical-institutional roots of Africa's used vehicle dependency—i.e., the policy processes institutional

dynamics, and the historical peculiarities that have transformed the continent into advanced capitalist countries' dumping sites for used vehicles—remain under researched. The result of this is the narrowing of the discourses on the topic to the above noted push-pull factors.

Using Ghana as case study, this paper aims to deepen our understanding of Africa's used vehicle dependency. As with other countries in the continent (Klopp & Cavoli, 2017; Oviedo et al., 2021), people walk a great deal in Ghana to access work and services (Koinange, 2018; Obeng-Atuah et al., 2017). For longer distances, however, many of them rely on the ubiquitous “*tro-tro*” (minibuses) as well as personal cars—the majority of which tend to be used vehicles (Obeng-Odoom, 2010, 2013; ITA, 2020). Used vehicles are often highly-polluting and prone to malfunctioning, and, therefore, contribute significantly to the country's RTC problems (Angnunavuri et al., 2019; Boateng, 2020, 2021a, 2021b; Boateng, Ofori-Dua, et al., 2022; CDC, 2019; NRSC, 2009a, 2009b) and vehicular pollution especially in the cities and towns where most vehicles are concentrated (Amegah et al., 2021; Essel, 2016; EPA, 2019; Graphic Online, 2018; Ministry of Transport, 2020; USAID, 2016).

Studying Ghana might thus offer some useful lessons to better understand Africa's used vehicle dependency in relation to public health and climate goals. Specifically, this study asks the following questions:

- What are the historical-institutional roots of Ghana's used vehicle dependency—i.e., what are the policy processes, institutional dynamics, and historical peculiarities that have transformed Ghana into one of the important sites of used vehicles in Africa?
- What can be learned from analyzing the historical-institutional roots of Ghana's used vehicle dependency to: (a) understand why used vehicle bans seldom yield sustained public health benefits (b) move used vehicle research in the country and Africa forward and (c) support global and local goals towards safe and low emissions transport?

In addition to a review of peer-reviewed sources, this paper relies on evidence from grey literature including media and institutional sources as well as some key interviews. This is necessary because the policy realm is fast changing and not always captured real-time in scholarly sources. Media sources are increasingly being endorsed in Ghana's (Boateng et al., 2021; Boateng, Appau, & Baako, 2022a; Mintah et al., 2021; Oteng-Ababio & Agyemang, 2012) but also Africa's scholarly community (see e.g., Boateng, 2016; Boateng & Wright, 2019; Yahya, 2006) as an important source of information for investigating highly dynamic development questions. The possibility of bias media reporting, however, requires careful triangulation of sources in order to have a comprehensive grasp of the topic under investigation. Accordingly, we sourced information from both local private (e.g., Myjoyonline, 2013) and state-owned (e.g., Graphic Online, 2018) as well as international media agencies (e.g., *New York Times*—see e. g., Plumer, 2020).

Some of the institutional evidence for this study include budget statements, income statistics, RTC, air pollution, and vehicle import data. This evidence was assembled from institutions such as the Ministry of Finance (see e.g., Ofori-Atta, 2018), Ministry of Transport (e.g., Ministry of Transport, 2020) and the National Road Safety Authority (e.g., NRSC, 2009a, 2009b) as well as international bodies like the Automobile Association of South Africa (e.g., AASA, 2020), the World Health Organization (e.g., WHO, 2018), United Nations Environment Program (e.g., UNEP, 2020), and the United States Centers for Disease Control and Prevention (e.g., CDC, 2019).

The study also relies on empirical information on used and brand-new vehicles' pricing generated from interviews with some car dealers and owners operating in the Ghanaian commercial passenger transport sector. This wide-ranging evidence from academic, media, and institutional (local, regional, and global) and empirical sources was woven together to provide an alternative, critical analysis of why the imposition of bans and higher penalties generally fail to address used vehicle dependency and associated ills in Ghana and Africa generally.

By bringing in a wider political economy lens we can better explain why such measures persist even though they fail to work as claimed. After an overview of the problem framing and motivation for the study, the rest of the paper is divided into four sections. Section 2 details and critiques the push-pull approach to Africa's used vehicle dependency. Section 3 builds on the critique and offers another layer of explanation using Ghana as case study. Section 4 discusses the implications of this more layered and historically nuanced explanation for the broader policy and scholarly discourses on used vehicle dependency, after which the paper concludes with some recommendations for a more holistic approach to addressing the public health and emissions problems raised by used vehicle dependency in Africa.

2 Africa's used vehicle dependency: Overview and critique of the push-pull approach

Most explanations for the export of older, dirtier vehicles into Africa look at push and pull factors. The push factors relate to conditions in wealthy countries that propel the export of used vehicles while the pull factors relate to the conditions in Africa that sustain their importation. First, in relation to the push factors, research has shown that consumers in wealthy nations, subjected to substantial advertising by car companies, tend towards purchasing higher-quality, stylistically elegant vehicles (Davis & Kahn, 2010; Grubel, 1980; Pelletiere & Reinert, 2006; UNECE, 2017). Poor families, however, often remain reliant on used vehicles (Klein & Smart, 2019). Second, it is very expensive to own used vehicles in wealthy nations because of the high cost of repairs/maintenance. Stringent environmental protection regulations also increase the cost of insuring, recycling or disposing them. The result of these dynamics is a limited desire for used vehicles in wealthy countries (Coffin et al., 2016; Grubel, 1980; Plumer, 2020).

On the other hand, while consumers in low-income countries may not inherently prefer used over new vehicles at similar prices, they are often income-constrained. Auto loans too are highly unaffordable, with the result that the vehicle hire purchase market is accessible to a few high-income people—often with stable sources of income (see Obeng-Odoom, 2010). This undermines effective demand for the often-expensive brand-new vehicles that are largely manufactured in the wealthy countries¹. For instance, in 2014, the average costs of a new and used vehicle exported from the USA were \$28 000 and \$11 000, respectively (AASA, 2020, p. 7). This cost differential, coupled with the limited number of new vehicles produced locally, lax environmental protection standards, and relatively cheaper cost of vehicular repairs, creates room or elevates demand for used vehicles in Africa.

The embeddedness of corruption among custom services in the continent also makes it easy for the elevated demand for such vehicles to be met by the network of local-global purveyors of such vehicles that work with customs officials to circumvent bans and fees (see e.g., Brooks, 2012; Onogwu, 2018). It is, therefore, plausible to attribute Africa's used vehicle dependency to lack of effective demand for new vehicles, corruption and lax regulation generally which together with cheaper cost of vehicular repairs, create room or elevate demand for used vehicles which are in ready supply because of demand for new cars and policies in wealthier countries that enable recycling (AASA, 2020; Brooks 2012; Coffin et al., 2016; Grubel, 1980; Onogwu, 2018; Pelletiere & Reinert, 2006; Plumer, 2020; UNECE, 2017).

The push-pull view of used vehicle dependency in Africa brings to the fore the rather important recognition that policies aimed at reducing emissions and road injuries in wealthy countries would not yield aggregate global gains in so far as fuel-inefficient highly-polluting and crash prone used vehicles are exported to Africa and other low-income regions of the world. The imposition of bans and penalties (e.g., higher taxes) on the importation of used vehicles also seems to be a logical response by African

¹ A few countries in Africa including South Africa, manufacture cars.

governments to address air pollution, road traffic crashes, and other used vehicle related problems, although, in practice, the policy rationales for these bans tend to include stimulating local automobile manufacturing (see e.g., Ghana's Customs (Amendment) 2020: ACT 1014) and may also be linked to corruption networks that benefit from extraction at customs linked to facilitating evasion of these bans and tariffs on used cars (Brooks, 2012; Onogwu, 2018).

