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# Tax-aid nexus

The case of Sub-Saharan Africa and China

by

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**Abstract:** This paper empirically discusses the interaction between Chinese Official Development Assistance (ODA) and Sub-Saharan tax revenue 2000-2017. Through the use of the methods OLS and IV, I pose the question whether there is evidence supporting the tax-aid nexus, which suggests a negative impact of increasing foreign aid on tax revenue. Additionally, the research delves into the specific effects of ODA loans compared to ODA grants, as well as the varying impact of sector-specific ODA flows on tax revenue. The findings reveal that an increase in Chinese ODA has a detrimental impact on tax revenue in Sub-Saharan Africa. Moreover, the results suggest that an increase in grants offsets tax revenue, while an increase in loans does not yield a significant effect. Lastly, although no discernible effect can be observed in the economic sector, there is evidence indicating that increased Chinese ODA inflows in the social sector negatively affect tax effort.

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## 1. Introduction

“So why is Africa still poor?” asks Amoako (2020) early on in his book. The question is triggered by his reflections on the sixtieth anniversary of Ghana’s independence in 2017. After a lifetime of working for African development, the Ghanaian economist himself concludes that the answer is complex and disputed.

Africa continues to hold the unfortunate distinction of being the world’s poorest continent, irrespective of the measure. This issue is even more pronounced in Sub-Saharan Africa and does not seem to be what the countries and continent fighting for independence after World War II envisioned. In 2017, according to the World Bank (2021g) in 2017 purchasing power parity (PPP) terms, the poverty headcount ratio at \$2.15 a day was the highest in Zimbabwe (34.2 percent), followed by other Sub-Saharan African countries such as Lesotho and São Tomé and Príncipe. To take another measure, in 2017 the gross domestic product (GDP) per capita in constant 2015 US\$ in Sub-Saharan Africa was approximately \$1650. That compares with South Asia’s \$1705, Latin America and Caribbean’s \$8620, and a world average of \$10545 (World Bank, 2021c).

From that point of view, Sub-Saharan Africa’s development has thus been unsatisfactory. In order to obtain sustained acceleration of GDP growth, as well as the consecutive reduction in poverty, these countries must promptly address two critical gaps—the human capital gap and the infrastructure gap (Graham & Bamba, 2020). Successfully bridging these gaps will necessitate substantial financial resources.

In most developing countries, fiscal policies, including tax policies, provide one of the most feasible tools available to governments for generating resources. Tax administration has long been viewed as a fundamental component of the development process (Kaldor, 1963). New revenues, raised equitably and spent efficiently, can enhance the lives of citizens by financing better healthcare, schools, sanitation systems and social safety nets for the poorest (Graham & Bamba, 2020).

Those resources could also exist as outside assistance, in the form of overseas development grants, loans, or technical transfers. However, at the same time, it may be that the incentive to implement tax reforms, critical for boosting shared prosperity, is lower if the level of aid is high in relation to overall tax revenue. In such cases, policymakers may opt for the easier alternative provided by external assistance (Azam et al., 1999). Under these circumstances, overseas assistance can warp incentives and actually do damage to achieving the development objectives (Pilling, 2022). This phenomenon is commonly referred to as the tax-aid nexus: development aid intended to promote sustainable economic development undermines the efforts in achieving the development objectives and eradicating mass poverty.

While African aid from Development Assistance Committee (DAC) members has been stagnating since the start of the century, especially to least developed regions such as Sub-Saharan Africa, China provided increasingly more aid (Khan, 2015). Over the last few decades, China has expanded from being a former

beneficiary of aid to being a large donor and a significant government creditor on the global (Horn et al., 2021). Since China's approach to foreign aid policy, and global policy in general, is different from that of the traditional Western powers, it is essential to revisit the tax-aid nexus. The purpose of the present paper is to analyse the interaction between Chinese aid and Sub-Saharan tax revenue between 2000 and 2017, thereby making a valuable contribution to existing research by investigating this relationship within the unique and increasingly important context of Sino-African dynamics. The main research question is whether in these circumstances, there is proof of the tax-aid nexus, namely a negative impact of an increase in net foreign aid flows on tax revenue. Delving deeper into the Chinese aid architecture, the next question is whether Official Development Assistance (ODA) loans have a different impact than ODA grants. Finally, I pose the question to what extent net ODA flows targeted at specific sectors have varying effects on tax revenue. A sufficient understanding of these dynamics may raise interesting and complicated policy and research issues, particularly in the fields of development co-operation, taxation and sustainable economic development.