Despite the value of the push-pull approach, it is important to embed Africa's used vehicle dependency in a broader political economy and context around transportation and land-use in order to explore more multi-faceted policy options that go beyond bans. In addition, internationally, there is a groundswell of research that shows that the automobile-dependent nature of modern societies is not an apolitical or a technical/natural state of affairs (see e.g., Conley & Tigar McLaren, 2016; Mattioli et al., 2020) and this is equally true for Ghana (see e.g., Abane, 1993; Adarkwa, 1991; Hart, 2014, 2020; Obeng-Odoom, 2010, 2013; Oteng-Ababio & Agyemang, 2012; Quayson, 2014) and Africa generally (Klopp, 2012; Njoh, 1997, 2003).

Instead, it is the continuing legacy of the historical process of channeling public resources—streets, finance, planning laws and land-use patterns—to accommodate and promote the culture of automobile consumption of a few,² with the repercussion of displacing or undermining the desire for and investments in other transport modes used by the majority (see e.g., Appleyard & Riggs, 2021; Ewing & Cervero, 2010; Litman, 2002, 2017; Mattioli et al., 2020; Norton, 2007; van Acker & Witlox, 2010). In the African context, such processes emerged during the colonial period when elites used cars and growing African entrepreneurs used the new technology to build bottom-up bus and freight systems (see e.g., Hart, 2014, 2016a, 2016b, 2020; Klopp, 2012).

Yet, the push-pull approach to used vehicle dependency in the continent, does not adequately engage in any meaningful or systematic manner with how this broader political economy of investments also shapes used vehicle dependencies. Further, the use of the used vehicle (public transport versus personal use) is often not disaggregated and examined separately. These omissions are significant because they limit a comprehensive understanding of how the historically, socially, and politically contingent factors, processes and developments shaping the pursuit and the provision of transport needs in Africa also contribute to the continent's problematic heavy dependence on used vehicles. We will show that by adding more contextualization of the problem, more comprehensive interventions for addressing used vehicle dependency in Africa suggest themselves. We explore such an analysis in the remainder of the paper with particular reference to Ghana.

3 Africa's used vehicle dependency: A historical-institutional political economy grounding from Ghana

A review of the techno-politics of mobility scholarship on Ghana reveals two intricately related factors, which when considered in tandem with the issues emphasized in the push-pull approach, provide a more holistic explanation for Ghana's used vehicle dependency. The factors are **(a)** the persisting low-density sprawl-inducing spatial or societal organization system and **(b)** inadequate prioritization of user-oriented public transport systems. Both of these factors have roots in the country's colonial experience.

² We do not have access to good transport data but one figure commonly cited is that approximately 3% of households own cars in Ghana (see Armah et al., 2010; Quarshie, 2007; and World Bank, 2015b in Adjei Appiah, 2020). The Ministry of Transport suggests that in 2015 1,952,564 registered vehicles existed in the country which has a population of 27,707,000; assuming an average household size of 4 people, this gives a rate of approximately 2% of households with a vehicle. This may be higher given corruption and the fact that all vehicles may not be formally registered. Most vehicle ownership is concentrated in cities, and many are owned by commercial entities; overall this suggests that household car ownership is very small, especially in rural areas.

3.1 Molding Ghana into used vehicle-dependent road-based motorized transport society: The Longue durée

The dominance of road-based motorized transport in Ghana today, and its heavy dependence on used vehicles is actually an unexpected outcome. The British colonial government, which fashioned the landscape for the outcome through their policies, heavily favored rail to facilitate the movement of farm produce from the interior to the coastal ports for export, while undermining the growth of road transportation by refusing to build new roads and maintain existing ones. This was to prevent what the then Colonial Secretary, Lord Passfield described as “road vs. rail competition” (Hart, 2014, p. 198).

The attempt to restrict road transportation for Africans, however, failed because the colonial town planning system followed a monolithic land-use pattern that separated work and other activities from home and fostered social segregation between wealthy (colonial officials and some African elite) and poor classes (mostly African). The government used disease epidemics and earthquakes as excuses to decongest and segregate cities and further stifle agglomeration, and, in so doing, stimulated suburbanization (Hart, 2020; Quayson, 2014; Yeboah et al., 2020).

These patterns of spatial development encouraged more travelling within and across cities. Meanwhile, the railway system, which was the main means of transport in the colony, as noted earlier, was structurally oriented towards facilitating the exploitation of natural resources in the hinterlands for export, and was, therefore, not necessarily aligned to the urban and general mobility patterns and needs of the indigenous people. Second, the colonial government’s relatively limited municipal bus services were solely designed for passenger transport. However, the majority of the people—particularly market women—carried goods with them when travelling. Thus, the municipal buses too, as with the railway, were poorly suited to the needs of the people (Hart, 2016, 2020).

The result was that the colonial transport modes did not just prove insufficient, they also were unusable for a large number of the city’s most mobile residents. Essentially, the colonial government implemented a low-density sprawl-inducing spatial or societal organization system, which solicited, encouraged or compelled more travelling and at the same time, failed to invest in user-oriented public transport systems. The situation forced the indigenous people to construct their own networks and means of transportation. They began developing vehicles, popularly called *mammy trucks* or *lorries* or *wagon*, from wood and imported engines and chassis from Europe and the United States (Hart, 2014; Quayson, 2014).

The colonial authorities sought to stymie this indigenous-controlled private commercial motorized transport sector when the growth of the sector began to undermine the government’s control over movement of people and export revenues, and also engaged its municipal buses in a fierce competition for passengers in the cities (Burchardt, 2015; Hart, 2014, 2016a, 2016b, 2020). The authorities labelled the vehicles “pirate passenger lorries,” introduced new regulations that made it harder for indigenous people to qualify to drive, and restricted passenger transport to the municipal bus services. Driving practices such as stopping to load and unload along and at roadsides too were criminalized (Burchardt, 2015; Hart, 2014, 2016a, 2016b, 2020).

However, the inadequacy and unsuitability of the existing transport systems to the needs of a large number of the colony’s most mobile people meant that the commercial motor transport sector and road-based motorization generally was always going to grow—despite the authorities’ attempts to stifle it. More and more vehicles were, therefore, imported into the country for commercial but also private use. For instance, the number of vehicles in the colony grew from only 16 in 1908 to 4,141 commercial motor vehicles and 1,618 private cars and taxis by 1932. By the end of the 1930s, there were over 5,501 commercial vehicles and 2,076 private cars and taxis (Hart, 2020, p. 55).

The growth of vehicle ownership and usage in the colony coupled with pressures from striking-

driver unions forced the colonial government to construct more roads, seek out lands for new lorry parks and invest in the expansion of existing ones (Hart, 2014). The provision of new vehicle infrastructure and the expansion of existing ones, however, fashioned a landscape ripe for the importation of even more vehicles into the colony. By 1952, the number of vehicles in the colony had reached 20,000, of which 7,700 were mammy wagons (Gould, 1960, p. 79).

3.2 Postcolonial story: Same old colonial story

What the historical evidence shows overall is that the heavy reliance on imported vehicles in Ghana emerged from the colonial state's regressive low-density, urban sprawl-inducing planning systems, socially segregated land-use patterns, and low investment in user-oriented public transport. This policy and institutional configuration encouraged more travelling without commensurate adequate and comprehensive public transport systems in the colony. At independence, the Ghanaian authorities sought to resolve the transportation challenges.

Kwame Nkrumah and the other leading nationalists who contended with the British for control of the then Gold Coast economy couched their struggle for independence in unconditional condemnation of imperialism, and grand declarations of uprooting all vestiges of European domination from the country. Nonetheless, in common with their colleagues in other parts of Africa (see e.g., Njoh, 1997, 2003, 2008), at political independence, they adopted the colonial models of development (Aboagye & Bolt, 2018; Boateng, 2022; Boateng, Ametepey & Kusi, 2022b; Obeng-Odoom, 2013; Songsore, 1979). In the transport sector for instance, Nkrumah's socialist CPP and the other early post-colonial governments failed to re-orient the railway systems they inherited from their colonial interregional focus of facilitating the extraction of raw materials from the hinterlands for export and align them with the urban or intraregional mobility needs of the people.

Attempts, however, were made to build a public bus transport sector (Brookins, et al., 2019; Clayborne, 2012). For instance, Nkrumah's government established the State Transport Corporation (STC) while the military National Liberation Council (NLC) junta too established the Omnibus Services Authority (OSA). These public bus transport agencies established in the early days of independence, as with the others that followed them, unfortunately were racked by corruption and mismanagement, leading to heavy losses (Brookins et al., 2019; Hart, 2013). The result of this was that the importation of engines and chassis from Europe and the United States for the manufacturing of mammy wagons and subsequently the importation of tro-tros (minibuses) remained a core part of Ghana's public transport system (Hart, 2013, 2014) but remain marginal in terms of public support and investment.

When years of economic decline turned into decades, Ghana signed onto the IMF/World Bank's market-heavy Economic Recovery Program (ERP), popularly called structural adjustment reform, to revive the economy (Brookins et al., 2019; Obeng-Odoom, 2013; IMF, 1988). The unequal economic gains, the privatization of transport, and removal of vehicle import restrictions (tariffs and license) that came with the reforms created room for the importation of even more vehicles into the country—a development that has since remained a marked feature of the Ghanaian society. The broader point here is that, as part of structural adjustment reform's market-heavy intention to “roll back the state” from the delivery and provision of public goods and services, and cut down public expenditure, a freeze was placed on public sector employment and wages. Investment in public transport was also curbed. Workers were retrenched; those who escaped retrenchment saw major cuts in their salaries, with the overall result of widespread economic hardships (Aye, 2001; Boateng, 2019).

A minority made some significant gains, though. For instance, prior to the reforms, senior civil servants' salary ratio to that of juniors hovered below 2:1. By 1991 (the 9th year of structural adjustment reforms), the ratio had risen dramatically to 10:1. Between 1992 and 1999, the mean income of the

poorest 10% of workers increased by just 38%. That of the richest 10%, however, went up by 600%, implying a 150:1 ratio of average income for top decile and bottom decile workers, respectively (Obeng-Odoom, 2013, p.72). The percentage of income controlled by the richest 10% of the population also rose from 29.5% in 1998 to 32.8% in 2007 (Obeng-Odoom, 2013, p. 72). When the government privatized transport service delivery and relaxed restrictions (tariffs and license) on vehicle imports, the top decile class, whose economic fortunes increased in the course of the reforms, were also granted car loans by the government (Abane, 1993, p. 196). Hence, they invested in vehicle imports—for personal and commercial uses.

Unsurprisingly, therefore, vehicle importation rose from negative³ 2,184 in 1983 (Obeng-Odoom, 2010, p. 34) to 50,000 vehicles in 1999, followed by 35, 000 more in 2000 (Chalfin, 2008, p. 433). Meanwhile the colonial planning systems and land-use patterns that separate work and other activities from home and persisting underinvestment in public transport relative to roads were retained (Abane, 1993; Adarkwa, 1991). This stimulates the need and demand for roads to connect the many sub and peri-urban areas that are rapidly developing in the country, and since roads have huge political value and opportunity for rent-seeking in Ghana (see e.g., Osei-Tutu et al., 2010; Obeng-Odoom, 2013), more and more of them are being constructed in the country (Obeng-Odoom, 2010, 2013; Oppong-Yeboah & Gim, 2020).

For instance, the current New Patriotic Party (NPP) government declared 2020 the “year of road” (e.g., Gyesi, 2020). In its 2019 budget, the government outlined some 16 “special initiatives” that were to be given sharper policy focus among which was road construction which also received the 4th biggest allocation of GH¢ 380, 000, 000 (\$64, 182,554) (see Ofori-Atta, 2018, p. 2). Between 2002 and 2007 alone, over US\$1 billion were sunk into roads expansion in Ghana. Between 2000 and 2008, a period of only eight years, the total length of surfaced roads in Ghana increased by over 72% (Obeng-Odoom, 2010). Overall, 80% of Ghana’s annual budget for the transport sector is channeled into road infrastructure projects, and motorization rates have grown from an estimated 50 vehicles per 1,000 people in 2010, to 70 vehicles per 1,000 people in 2015 (Essel, 2016: 5).

What the foregoing shows overall is that road construction is heavily prioritized in Ghana. The problem, however, is that road construction may be one of the few cases Say’s law, supply creates its own demand, applies. The prioritization of road construction coupled with the continuing underinvestment in public transport and the high social/cultural status attached to vehicle ownership (Chalfin, 2008)⁴ has encouraged the importation of more and more vehicles for private use through a liberalized market into Ghana (Kehbila et al., 2009; Obeng-Odoom, 2010, 2013). However, as discussed in the push-pull approach to used vehicle dependency in Africa, in common with other countries in the continent, income levels in Ghana are generally low. Further, auto loans are highly unaffordable, with the result that the vehicle hire purchase market is accessible to a few high-income people (see Obeng-Odoom, 2010).

Together, these and other income/credit-related constraints undermine effective demand for the usually expensive brand-new vehicles (see e.g., AASA, 2020, p. 7). This, coupled with the limited number of new vehicles produced locally, low vehicular emission standards, and relatively cheaper cost of labor and vehicle repairs, creates room or elevates demand for used vehicles in the country. The demand is easily met by the network of local-global importers with the required levels of used vehicle supply; at the same time the well-documented issue of corruption in the Customs Service (Addo, 2021; Ghanaweb

³ That is the difference between 1982 and 1983 vehicle imports (9, 264–11, 448) (see Yeboah, 2000, p. 76)

⁴ Adeji Appiah suggests we need much more work on car ownership in relatively low car owning environments and that some evidence exists that in these contexts, an instrumental or utility value is placed on the car more than the emotional attachment the car presents (2020, p. 186). Poor public transport pushes people towards car ownership for practical purposes but this also means that strong public transport improvements might also lead to less car ownership (Adeji Appiah, 2020). This all requires more study.

2011; GII, 2018; Transparency International 2010) undermines effective enforcement of vehicle import regulations. It is, therefore, not surprising that 90% of Ghana's vehicle imports are used vehicles as recently reported by the International Trade Administration of the US Department of Commerce (see ITA, 2020).