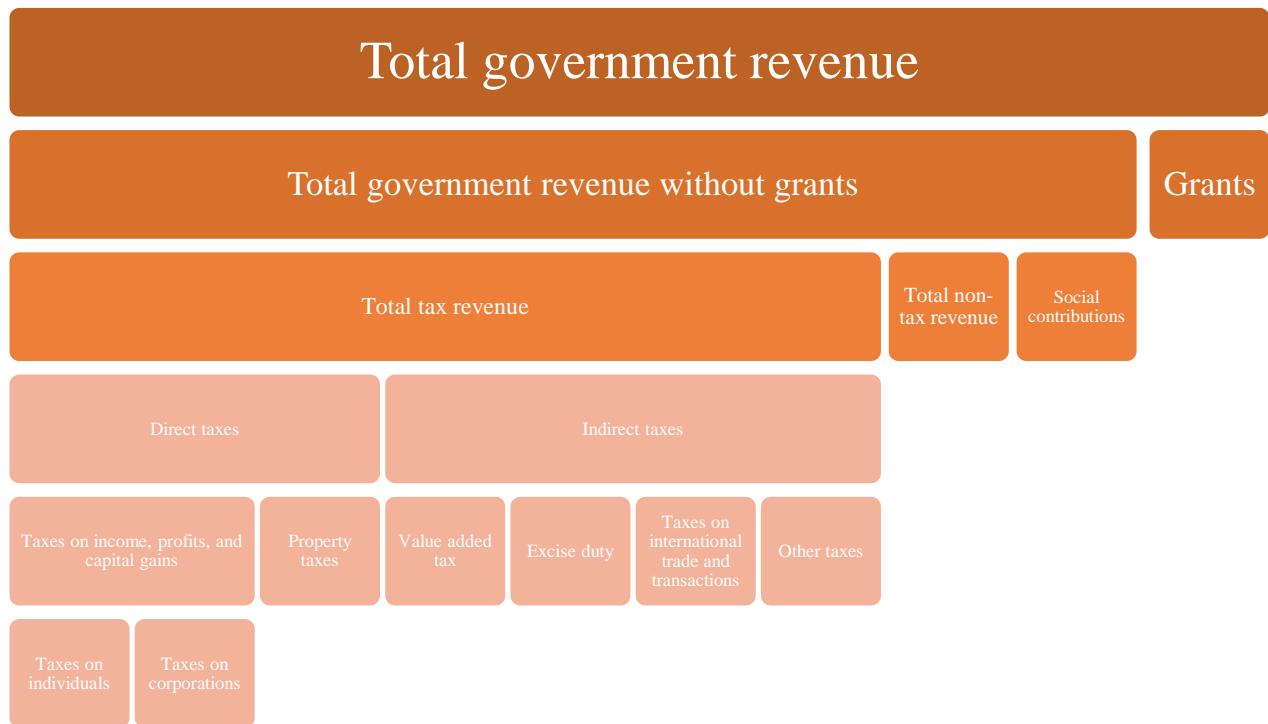
I find that a Chinese ODA increase negatively affects tax revenue in Sub-Saharan Africa. The main result therefore supports the idea that aid serves as an alternative, non-earned source of revenue for governments in addition to tax revenue, leading to a subsequent reduction in taxes. Furthermore, the results imply that an increase in grants leads to an offset in the total non-resource tax revenue, while an increase in loans has no significant impact. This reinforces the concerns raised by certain donor countries and researchers regarding the conversion of concessional lending into grants. Lastly, although no discernible effect can be observed in the economic sector, there is evidence that an increase in Chinese ODA inflows in the social sector negatively affects tax effort.

The rest of the paper is organized as follows: in the next two sections I provide an overview of the previous research and theory. I do this by first focusing on the relationship between taxation and economic development, in order to grasp the importance of a well-functioning tax system. Additionally, I review the tax-aid nexus. In the fourth part of this study I then discuss context on the Sub-Saharan African case, and on the subcase of China. Next, the used data and its limitations are described. The sixth component consists of the empirical strategy. I display the results and the discussion in the seventh section, leading to the conclusions in the eighth section.

## 2. Taxation and economic development

The taxation system is a major building block of societies worldwide. A functioning tax system is crucial, as the funds are used by the states to support fundamental matters such as education systems, health care

systems, pensions for the elderly, unemployment benefits, and public transportation. Hence, revenues present themselves as one of the most efficient methods for mobilizing a nation's internal resources, while comprising a variety of components and subcomponents. A detailed overview is given in *Figure 1*.



*Figure 1: components and subcomponents of total government revenue.*

**Source:** own composition based on the Government Revenue Dataset: variable description (Oppel et al., 2021).

Overall, government revenues are composed of grants, social contributions, non-tax revenue, and tax revenue. Direct and indirect taxes make up the majority of the revenue structure. For direct taxes, the elements that produce the earnings are expected to pay the corresponding taxes, while indirect taxes are assumed to be paid by households or businesses that consume goods and services. Examples of direct taxes include taxes on income, profits, and capital gains and property taxes. Indirect taxes, on the other hand, include value added tax (VAT), excise duty and taxes on international trade and transactions (Fjeldstad & Rakner, 2003).

By raising stable revenue for the government, regulating the economy and economic activities, and controlling income and employment, an extensive taxation system plays an essential part in a country's investment and sustainable growth plan (Addison & Levin, 2012; Anyanwu, 1993; Nzotta, 2007; Salami et al., 2015). Investment in new human and physical capital, the implementation of new production techniques and the introduction of new products are the fundamentals of the growth process. Taxation can affect what



choices are made and, ultimately, the rate of growth. In most developed countries, the level of taxes has risen steadily over the course of the last century (Myles, 2000). The level of per capita income—a proxy for the degree of overall economic development—is expected to be positively correlated with tax revenues (Fenochietto & Pessino, 2013). Fenochietto and Pessino (2010) find a positive and significant relationship between tax capacity and the level of development, trade, and education.

In recognition of the above, it has been claimed that taxation should be a key component of development strategies in low-income countries (Bird, 2013; Kaldor, 1963; Zolt and Bird, 2005). Taxation provides the necessary resources to finance public goods and services, which are essential for promoting economic growth and reducing inequality. However, tax reform can be difficult to implement and policymakers need to carefully consider the impact of tax policies on investment, productivity, and international competitiveness. Caution is required when increasing taxes, as it may have a negative impact on economic growth, especially in the long run (Barro, 1991; Lee & Gordon, 2005).