The vehicles support mobility and create economic opportunities in the country. For instance, the majority of tro-tros in Ghana—the backbone of urban mobility in the country—are used vehicles (Obeng-Odoom, 2010, 2013). Also, many people in Ghana make a living from used vehicles as importers, mechanics and sprayers (Dontoh & Dzawu, 2020; Larnyoh, 2020). The challenge, however, as we have noted, is that these vehicles are often highly polluting and prone to malfunctioning (Coffin et al., 2016; Plumer, 2020; Sulemana, 2012; UNEP, 2020). As a result, they end up worsening air pollution, crashes and other road transport miseries in the country (Boateng, 2021c, 2021d, 2021e). The discomfort, inefficiencies and other problems in the tro-tro sector (see e.g. Boateng, Ofori-Dua, Dwumah and Forkuor 2022c; Obeng-Odoom, 2010, 2013) further encourage individual car use which, in turn, exacerbates the demand for used personal cars—a key source of road miseries in Ghana. For instance, data from the National Road Safety Authority suggests that private cars dominate in RTCs in Ghana (Boateng & Kwame, 2022; Bokpe, 2018).

4 Discussion

We have examined the web of historical-institutional factors that have locked-in Ghana to depend heavily on used vehicles. As summarized in Figure 1, the green boxes contain the typical push-pull model factors and the black boxes the other layers of factors that a historical-institutional approach brings to the fore. The dash/broken arrows indicate an indirect, albeit, rather important pathway of causation.

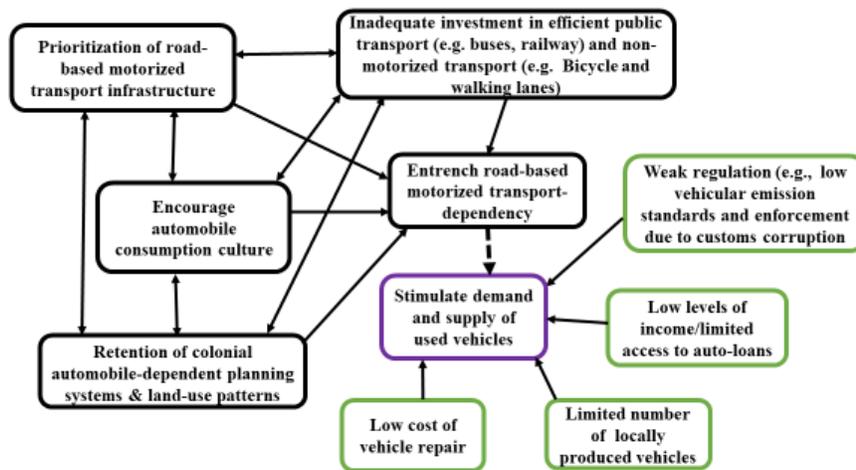


Figure 1. Conceptual framework of used vehicle dependency in Ghana

The figure shows that the entrenchment or elevation of motorized mobility modes as the optimal means of transport is at the heart of Ghana's used vehicle dependency. But the relationship between the two is mediated by the push-pull factors (e.g., weak regulation and low levels of income). Thus, the critical issues include chronic government failure to provide adequate and comprehensive public transport, to dismantle the persisting roads-driven low-density urban sprawl-inducing colonial planning systems and to encourage better land-use patterns have entrenched automobile consumption culture in

the country. These factors, coupled with weak regulation of vehicle importation, low levels of income, limited number of locally produced vehicles as well as low cost of vehicle repairs, elevate the demand and supply of used vehicles in the country in ways that undermine public health, development, and climate goals.

Our approach to used vehicle dependency enhances the existing push-pull research and suggests that further, more holistic research is required. As discussed earlier, the push-pull approach to used vehicle dependency in Ghana (see e.g., Arhinful, 2002; Ayetor et al., 2020, 2021; Chalfin, 2008; Kehbila et al., 2009) and Africa generally (Coffin et al., 2016; Davis & Kahn, 2010; Grubel, 1980; Pelletiere & Reinert, 2006; Plumer, 2020; UNECE, 2017) considers the phenomenon as being driven primarily by defective demand, effective supply, and defective regulation. The approach has considerable merits. Indeed, our analysis corroborates the importance of some of its analytical scaffolds, showing how low-income levels and weak regulation, for instance, contribute to the inundation of Ghana's roads by used vehicles.

The approach, however, has limitations. Today, there is a growing recognition among critical sustainable transport scholars and practitioners that the automobile-dependent nature of modern societies is not an apolitical or a technical/natural state of affairs (see e.g., Appleyard & Riggs, 2021; Van Acker & Witlox, 2010; Ewing & Cervero, 2010; Litman, 2002, 2017; Mattioli et al., 2020; Norton, 2007). It instead is, as we have shown in the case of Ghana, the continuing legacy of the historical process of channeling public resources—streets, finance, planning laws and land-use systems—to accommodate and promote the culture of automobile consumption, with the repercussion of displacing or undermining the desire for and investments in other transport modes.

In the African context—where the majority of people rely on public transport—this is highly regressive. The push-pull explanation for used vehicle dependency in the continent, however, does not engage in any meaningful or systematic manner with this broader context which narrows policy options to the imposition of bans and higher penalties on used vehicle import. Bringing in this broader historical context confers insight into why the imposition of bans and penalties on used vehicle import, African governments' go-to strategy (Ayetor et al., 2020, 2021; ILT, 2020), does not work to address public health and climate concerns. The imposition of bans and higher penalties on used vehicle import only sets the regulatory bar—and often bribe, higher—a measure which, however, does not address and, therefore, leaves intact the other critical influencing factors—such as low incomes, inadequate public transport, and the regressive low-density urban sprawl-inducing planning systems and land-use patterns.

For instance, banning or raising penalties on used vehicle import does not result in a consequential improvement in access to auto-financing to position hitherto used vehicle consumers to afford *new* less-polluting eco-friendly options—perhaps, the reason such measures often do not result in increased purchase of new vehicles (Ayetor et al., 2021). More fundamentally, used vehicles, as shown throughout the study, serve real needs. They are the backbone of mobility in Africa. Banning or restricting their consumption and supply without providing any meaningful alternatives—which is often the case in Ghana and other parts of the continent—only serves to direct demand and supply to the black market.

Researchers (Ayetor et al., 2021; Chalfin, 2008); the Ghana Revenue Authority (Abbey, 2018) and the Customs Excise and Preventive Service (CEPS) (Myjoyonline, 2013) have all confirmed that used vehicle smuggling is widespread in Ghana and Africa more generally (Brooks, 2012; Ezeoha et al., 2019). There exist so many “unknown whereabouts vehicles” in the world. These are vehicles that are deregistered but without certificates of destruction or any known destination (Ayetor et al., 2021). The European Union estimates that annually 4 million of such vehicles find their way into the global fleet of vehicles and given the dynamics of global vehicle export, there is little doubt that the majority of them end up in Africa and countries like Ghana.

Thus, importers, often in cahoots with corrupt public officials, frequently manipulate the details of used vehicles and declare false information to escape imposed bans and penalties (Brooks, 2012). As a result, more and more of such vehicles escape *official statistics/records* and end up on the market, which might well explain why the imposition of bans and higher penalties in places like Ghana often lead to reduced used vehicle import without commensurate, sustained improvement in public health gains in terms of reduced pollution and RTC injuries (Obeng-Odoom, 2010; Sulemana, 2012). Thus, the bans and penalties do not really bring down supply or consumption; they only redirect them to the black market.

Governments in Africa are increasingly aligning their used vehicle import bans to industrial policies meant to enhance local capacity for vehicle manufacturing. For instance, the Customs (Amendment) Act, 2020 (ACT 1014) passed by Ghana's parliament to proscribe the importation of all used vehicles over 10 years of age and all salvaged vehicles of any age into the country also provides incentives for automotive manufacturers and assemblers registered under the Ghana Automotive Manufacturing Development Program (GAMDP). The promotion of automotive manufacturing has numerous development benefits including job creation, but a lot more will need to be done so such interventions do not end up worsening public health and environment damages in the continent.

For instance, an automotive manufacturing industrial policy that stimulates the production of more and cheaper vehicles for personal use and ignores investment in public transport and mixed land-use, could end up undermining the environment, equity and public health. First, increased use of personal cars has been well-established to have significant negative externalities such as congestion, pollution and RTCs (see Obeng-Odoom, 2010; Parry et al., 2007). Second, heavy investment in the production of personal cars could undermine the production of adequate higher occupancy, low emission and safer vehicles for public transport. This could result in the practice of extending the lifespans of the existing stock of really old public transport vehicles as they will be kept on the roads even as they get older and more dangerous in the absence of alternatives. More fundamentally, industrial policies that heavily focus on personal cars, and are not adequately aligned to the demand for public transport, will end up heightening the smuggling of even more older, dirtier and potentially faulty used vehicles to meet the unmet demand for public transport. The result of which will manifest in more human life and property losses (resulting from crashes) and increased environmental damage (through vehicular pollution). What these show overall is that the contradictions underlying the supply and the consumption of used vehicles and the associated adverse social and environmental outcomes are structural. As a result, to be effective, measures for tackling them must not just raise the regulatory bar (imposition of bans and penalties). Instead, they need to be carefully tailored to tackle the range of factors, causes, motivations and constraints that influence, promote, enforce, support and entrench motorized modes of transport generally.

Table 2. Estimates for replacing 10,000 old Nissan Urvan NV 350 Tro-Tro vehicles with new low emissions, safer ones

Per unit cost of brand new (N)	Per unit cost of used one (U)	Per unit cost of replacement (N – U)	Total cost of replacing 10,000 used ones
\$43,000	\$10,000	\$33,000	\$330,000,000

Source: Authors' fieldwork

In short, measures for addressing used vehicle dependency in Africa are likely to be more effective if couched as part of larger policies and practices for addressing motorized transport-dependency generally in the continent. A broader view of the problem provides new policy options to explore including more investment in non-motorized and public transport systems, including minibus recapitalization

programs such as are occurring in South Africa and Senegal as way to introduce higher occupancy, low emissions and safer vehicles (Klopp & Schalekamp, 2018; World Bank, 2016).

Information gathered from 3 car dealers and 3 car owners suggest that the price of a 16-seater imported used Nissan Urvan NV 350 in Ghana hovers around \$10, 000 (Personal communication to authors: August 11, 2021). However, our checks at the Kumasi-Adum branch office of Japan Motors Trading Co. Ltd show that the price of a brand new version of the vehicle stood at \$43, 000. These figures are valid as of August 11, 2021. Table 2 shows that if the government were to support *tro-tro* owners to replace 10, 000 of the existing old highly polluting malfunction-prone versions of the vehicles with new low emissions, safer ones over a ten year period, it will cost about \$33, 000 000 per year.

The figure includes import duties and other costs implying that the cost could even come down further if the government decides to import the vehicles en masse and also shares the cost with *tro-tro* owners who would also reduce maintenance and fuel costs by having new, more efficient vehicles. This seems a worthwhile investment to explore given that the annual cost of road traffic fatalities—in which used *tro-tro* vehicles feature strongly—hovers around 8.2% of Ghana's GDP (Boateng, Ofori-Dua, Dwumah & Forkuor, 2022c; World Bank, n.d.). Furthermore, such investments also come with climate and other invaluable environmental and public health benefits (Garcia et al., 2021) and, therefore, could position Ghana closer to achieving the sustainable development goals of ensuring safe and sustainable transport (SDG 11.2), and reducing deaths and injuries from RTCs (SDG 3.6).

Minibus capitalization programs could be accompanied by incentives such as zero import taxes or low interest loans for high occupancy public transport vehicles. Another option to enforce this trend would be stronger investments in related public transport infrastructure like dedicated bus lanes and proper bus stops, stations and passenger information. Here it may be interesting to note that relatively new low emissions buses made available by bus electrification in Europe may still be a good option if they replace very old and polluting buses in Ghana. Further, minibus electrification itself may be an option to explore (Odhiambo et al., 2021). More careful monitoring of air pollution from transport and inclusion of health costs on transport calculations is also important and makes public investment in new public transport vehicles even more attractive (Garcia et al., 2021).

Finally, it will be important to rethink land-use patterns and ways to develop transit-oriented development in a way that makes sense for Ghanaian cities and towns (Agyemang et al., 2020; Onyango et al., 2021). This could include dismantling the persisting colonial planning practices, systems and societal organization generally that separate work and other activities from home and moving towards more mixed land-use and transit-oriented development in urban areas. This way, people can live, work, and shop in the same area so they travel less. Other similar measures to reinforce this trend could include investing in non-motorized transport systems to make walking, bicycling and other similar modes safer and enjoyable. This could help reduce the heavy reliance on used vehicles in the country and, in turn, the social, environmental and other harms that come with it.

5 Conclusion

In conclusion, the paper shows that we need to consider a wider policy environment to understand and address Africa's used vehicle dependency; we also need to bring more data and research around auto-mobility to bear on a problem that is poised to get worse as other parts of the world accelerate transport electrification and used vehicle supply goes up. The paper has also shown that if reducing emissions and improving road safety are key goals in Ghana and Africa generally, bans and higher import penalties on used vehicles simply do not work under current conditions.

Using a historical institutional approach, we have developed a more holistic explanation for why

this is the case, and pointed to the need for broader land-use and transport planning and policy reform. Indeed, in urban areas where most Ghanaians live, it is critical to dismantle the persisting colonial planning practices, systems and societal organization generally that separate work and other activities from home and move towards encouraging mixed land-use that allows people to live, work and shop in the same area so they travel less.

At the same time, it is key to invest in extensive public transit services (e.g., improved busses, rail and non-motorized transport systems such as bicycle lanes and walkways, combined with well-integrated multi-modal public transport systems) and encourage transit-oriented development. Redirecting some resources from the construction of expensive roads, which stimulates sub- and peri-urbanization in cities and towns, and, therefore, heightens the need for automobiles, to these kinds of measures would be an effective way to reduce automobile-dependency and with it, used-vehicle dependency and all the harms these bring.