### 3. The tax-aid nexus

As tax administration has long been viewed as a fundamental pillar of promoting economic activity and (institutional) development, it is no surprise that economic policies aimed at fostering good governance are high on many governments and multilateral organizations agendas (Kaldor, 1963).

However, the fact that tax systems, crucial for sustainable economic development, are at this point in time far from efficient and hence do little to mobilise domestic revenue in developing nations, implies that foreign revenue inflows to these regions are disproportionately large. In addition to sources such as natural resource rents, this then becomes one of the few revenue streams for developing economies to rely on. Nevertheless, apart from a development boost, large aid inflows could also undermine the incentives to set up a sustainable tax system, as foreign aid is the easy way out. The issue of aid fungibility, namely the possibility that aid is used in ways not intended by donors, becomes more prominent when inflows of ODA are utilised to pay tax reductions rather than raising investments and government spending (Pivovarsky et al., 2003).

Studies investigating the connection between aid and taxation are motivated by the theoretical framework of the fiscal response model, initially developed by Heller (1975) and subsequently extended by others. The model involves a benevolent government that minimizes a loss function while adhering to targets (such as economic growth or welfare) and a budget constraint determined by revenue, borrowing and aid in order to generate revenue (Benedek et al., 2014; Bhushan & Samy, 2012; Carter, 2013). Consequently, this model generates testable predictions, subject to specific assumptions, regarding the behaviour of budgetary aggregates in response to aid. Given exogenous government expenditure and borrowing, for instance, this

model reveals how utilizing aid as a substitute for domestic revenue would be a rational choice, particularly if domestic revenue is distortionary. However, in the more general scenario where government decisions and aid are endogenous, the dynamics between donors and recipient countries can influence the equilibrium outcome. For example, a Samaritan dilemma may arise where the recipient country strategically maintains poor tax performance to continue receiving higher concessional aid (Gibson et al., 2005; Harford & Klein, 2005). Thus, the relationship between aid and taxation is not straightforward, but rather an empirical question that requires further investigation (Benedek et al., 2014).

In the tax effort literature, the financial reaction of foreign aid is generally expected to end up in a negative feedback loop. There is a lot of support for the idea that since aid provides an alternative, non-earned source of revenue for governments in addition to tax revenue, it reduces tax shares (Bräutigam & Knack, 2004; Ghura, 1998; Moss et al., 2006; Remmer, 2004). Individuals engage in rent-seeking activities in order to claim a portion of the resources windfall and, by doing so, reduce the economic growth rate (Djankov et al., 2008). The reduction in taxation is a welfare-optimal response to aid: aid-receiving governments face the costs of taxation alongside the benefits of expenditure, prompting them to adopt a fiscal policy that strikes a balance between the two at the margin, with aid used partially to relieve governments and citizens of the burden of taxes and partially to fund expenditure (Collier, 1999; Kimbrough, 1986). Political economy considerations provide additional support to the argument that aid may discourage taxation by recipient governments. A key argument of the aid dependency literature is that aid lowers tax revenue because it undermines the development of domestic institutions that support tax administration and good governance (Benedek et al., 2014; Bräutigam & Knack, 2004; Gupta & Heller, 2002; Harford & Klein, 2005; Knack, 2001; Moss et al., 2006). Bräutigam and Knack (2004), Subramanian and Sala-i-Martin (2003) and Djankov et al. (2008) claim that aid can support poor governance and damage institutions crucial for economic development by removing incentives to reform, improve infrastructure, or establish a well-functioning tax bureaucracy. Large aid flows may eliminate the need to create a responsive, tax-collecting civil service, while a need to collect taxes enhances the capability and accountability of government. Aid-dependent governments are accountable to donors, not to their population (Harford & Klein, 2005; Moss et al., 2006).

This is similar to what happens when countries face a resource curse, a phenomenon recognized in mainstream economics as countries with large primary export sectors (oil, rubber, diamonds, minerals) often growing more slowly than their peers (Harford & Klein, 2005). Many studies have shown a negative correlation between economic growth and natural resources (Djankov et al., 2008). The principal external revenue with which natural resource revenue has been compared is foreign aid, both can be seen as foreign rents (Collier, 2006; Moore, 2001; Morrison, 2006; Morrison, 2010; Smith, 2008; Svensson, 2000; Therkildsen, 2002). Natural resources and foreign aid have a shared characteristic: they can be exploited by

corrupt politicians without having to resort to unpopular, and normally less lucrative, measures like taxation (Djankov et al., 2008). Moreover, adding to crowding out the incentives for reforms and taxation itself, both types of revenues crowd out the opportunities for other economic sectors, crucial for economic development. While revenues from natural resources often go into the extractive sectors, revenues from aid crowd out the domestic opportunities to provide the goods and services that the aid is paying for. This adds an extra layer to the detrimental effect of the lack of incentives to reform on economic welfare.