References

- AASA (Automobile Association of South Africa). (2020). *Promoting safer and cleaner used vehicles for Africa*. Johannesburg: Automobile Association of South Africa.
- Abane, A. M. (1993). Tackling traffic congestion in Accra, Ghana: A road user's perspective. *Journal of Advanced Transportation*, 27(2), 193–206.
- Abbey, E. N. (2018). *GRA to impound uncustomed vehicles*. Retrieved from <https://www.graphic.com.gh/news/general-news/gra-to-impounduncustomedvehicles.html>
- Aboagye, P. Y., & Bolt, J. (2018). *Economic inequality in Ghana, 1891-1960. African Economic History Network* (Working paper series 38). Brussels: Union of International Associations, African Economic History Network.
- Adarkwa, K. (1991). Urban consumer needs in the transport sector and government policy in Ghana. *Journal of Advanced Transportation*, 25(1), 43–53.
- Addo, A. (2021). Controlling petty corruption in public administrations of developing countries through digitalization: An opportunity theory informed study of Ghana customs. *The Information Society*, 37(2), 99–114.
- Adjei Appiah, S. (2020). *Understanding car ownership among households in developing countries: A case study of Accra, Ghana* (Doctoral dissertation), University of Leeds, Leeds, UK.
- Agyemang, K. K., Amoako-Sakyi, R. O., Antwi, K. B., Mensah, C. A., & Abane, A. M. (2020). Transit oriented development: Theory and implementation challenges in Ghana. *Journal of Land Use, Mobility and Environment*, 13(3), 409–425.
- Akerlof, G. A. (1970). *The market for lemons: Quality uncertainty and the market mechanism*. In *Uncertainty in economics* (pp. 235-251). Cambridge, MA: Academic Press.
- Amegah, A. K., Sewor, C., & Jaakkola, J. J. (2021). Cadmium exposure and risk of adverse pregnancy and birth outcomes: A systematic review and dose–response meta-analysis of cohort and cohort-based case–control studies. *Journal of Exposure Science & Environmental Epidemiology*, 31(2), 299–317.
- Angnunavuri, P. N., Kuranchie, F. A., Attiogbe, F. & Nerquaye-Tetteh, E. (2019). The potential of integrating vehicular emissions policy into Ghana's transport policy for sustainable urban mobility. *Applied Sciences*, 1, 1201.
- Appleyard, B., & Riggs, W. (2021). Human rights to the street: Ethical frameworks to guide planning, design, and engineering decisions toward livability, equity, and justice. *Journal of Transport and Land Use*, 14(1), 911–931.
- Arhinful, D. (2002). We think of them: Money transfers from the Netherlands to Ghana. In I. van Kessel (Ed.), *Merchants, missionaries and migrants: 300 years of Dutch-Ghanaian relations* (pp. 151–159). Amsterdam: KIT Publishers.
- Ayee J. R. A. (2001). Civil service reform in Ghana: A case study of contemporary reform problems in Ghana. *African Journal of Political Science*, 6(1), 1–41.
- Ayeter, G. K., Mbonigaba, I., Sackey, M. N., & Andoh, P. Y. (2021). Vehicle regulations in Africa: Impact on used vehicle import and new vehicle sales. *Transportation Research Interdisciplinary Perspectives*, 10, 100384.
- Ayeter, G. K., Quansah, D. A., & Adjei, E. A. (2020). Towards zero vehicle emissions in Africa: A case study of Ghana. *Energy Policy*, 143, 111606.
- Boateng, F. G. (2016, November). The collapse of buildings in cities in Ghana: Reasoning beyond scientism. In M. Chou (Ed.), *Proceedings of the Australian Sociological Association 2016 Conference* (pp. 7–12), The Australian Catholic University, Melbourne, Australia.
- Boateng, F. G. (2019). *Building collapse: Pathologies in cities in Ghana* (Doctoral dissertation), RMIT

- University, Melbourne, Australia.
- Boateng, F. G. (2020). Indiscipline in context: A political-economic grounding for dangerous driving behaviors among Tro-Tro drivers in Ghana. *Nature: Humanities and Social Sciences Communications*, 7(1), 1–5.
- Boateng, F. G. (2021a). Why Africa cannot prosecute (or even educate) its way out of road accidents: Insights from Ghana. *Nature: Humanities and Social Sciences Communications*, 8(1), 1–11.
- Boateng, F. G. (2021b). Why fines and jail time won't change the behavior of Ghana's minibus drivers. *The Conversation Africa*, Johannesburg, South Africa.
- Boateng, F. G. (2021c). Standard responses to road accidents haven't worked in Ghana: Here are some alternatives. *The Conversation Africa*, Johannesburg, South Africa.
- Boateng, F.G. (2021d). Ghana's road traffic problems have deep and spreading roots. *The Conversation Africa*, Johannesburg, South Africa.
- Boateng, F. G. (2021e). Poor policies, not drivers, are to blame for Ghana's road transport miseries. *The Conversation Africa*, Johannesburg, South Africa.
- Boateng, F. G. (2022). Defying Ghana's lockdown rules wasn't simply stubborn: Here's what was going on. *The Conversation Africa*, Johannesburg, South Africa.
- Boateng, F. G., Appau, S., & Baako, K. T. (2022a). The rise of smart solutions in Africa: A review of the socio-environmental cost of the transportation and employment benefits of ride-hailing technology in Ghana. *Humanities and Social Sciences Communications*, 9(1), 1–11.
- Boateng, F. G., Ametepey, S., & Kusi, S. (2022b). The haunted and the haunting: Reproducing Ghana's historical injustices during the Covid-19 pandemic. *African Review of Economics and Finance*, blog section. Retrieved from <https://www.african-review.com/blog-details.php?id=17>
- Boateng, F. G., Ofori-Dua, K., Dwumah, P., & Forkuor, J. B. (2022c). Crimes of accommodation: A criminological grounding for road traffic violations among minibus drivers in Africa. *International Review of Sociology*, 32(2), 1–21.
- Boateng, F. G., Kusi, S., & Ametepey, S. (2021). Covid-19 lockdown defiance, public indiscipline, and criminalization of vulnerable populations in Ghana. *African Review of Economics and Finance* (Online first articles), 1–30.
- Boateng, F. G., & Wright, R. (2019). A conceptual inquiry into building collapse in cities in developing countries. In X. Zhao, P. Kalutara, & R. Webber (Eds), *43rd AUBEA: Australasian Universities Building Education Association Conference Proceedings*, pp. 6–8, November 2019, Noosa, QLD, Australia.
- Boateng, F. G., & Kwame, K. A. (2022, August). On Ghana's roads in 2022: Safety has improved but private vehicles are still a menace. *The Conversation Africa*, Johannesburg, South Africa.
- Bokpe, S. J. (2018). *Private cars dominate road accident statistics*. Retrieved from <https://www.graphic.com.gh/news/general-news/private-cars-dominate-road-accidentstatistics.html>
- Bonsu, N. O., Pope, F., Ababio, M. O., Appoh, E., Ashinyo, M. E., Essuman, S. N., ... & Thomson, I. (2020). How coronavirus (Covid-19) has made the invisible silent killer of air pollution visible: Lessons for building resilient communities. *Biomedical Journal of Scientific & Technical Research*, 28(1), 21219–21220.
- Brookins D., Davis, D., Song, L., Jan, A., Trevisan, S., Mahmood, H., & Zou, S. (2019). *Transforming urban transport – The role of political leadership TUT-POL Sub-Saharan Africa: Case Accra*. Gothenburg: Volvo Foundation for Research and Education.
- Brooks, A. (2012). Networks of power and corruption: The trade of Japanese used cars to Mozambique. *The Geographical Journal*, 178(1), 80–92.
- Burchardt, J. (2015). *Order out of chaos self-management and public control of the paratransit sector: Case Ghana international association for the history of transport, traffic and mobility (T2M) and the cosmo-*

- bilities network. Paper presented at the International Association for the History of Transport, Traffic and Mobility (T2M) and the Cosmopolitanities Network, Santa Maria CV (Caserta), Italy, September, 14-17.
- Centers for Disease Control and Prevention (CDC). (2019). *CDC in Ghana*. Retrieved from https://www.cdc.gov/globalhealth/countries/ghana/pdf/Ghana_Factsheet.pdf
- Chalfin, B. (2008). Cars, the customs service, and sumptuary rule in neoliberal Ghana. *Comparative Studies in Society and History*, 50(2), 424–453.
- Clayborne, D. D. (2012). *Owner-drivers in the Tro-Tro industry: A look at jitney service provision in Accra, Ghana* (Doctoral dissertation), UCLA, Los Angeles, CA.
- Coffin, D., Horowitz, J., Nesmith, D., & Semanik, M. (2016). *Examining barriers to trade in used vehicles*. Washington, DC: Office of Industries, US International Trade Commission.
- Conley, J. & Tigar McClaren, A. (2016). *Car troubles: Critical studies of automobility and auto-mobility*. Abingdon-on-Thames, UK: Routledge.
- Davis, L. W., & Kahn, M. E. (2010). International trade in used vehicles: The environmental consequences of NAFTA. *Economic Policy*, 2(4), 58–82
- Delorenzo, M. (2021). *Cash for clunkers 2021?* Retrieved from <https://www.kbb.com/car-news/cash-for-clunkers/>
- Dontoh, E., & Dzawu, M. M. (2020). *Ghana bans import of cars older than 10 years to draw automakers*. Retrieved from <https://www.bloomberg.com/news/articles/2020-05-29/ghana-bans-import-of-cars-older-than-10-years-to-draw-automakers>
- Essel, D. (2016). *Vehicle population and growth*. Accra, Ghana: Ministry of Transport.
- EPA (Environmental Protection Agency). (2017). *Roadmap for the promotion of cleaner buses in Accra, Ghana*. Accra, Ghana: EPA.
- EPA (Environmental Protection Agency). (2019). *Fourth national greenhouse gas inventory report*. Accra, Ghana: EPA.
- Ewing, R., & Cervero, R. (2010). Travel and the built environment: A meta-analysis. *Journal of the American Planning Association*, 76(3), 265–294.
- Ezeoha, A., Okoyeuzu, C., Onah, E., & Uche, C. (2019). Second-hand vehicle markets in West Africa: A source of regional disintegration, trade informality and welfare losses. *Business History*, 61(1), 187–204.
- Garcia, L., Johnson, R., Johnson, A., Abbas, A., Goel, R., Tatah, L., & Woodcock, J. (2021). Health impacts of changes in travel patterns in greater Accra metropolitan area, Ghana. *Environment International*, 155, 106680.
- Ghanaweb. (2011). *Customs service transfers 97 officers after Anas' expose on corruption*. Retrieved from <https://www.ghanaweb.com/GhanaHomePage/NewsArchive/Customs-Service-transfers-97-officers-after-Anas-expose-on-corruption-202894>
- GII (Ghana Integrity Initiative). (2018). *Assessment of perceptions and experience of corruption in Customs operation*. Accra: Ghana Integrity Initiative.
- Gould, P. R. (1960). *The development of the transportation pattern in Ghana*. Evanston, IL: Northwestern University, Department of Geography.
- Graphic Online. (2018). *Over 1 million vehicles imported into Ghana in 10 years*. Retrieved from <https://www.graphic.com.gh/news/general-news/over-1-million-vehicles-imported-into-ghana-in-10-years.html>
- Grubel, H. G. (1980). International trade in used cars and problems of economic development. *World Development*, 8(10), 781–788.
- Gyesi, Z. K. (2020). *2020 is year of roads, President Akufo-Addo*. Retrieved from <https://www.graphic.com.gh/news/general-news/ghana-news-2020-is-year-of-roads-president-akufo-addo.html>

- Hart, J. (2013). One man, no chop: Licit wealth, good citizens, and the criminalization of drivers in postcolonial Ghana. *The International Journal of African Historical Studies*, 46(3), 373–396.
- Hart, J. (2014). Motor transportation, trade unionism, and the culture of work in colonial Ghana. *International Review of Social History*, 59(S22), 185–209.
- Hart, J. (2016a). Nifa Nifa: Technopolitics, mobile workers, and the ambivalence of decline in Acheampong's Ghana. *African Economic History*, 44(1), 181–201.
- Hart, J. (2016b). *Ghana on the go: African mobility in the age of motor transportation*. Bloomington, IN: Indiana University Press.
- Hart, J. (2020). Of pirate drivers and honking horns: Mobility, authority, and urban planning in late-colonial Accra. *Technology and Culture*, 61(2), S49–S76.
- ILT (The Human Environment and Transport Inspectorate). (2020). *Used vehicles exported to Africa: A study on the quality of used export vehicles*. Amsterdam: Netherlands Human Environment and Transport Inspectorate Ministry of Infrastructure and Water Management.
- IMF (International Monetary Fund). (1988). *Ghana –Enhanced structural adjustment facility: Economic and financial policy framework paper, 1998–2000*. Washington, DC: IMF.
- ITA (International Trade Administration). (2020). *Ghana country commercial guide: Automobile*. Retrieved from <https://www.trade.gov/country-commercial-guides/ghanaautomotivesector#:~:text=Recent%20estimates%20put%20the%20average,the%20top%20single%20import%20item>
- Kanyoke, E. (2004). *Pollutant emissions measured: Rising transport pollution in the Accra–Tema metropolitan area, Ghana* (MSc thesis). Lund University, Lund, Sweden.
- Kehbila, A. G., Ertel, J., & Brent, A. C. (2009). Sustainability appraisal of used vehicle trade policy options in sub-Saharan African countries. *The Environmentalist*, 29(4), 360.
- Klein, N., & Smart, M. (2019). Life events, poverty, and car ownership in the United States: A mobility biography approach. *The Journal of Transport and Land Use*, 12(1), 395–418.
- Klopp J.M., & Schalekamp, H. (2018). *Beyond BRT: Innovation in minibus-taxi reform in South African cities*. Paper presented at the 37th Southern African Transport Conference, July 9–12, Pretoria, South Africa.
- Klopp, J. M. (2012). Toward a political economy of transportation policy and practice in Nairobi. *Urban Forum*, 23(1), 1–21.
- Klopp, J. M., & Cavoli, C. M. (2017). The paratransit puzzle: Mapping and master planning for transportation in Maputo and Nairobi. In *Urban mobilities in the global south* (pp. 95–110). Abingdon-Thames, UK: Routledge.
- Koinange, C. (2018). *Ghana NMT strategy*. Nairobi, Kenya: UN Environment.
- Kombat, A. M., & Wätzold, F. (2019). The emergence of environmental taxes in Ghana—A public choice analysis. *Environmental Policy and Governance*, 29(1), 46–54.
- Larnyoh, M. T. (2020). *Ghana's parliament passed the Customs (Amendment) Bill, 2020 that bans the importation of accident and salvaged motor vehicles into the country*. Retrieved from <https://africa.businessinsider.com/local/markets/the-ghanaian-government-has-bannedthe-importation-of-salvaged-cars-making-garage/0v9vc39>
- Litman, T. A. (2002). *The costs of automobile dependency and the benefits of balanced transportation*. Victoria, BC, Canada: Victoria Transport Policy Institute.
- Litman, T. A. (2017). *Transportation market distortions: A survey*. Victoria, BC, Canada: Victoria Transport Policy Institute.
- Mattioli, G., Roberts, C., Steinberger, J. K., & Brown, A. (2020). The political economy of car dependence: A systems of provision approach. *Energy Research & Social Science*, 66, 101486.
- Ministry of Transport. (2020). *National transport policy*. Accra, Ghana: Ministry of Transport.
- Mintah, K., Boateng, F. G., Baako, K. T., Gaisie, E., & Otchere, G. K. (2021). Blockchain on stool land