There still is disagreement with respect to the economic impact of aid. Contrary to the aforementioned perspective, Remmer (2004), Bräutigam (1992) and Knack (2001) argue that aid may have a positive flypaper effect on government expenditure in long run. They point out that foreign revenue does not have the same domestic political costs as domestic revenue mobilization. The political costs associated with aid are increased dependency, costs of accountability (donors are accountable to their respective parliaments, while recipient governments are accountable to their constituencies and donors) and bureaucratic costs of administration. This makes the fiscal reaction to aid a trade-off between the political costs of taxation versus the political costs of aid (Morrissey, 2015; Tagem, 2017). One can argue that the lower political costs associated with aid provide incentives and opportunities to increase public spending. In essence, proponents of the flypaper effect contend that a higher reliance on aid, as opposed to domestic taxation, results in greater government expenditure due to the broader public acceptance of aid compared to taxation.

Several recent studies have discussed the foreign aid-tax relationship from various angles, to assess the impact of aid and its components on tax effort in developing countries. There is however substantial heterogeneity in empirical findings on the foreign aid-tax effort relationship. Some studies report a negative association whereas others find no significant results or a positive relationship. The findings are sensitive to methodological specifications, the scope of the estimation sample and significant gaps in the data, especially tax data.

Evidence indicating a negative relationship between aid and tax revenue has been borne out in several studies. Ghura (1998), using data for a sample of 39 Sub-Saharan African countries for the period 1985-1996, finds that aid has a statistically significant negative effect on the ratio of taxes to GDP. Remmer (2004) uses a broader sample of 120 developing countries over the period 1970-1999. She finds a negative relationship between three different measures of aid and the ratio of tax revenue to GDP. Bräutigam and Knack (2004), Moss et al. (2006) and Pivovarsky et al. (2003) find similar results. Moreover, by disentangling total net aid into grants and loans, Pivovarsky et al. (2003) test whether their impact on domestic revenue differs. The findings indicate that grants have a significant and negative effect on revenue, while loans have a significant and positive impact. This suggests that certain governments may perceive grants as a free substitute for tax revenue, whereas loans need to be repaid, thereby incentivizing

governments to maintain tax revenues at their current levels. Thornton (2014), Khan and Hoshino (1992) and Odedokun (2003) reach the exact same conclusions. Tapping into the link between the natural resource curse and the aid curse, Knack (2009) finds a robust negative relationship between sovereign rents from aid and natural resources, and taxation.

Nevertheless, the empirical evidence from both cross-country and individual country studies is generally mixed. Leuthold (1991) fails to find any significant impact of aid on tax effort in a panel of eight African countries over the period 1973 to 1981, nor do Teera and Hudson (2004) using a panel of 116 developed and developing countries for 1975-1998. In contrast, a significant positive impact of aid on tax revenue is reported by Gupta (2007) from a panel of 105 developing countries during 1980-2004, and by Clist and Morrissey (2011). The aforementioned argue that this a shift in the aid allocation pattern since the mid-1980s, when aid became conditional on implementation of good policies or structural reforms.

Reminiscent of the micro-macro paradox in the aid-growth literature, studies conducted at the country level reveal mixed findings regarding the relationship between aid and revenue mobilization. Some countries, such as Indonesia (Pack & Pack, 1990) and Ghana (Osei et al., 2003), exhibit a positive association. In contrast, other countries, such as Pakistan (Franco-Rodriguez et al., 1998) and Cote d'Ivoire (McGillivray & Ouattara, 2005), demonstrate a negative relationship.

## 4. Context

### *4.1. Sub-Saharan Africa*

As argued above, increasing tax revenue, one of the facets of domestic revenue mobilization, is essential for developing countries. Yet, many African countries struggle to collect an adequate amount of taxes. Tax collection in Africa is low, but similar to other regions at a similar income level (Okunogbe & Santoro, 2023). The largest shortfall can be found in the Sub-Saharan region. In 2018, Sub-Saharan African countries collected approximately 14 percent in taxes as a share of GDP (Okunogbe & Santoro, 2023; UNU-WIDER, 2022).

According to Coulibaly and Ghandi (2018), even though tax revenues in the region moved up since the turn of the century, the ratios are still well below the desired level. In contrast, the Europe and Central Asia region has the highest rate of 32 percent (UNU-WIDER, 2022). Across all countries, on average, a higher share of GDP as taxes is collected in higher income countries (Okunogbe & Santoro, 2023). Taxation in Sub-Saharan Africa has presented a complex and daunting challenge over the course of the twentieth and twenty-first centuries, adapting and transforming alongside the region's substantial political, economic, and social shifts.

In the early twentieth century, colonial powers used taxation as a means of generating revenue for their administration (Ndikumana, 2008). Notwithstanding the distinct goals and frameworks of French and British colonial administrations in Sub-Saharan Africa, the establishment of the fiscal state and the expansion of the revenue foundation were predominantly shaped by the opportunities and limitations imposed by local commercial and environmental circumstances, encompassing African reactions to the growing interactions with the colonial powers (Frankema & van Waijenburg, 2014). The constraints varied from logistic challenges and persistent administrative understaffing to the more fundamental political dilemma concerning the balance between tax expansion and domestic stability (Frankema, 2011).