- acquisition: Lessons from Ghana for strengthening land tenure security other than titling. *Land Use Policy*, 109, 105635.
- Myjoyonline. (2013). *CEPS warns importers of smuggled vehicles*. Retrieved from <https://www.myjoyonline.com/ceps-warns-importers-of-smuggled-vehicles/>
- Njoh, A. J. (1997). Colonial spatial development policies, economic instability, and urban public transportation in Cameroon. *Cities*, 14(3), 133–143.
- Njoh, A. J. (2003). *Planning in contemporary Africa: The state, town planning and society in Cameroon*. Abingdon-on-Thames, UK: Routledge.
- Njoh, A. J. (2008). Implications of Africa's transportation systems for development in the era of globalization. *The Review of Black Political Economy*, 35(4), 147–162.
- Norton, P. D. (2007). Street rivals: Jaywalking and the invention of the motor age street. *Technology and Culture*, 48(2), 331–359.
- NRSC (National Road Safety Commission). (2009a). *Annual distribution of fatalities by road user*. Accra, Ghana: National Road Safety Commission.
- NRSC (National Road Safety Commission). (2009b). *National trends in road traffic accidents and casualties*. Accra, Ghana: National Road Safety Commission.
- Obeng-Atuah, D., Poku-Boansi, M., & Cobbinah, P. B. (2017). Pedestrian crossing in urban Ghana: Safety implications. *Journal of Transport & Health*, 5, 55–69.
- Obeng-Odoom, F. (2013). *Governance for pro-poor urban development: Lessons from Ghana*. Abingdon-on-Thames, UK: Routledge.
- Obeng-Odoom, F. (2010). Drive left, look right: The political economy of urban transport in Ghana. *International Journal of Urban Sustainable Development*, 1(1–2), 33–48.
- Odhiambo, E., Kipkoeh, D., Manuel, M., Schalekamp, H., & Klopp, A.H. (2021). *The potential for minibus electrification in three African cities: Cairo, Nairobi, and Cape Town*. Gothenburg, Germany: Volvo Research and Educational Foundations.
- Ofori-Atta, K. (2018). *Budget highlights of the budget statement and economic policy of the government of Ghana for the 2019 financial year*. Accra, Ghana: Ministry of Finance.
- Onogwu, D. J. (2018). Corruption and the efficiency of customs' clearance process in selected countries. *Review of Public Administration & Management*, 6(3), 1–8.
- Onyango, G. M., & Owino, F. O. (2021). Transit oriented development in medium cities in Africa: Experiences from Kisumu, Kenya. *Journal of Geography and Regional Planning*, 14(2), 91–104.
- Oppong-Yeboah, N. Y., & Gim, T. H. T. (2020). Does urban form influence automobile trip frequency in Accra, Ghana? *Journal of Transport and Land Use*, 13(1), 71–92.
- Osei-Tutu, E., Badu, E., & Owusu-Manu, D. (2010). Exploring corruption practices in public procurement of infrastructural projects in Ghana. *International Journal of Managing Projects in Business*, 3(2), 236–256.
- Oteng-Ababio, M., & Agyemang, E. (2012). Virtue out of necessity? Urbanization, urban growth and Okada services in Accra, Ghana. *Journal of Geography and Geology*, 4(1), 148.
- Oviedo, D., Okyere, S. A., Nieto, M., Kita, M., Kusi, L. F., Yusuf, Y., & Koroma, B. (2021). Walking off the beaten path: Everyday walking environment and practices in informal settlements in Freetown. *Research in Transportation Business & Management*, 40, 100630.
- Parry, I., Walls, M., & Harrington, W. (2007). Automobile externalities and policies. *Journal of Economic Literature*, 45, 373–399.
- Pelletiere, D., & Reinert, K. A. (2006). World trade in used automobiles: A gravity analysis of Japanese and US exports. *Asian Economic Journal*, 20(2), 161–172.
- Plumer, B. (2020). *Exports of used cars are a pollution problem, UN warns*. Retrieved from <https://www.nytimes.com/2020/10/26/climate/used-carexportpollution.html#:~:text=Warns,Rich%20coun->

- tries%20are&te =Between%202015%20and%202018%2C%20the,America%20and%20the%20Middle%20East
- Quayson, A. (2014). *Oxford Street, Accra: City life and the itineraries of transnationalism*. Durham, NC: Duke University Press.
- Salifu, M., & Ackaah, W. (2012) Under-reporting of road traffic crash data in Ghana. *International Journal of Injury Control and Saftey Promotion*, 19(4), 331–339.
- Songsore, J. (1979). *Structural crisis, dependent capitalist development and regional inequality in Ghana*. The Hague: Institute of Social Studies.
- Sulemana, I. (2012). Assessing over-aged car legislation as an environmental policy law in Ghana. *International Journal of Business and Social Science*, 3(20), 57–64.
- Transparency International. (2010). *Overview of corruption and anti-corruption in Ghana*. Berlin: Transparency International.
- UNECE. (2017). *Background paper: Used vehicle global overview*. Geneva: United Nations Economic Commission for Europe.
- UNEP (United Nations Environment Program). (2020). *Used vehicles and the environment: A global overview of used light duty vehicles—flow, scale and regulation*. Nairobi, Kenya: UNEP.
- UNEP (United Nations Environment Program). (2016). *Air pollution: Africa's invisible, silent killer*. Nairobi, Kenya: UNEP. Retrieved from <https://www.unep.org/news-and-stories/story/air-pollution-africas-invisible-silent-killer-1>
- USAID. (2016). *Greenhouse gas emissions in Ghana*. Washington, DC: USAID. Retrieved from https://www.climatelinks.org/sites/default/files/asset/document/GHG%20Emissions%20 Factsheet%20 Ghana_6-17-16_edited_rev08-18-2016.pdf
- Van Acker, V., & Witlox, F. (2010). Car ownership as a mediating variable in car travel behavior research using a structural equation modelling approach to identify its dual relationship. *Journal of Transport Geography*, 18(1), 65–74.
- WHO (World Health Organization). (2018). *Global status report on road safety 2018*. Geneva: World Health Organization.
- World Bank. (2021). Population, total – Ghana. Retrieved from <https://data.worldbank.org/indicator/SP.POP.TOTL?locations=GH>
- World Bank. (2016). *Project performance assessment report: Senegal urban mobility improvement* (Project report No. 108407). Washington, DC: World Bank
- World Bank. (n.d). *Ghana, Sub-Saharan Africa: Ghana's road safety country profile*. Washington, DC: World Bank Global Road Safety Facility.
- Yahya, S. (2006). Unmaking the slums: Emerging rules, roles, and repertoires. *Stetson Law Review*, 36, 121–147
- Yeboah, I. E. (2000). Structural adjustment and emerging urban form in Accra, Ghana. *Africa Today*, 47(2), 61–89.
- Yeboah, T., Hart, J. & Plageman, N. (2020). *Architecting a new normal? Past pandemics and the medicine of urban planning*. Retrieved from https://nursingclio.org/2020/08/18/architecting-a-new-normal-past-pandemics-and-themedicine-of-urban-planning/?fbclid=IwAR2TzZ39CwsuP1LpDfRDZEQCHYfL6TM_cd1IOfr5YCHfVEnw1dYC3fjpug