French and British colonial administrations introduced a wide range of different tax instruments, but the overall logic was broadly similar: enhance trade and customs revenues (Frankema & van Waijenburg, 2014). Collecting custom duties, which are indirect taxes, was not only relatively easy and cheap, the political risks involved were also likely to be smaller. Tax revolts in colonial Africa were almost always provoked by taxes that were levied directly on people's income or assets. Import duties, which constituted the bulk of custom revenues before 1940, were mainly levied on luxury items such as beer, wine and tobacco. Part of the burden of import duties were thus born by foreign producers and European and African elite consumers. Import tariffs also offered some protection to local producers: it had a net progressive impact on the income distribution. On the other hand, a flat rate poll tax burdened the native poor disproportionately. This tax was fundamentally discriminatory, as it applied to all adult males at the same rate without accounting for variations in individual incomes or circumstances. Levying a poll tax or a land tax, which are direct taxes, also required considerable administrative capacity in assessment and collection. For these reasons colonial governments leaned towards founding state finances on custom revenue as much as possible (Frankema, 2011). An illustration of this can be seen in the case of Ghana. The introduction of the poll tax marked the initial endeavour by the colonial administration in the Gold Coast to supplement indirect taxes with direct taxation. However, due to its lack of success, the colonial administration shifted its reliance to import and export duties, developing the Gold Coast economy into an export-oriented economy, predominantly centred around cocoa production (Aboagye & Hillbom, 2020).

Nevertheless the resentment towards them, the colonial regimes succeeded in raising substantial funds from this source - especially in the decades preceding independence - due to a substantial degree of coercion that was used to force people to pay. Taxation was often oppressive and exploitative, exacerbating widespread poverty and inequality within the region (Ndikumana, 2008). Tax riots occurred, but they did not have wider political implications for the colonial regime as there was no meaningful political representation in place. These circumstances changed gradually during the post-independence era. While the new governments still employed coercion in poll tax collection, it was not implemented as forcefully and consistently as before.

This is evidenced by the significant variations in compliance rates across districts in the 1990s, as well as the overall decline in total revenue collected from poll taxes after independence. Both trends discourage quasi-voluntary compliance without which tax collection becomes economically and politically burdensome (Bräutigam et al., 2008; Levi, 1988).

Following the independence of numerous Sub-Saharan African countries in the 1960s, taxation took on a crucial role in building state capacity. The post-colonial period saw the various taxation policies and systems emerging (Ayittey, 2005). Regarding direct taxation of individuals, two developments unfolded simultaneously. Firstly, most countries retained the head, or poll, tax, albeit with certain modifications, sometimes redirecting its revenues to subnational governments. Secondly, governments strengthened more modern income taxation: expanding the rates, coverage, and progressiveness. In most cases, these two systems coexisted throughout the 1960s and early 1970s (Cogneau et al., 2021). All countries began to impose higher taxes on profits after independence. In Sub-Saharan Africa, profit taxation became prevalent in the mid- to late 1960s. By the early 1970s, countries such as Cameroon, Congo, Côte d'Ivoire, and Togo had already implemented profit taxation, while Madagascar introduced it later in 1978 (Genschel & Seelkopf, 2019). This suggests that the establishment or strengthening of profit taxes was a significant tax reform following independence. In the 1970s, (Cogneau et al., 2021) estimated that profit taxes accounted for approximately 10 percent of direct taxes in Mauritania, 80 percent in Guinea and Togo, and even as high as 90 percent in Gabon, mainly derived from mining companies.

However, the process of building a tax system in these newly independent countries was fraught with challenges, including weak administrative capacity, corruption, and a lack of public trust in government (Bräutigam et al., 2008). Moreover, the approaches were not yet successful in generating significant revenue, and many African countries became heavily indebted as a result. From the 1970s to the 1990s, many Sub-Saharan African countries faced significant economic challenges, including high levels of debt, inflation, and budget deficits. In an attempt to address these economic challenges, many countries turned to taxation to generate revenue and to improve the overall efficiency of the tax system, and in particular to allow governments to substitute inefficient trade taxes with a less distortive indirect tax (Ahlerup et al., 2015; Araujo-Bonjean & Chambas, 2005; Fjeldstad & Moore, 2009).

Much hope was vested in one particular tax innovation: value added taxes (VAT). A value added tax is essentially a general consumption tax but differs from traditional sales and turnover taxes, which it typically replaces (Bird & Gendron, 2006). While there may be variations in the details of VAT implementation across different countries, the key characteristics of this tax are its levying at each stage of the production chain and the provision for producers to credit taxes paid in previous stages towards their total value-added tax obligations (Ahlerup et al., 2015). One aspect of the VAT that makes it a particularly attractive tax for

developing countries is that, unlike traditional trade taxes, producers can credit the value added tax on imports. The VAT is hence less distortive in terms of international trade. Second, value added taxes provide a means to tax firms operating in the informal sector (Keen, 2008). As taxes paid on inputs can only be retrieved while being registered with the tax authorities, unregistered firms face a higher tax rate on their inputs. This higher tax burden incentivizes firms in the informal sector to register with the tax authorities (Ahlerup et al., 2015).

Indirect domestic taxation through a sales or turnover tax was the least implemented part of fiscal policy at the time of decolonization. Cameroon and Côte d'Ivoire were among the first to introduce a turnover tax in the late 1950s, and Côte d'Ivoire took the lead in implementing a VAT in 1964. Madagascar initially implemented a turnover tax in 1961, which was later replaced by a VAT in 1969. Senegal followed suit by replacing its turnover tax with a VAT in 1979 (Cogneau et al., 2021). However, it was in the 1990s that most African countries adopted VATs, often under the structural adjustment and stabilization policy conditionalities of the IMF and the World Bank (Ahlerup et al., 2015; Emran & Stiglitz, 2005).

In recent years, there have been other efforts to reform taxation in Sub-Saharan Africa, particularly in the areas of tax administration and compliance. In contrast to the 1980s and 1990s, in which the reforms were focused on dealing with high debts and changing the composition of the tax revenue, Fjeldstad (2016) notes that these efforts have been driven by a growing recognition of the importance of domestic revenue mobilization for financing development. Part of this recognition are semi-autonomous revenue authorities ((S)ARAs), which are semi-private agencies that are tasked with revenue collection. A semi-autonomous revenue authority is a new development in public administration. In essence, countries with a ((S)ARA) reassign the responsibility of tax administration from the finance ministry to a separate institution that possesses a certain degree of autonomy from the rest of the public sector, which was often perceived as corrupt, inefficient, and subject to political distortions (Baskaran, 2014; Fjeldstad & Moore, 2009; Jeppesen, 2021). The idea is to entrust tax collection to an agency that is less influenced by political factors and presumed to be more competent than the traditional public (Ahlerup et al., 2015; von Haldenwang et al., 2014).

The first semi-autonomous revenue authority occurred in Jamaica in 1981. Only a few years later, sub-Saharan Africa's first (S)ARAs appeared, initially 1985 in Ghana. Currently, (S)ARAs are less prevalent compared to VATs. From a practical perspective, however, it is plausible that (S)ARAs will lead to increased revenue generation. Tax officials selected based on merit are likely to possess greater competence compared to those appointed due to political affiliations. Their effectiveness in identifying tax evasion and curbing avoidance activities is anticipated to be higher. A more professional administration also poses a greater threat

to potential tax evaders. Moreover, higher salaries should reduce the likelihood of officials accepting bribes in exchange for lenient tax treatments (Ahlerup et al., 2015).

While VAT and (S)ARAs hold theoretical promise, it is important to recognize that their effectiveness is contingent upon good governance and economic development, as emphasized by Ahlerup et al. (2015). Moreover, as argued before, the implementation of VAT may lead to the reduction or disappearance of the large informal sector, but a revenue-neutral increase in VAT across all sectors can introduce intersectoral distortions between the formal and informal sectors. Consequently, contrary to prevailing consensus, this type of reform may reduce welfare under plausible conditions. These findings challenge the validity of the current consensus on comprehensive indirect tax policy reform in developing countries. Nevertheless, it does leave open the question of the desirability of a selective indirect tax reform along the lines frequently prescribed by the IMF and the World Bank (Emran & Stiglitz, 2005).

The above proofs that tax structures in many of Sub-Saharan countries have improved in recent times. However, growth in their domestic revenue mobilization has been generally sluggish. Many of them persistently experience significant tax-gaps (the difference between total amounts of taxes owed to the government versus the amount they actually receive) and budget deficits: a clear manifestation that their tax policies are in need of significant restructuring (Nwadior & Agbo, 2020).

One potential approach to address inadequate tax systems and the resulting shortfall in domestic revenue is to rely on foreign aid. This could partially account for why countries facing significant challenges in generating domestic revenue tend to receive higher amounts of aid from external sources. Many countries in Sub-Saharan Africa continue to rely heavily on aid, with the region receiving a net ODA flow of 52370 million USD in 2017 (OECD, 2019). Aid clearly can be useful and has certainly contributed to economic development and improvements in quality of life variables in many countries. But, at the same time, as already mentioned in section three, aid could also have distorting effects on some of the very outcomes donors hope to encourage through aid (Moss et al., 2006). Without aid, governments would have to cut spending, raise taxes, or borrow from other sources. Thus, it is argued, high levels of aid may diminish a government's incentive to make full use of its domestic resources for revenue generation (Bräutigam & Botchwey, 1999; Fjeldstad & Rakner, 2003; Robinson & White, 1998).

These two components make Sub-Saharan Africa the perfect case for examining the dynamics of the tax-aid nexus. The fact that tax systems, crucial for sustainable economic development, are far from efficient hinder the mobilization of domestic revenue, leading to a disproportionate reliance on foreign aid. However, apart from a development boost, large aid inflows could also undermine the incentives to set up a sustainable tax system, as foreign aid is the easy way out. Either way, it is important to remain critical of these trends.



On the one hand, there is an aid curse, meaning that a lot of net aid creates a lack of motivation to develop a well-functioning tax system. On the other hand, of course, one cannot ignore the fact that it is the poorest countries with the least developed institutions that receive the highest levels of aid. It is complex to decipher which phenomenon is occurring here, implying that this is a case of reverse causality.

#### *4.2. The role of China*

Over the last few decades, China has expanded from a poor country to a global superpower. China, formerly a beneficiary of aid, is a large donor and a significant government creditor on the global (Horn et al., 2021). Yet categorising China within emerging donors is in fact incorrect. China is neither an emerging nor a new provider of aid. In fact, China commemorated the 60th anniversary of its aid program in 2010. The origins of China's aid can be traced back to 1950, when it initiated in-kind support for the reconstruction of North Korea and neighbouring Socialist nations. Subsequently, China broadened the scope of its aid recipients to include non-socialist countries following the Asian-African Conference in Bandung, Indonesia in 1955 (Appadorai, 1955). This is the conference where the foundations were laid for South-South economic and cultural co-operation, the idea of which is very much based on solidarity between developing countries, together with collective self-reliance through partnership. Here, and during the 1975 UN Conference on South-South Co-operation in Buenos Aires, China cast itself as leader and protector of solidarity between developing countries (Muekalia, 2004; OECD, 2012).

The Bandung Conference enhanced the unity and cooperation among Asian and African countries, inspired the people in colonies to struggle for national liberation and played a pivotal role in promoting the anti-imperialist and anti-colonial movements in Asia and Africa. China shared with these nations a sense of humiliation, a strong desire to restore dignity and a determination to assert control over its own destiny. Following the Conference, China began to nurture relationships and provided economic, technical and military support to African countries and liberation movements. The objective was to promote wars of national liberation and revolutions, as well as to establish an international united front that stood against both the West and the Soviet Union (Ismael, 1971; Muekalia, 2004).

In the following years, China underwent a reassessment of its strategies and began placing greater emphasis on economic development. Its foreign policy centred on the principles of sovereignty, opposition to hegemony, and self-reliance, while advocating for a new international economic order. These calls for a new economic order resonated with many African leaders, who adopted a similar discourse at international fora. However, during the late 1970s and early 1980s, Sino-Africa relations experienced their lowest point. This was partly due to Beijing's tactical retreat, as well as significant changes in the political landscape of the

continent. With the majority of African nations achieving independence, the political elites became less receptive to calls for revolutionary struggle (Bräutigam, 2010; Muekalia, 2004).

The end of the Cold War, particularly the collapse of the Soviet Union, had a profound impact on China's global role and position. China emerged as both a balancing power to the United States and as torchbearer for the Third World. With a growing economy, significant military modernization, and increasing international influence, China advocated for multipolarity and a new global economic and political order. Moreover, China significantly intensified its engagement with Africa, surpassing previous levels of cooperation. Throughout the 1990s, China focused on strengthening relations with African countries, encompassing political, economic, trade, and military cooperation, as well as collaboration on multilateral issues (Muekalia, 2004). All of these more recent developments can be situated in the 'Going Global' policy, which was endorsed by the Chinese government in 2000. Under this campaign, China has launched various projects such as the One Belt, One Road initiative and the Asian Infrastructure Investment Bank, signalling a new economic and political landscape for international development cooperation (Carey & Li, 2016).

This makes that nowadays, China can be seen as a key foreign aid player in Sub-Saharan Africa (Bräutigam, 2009; Morgan & Zheng, 2019). Traditionally foreign aid has been a delicate topic in China, even considered a state secret. This can be attributed in part to diplomacy, cultural traditions and philosophy, as well as domestic reasons. However, in recent years, there has been a growing transparency from Chinese authorities regarding their aid program. In April 2011, China published a White Paper on Foreign Aid, which offers an overview of the country's aid initiatives and policies spanning several decades. More importantly, it highlights the increasing significance that China assigns to aid within its foreign policy framework, as evidenced by the substantial growth in aid volumes over the past decade (OECD, 2012).

Although China's assistance, in particular in Africa, has increased considerably over the past two decades, it still has been difficult to examine China's aid allocation behaviour using statistical analysis. Since China does not report ODA according to the OECD definition, many critics make assertions about official flows from China which include other flows beyond ODA, i.e. flows that are not primarily intended for development. In comparisons between the DAC donors and China, these critics are not comparing like with like (Bräutigam, 2009; Hoeffler & Sterck, 2022; Mandon & Tesfaye Woldemichael, 2022; OECD, 2012).

Nonetheless, significant progress has been made in gathering data on Chinese official flows, enabling more accurate comparisons between Chinese and DAC aid allocation patterns (Hoeffler & Sterck, 2022). An example is Strange et al. (2017)'s AidData's Chinese Official Finance to Africa dataset, where official flows are broken down into ODA-like flows and other official flows (OOF). This is also the dataset that will be used in the empirical analysis later on.

Rivalling traditional Western donors, China committed more than 350 billion US\$ in official finance to developing countries between 2000 and 2014 (Custer et al., 2021). In comparison to the aid provided by other Asian countries, an interesting feature of Chinese aid is the strong focus on Africa and on Least Developed Countries (LDCs). As indicated in the White Paper, Africa has historically received 45.7% of China's aid, while Asia has received 32.8%. This distribution might seem unexpected considering China's geographic location, but it suggests a global outlook influenced by its extensive trading relationships worldwide. Notably, 63.1% of China's aid has been directed to low-income countries, with 39.7% allocated to the least developed countries (LDCs). This highlights a significant emphasis on supporting the poorest nations (OECD, 2012).

The overwhelming majority of Chinese aid is disbursed bilaterally. China makes multilateral contributions to the World Bank, International Monetary Fund (IMF) and United Nations (UN) agencies. However, the bilateral share of China's aid is much larger than the multilateral: when China provides aid, it is generally a government-to-government relationship. It is provided in the form of grants, interest-free loans and concessional loans. In African context, there is generally a large use of export credits and concessional loans (Guillon & Mathonnat, 2020). Moreover, in the architecture of Chinese aid flows in its relations with developing countries there are frequently hybrid forms of financing arrangement - including grants, concessional loans, buyer credits and supplier credits (Carter, 2017; Dollar, 2016; Kimura & Todo, 2010). As economic and production sectors offer more opportunities for the use of those hybrid forms of aid financing than social sector interventions, more Chinese aid tends to flow in that direction (Bräutigam, 2010). An additional explanatory factor for relatively more aid flowing into those sectors is the fact that they include sectors that are of specific economic interests for China, which aligns with its commercial ties with African countries and its investment policy on the continent. This suggests that the economic incentives for China to allocate aid to the economic or production sectors are more important than they are for the social sector (Guillon & Mathonnat, 2020).

In general, China's increasing role as a global aid actor and the broader impact of its economic engagement overseas remains the subject of considerable interest and debate. Its rapidly expanding trade, investment, and aid have the potential to significantly reduce the economic marginalization of Sub-Saharan Africa and open up new opportunities for promoting growth through support for agriculture, health and other key sectors (OECD, 2009). Regarding its development co-operation activities, China has developed a strategy and is pursuing its so-called "mutual benefit approach". For their part, DAC members and other international donors can learn from China's approach to development cooperation, which is appreciated by many African countries and based on their shared experiences of disappointing economic performance and poverty. The literature highlights the influence of China's own past experience as an aid recipient, as well as that of the

historical context and geopolitics of China's regional and global circumstances (Bräutigam, 2009; Gu, 2015). Nevertheless, China's foreign aid has established itself as a distinct model with unique characteristics, and the lack of transparency surrounding its decision-making process makes it an intriguing and vital subject for analysing its impact on institutions in Sub-Saharan Africa.

## 5. Data

### 5.1. Sources

The central analysis of this research uses data concerning forty-six out of the forty-eight countries that comprise Sub-Saharan Africa according to the World Bank classification. A detailed overview of the nations receiving aid from China is provided in *Appendix 1*. Based on Chinese aid data availability, the current study limits its examination to the flows between 2000 and 2017. Due to missing data, the panel of forty-six developing countries is not balanced.

The research combines multiple data sources. The data concerning total government revenue and its components come from the United Nations University World Institute for Development Economics Research (UNU-WIDER) Government Revenue Dataset (UNU-WIDER, 2022). The net foreign aid flows data are retrieved from the AidData's Global Chinese Development Finance Dataset Version 2.0 (Custer et al., 2021). In this database, I selected the Chinese Official development assistance (ODA) to Sub-Saharan African countries. According to the Organization for Economic Cooperation and Development (OECD), these flows promote and specifically target the economic development and welfare of developing countries. I also choose to only include observations suitable for this analysis, which implies that projects of which the proof of money disbursement is lacking, as well as cancelled and suspended projects are excluded from the research. The focus lies on aid disbursements rather than commitments. After this selection, I arrive to a dataset of 1567 observations.

Meanwhile, the data regarding real GDP, real GDP growth, real GDP per capita, openness, industrial value added and total natural resources rents are extracted from the World Bank World Development Indicators (World Bank, 2021a; World Bank, 2021b, World Bank, 2021c, World Bank 2021d; World Bank 2021e; World Bank 2021f). G7, Non-DAC, DAC and multilateral ODA disbursements are extracted from the OECD.Stat database (OECD, 2021). For comparability reasons, both real GDP as the net ODA flows are expressed in constant 2015 US\$.

The political corruption index comes from the database constructed by Coppedge et al. (2022). A detailed description of the data is given in *Appendix 2*. Data on the bilateral distances between capitals, measured in

kilometre, comes from the Centre d'Études Prospectives et d'Informations Internationales (CEPII) database (Conte et al., 2022). The information regarding the Marxist status of Sub-Saharan countries during the period between their independence and 2017 is sourced from Cogneau et al. (2021). Finally, the data regarding the International Monetary Fund's (IMF) economic programmes come from the Monitoring of Fund Arrangements database (IMF, 2023).

## *5.2. Limitations*

### *5.2.1. Recipient countries*

Measurement is increasingly at the centre of debates in African economic development. At the macro level, development is conventionally measured by trends in GDP, either in total or on a per capita basis. That is also the case here (Jerven & Johnston, 2015). However, the statistical foundations of the recent growth in (per capita) GDP are quite weak. In many countries, GDP accounts use old methods, population censuses are out of date, and poverty estimates are infrequent and often not comparable over time. The proximate reasons have to do with weak capacity, inadequate funding, and a lack of coordination of statistical activities. The underlying cause however may be the political sensitivity of these statistics, and some donors' tendency to go around countries' own National Statistical Development Strategies (Devarajan, 2013).

The problems with these data are widespread, requiring improvement in national accounts (Jerven & Johnston, 2015). Given that the principle for data users is the comparability of data over time and space, revisions constitute an important step toward getting an accurate measure of GDP level for the individual country. However, issues utilizing the data for comparisons of changes in production and income remain (Jerven, 2012).

The generally low quality of data in the African context also implies carefulness and criticism concerning government revenue data and raises questions of wrongly conducted research and misleading policy implications (Jerven, 2012). Nevertheless, since its launch the UNU-WIDER Government Revenue Dataset (GRD) has quickly gained prominence as the go-to source for cross-country revenue data for many analyses (McNabb, 2017). By employing a standardized classification system and compatible sources, the GRD dataset offers increased transparency and comprehensiveness in analysing tax and government revenue data from various international source. Nonetheless, numerous shortcomings still persist, underscoring the need for a thorough examination of each observation to ensure its quality, consistency, completeness, and accuracy (McNabb, 2017; Prichard et al., 2014).

### 5.2.2. Donor country

Unlike traditional donors organized in the OECD DAC group, for a variety of domestic political and administrative reasons, China does not systematically publish detailed country-, sector- and project-level information about its foreign aid activities. Beijing's resistance to aid transparency may also reflect a broader disinterest in complying with Western (OECD-DAC) standards (Grimm et al., 2011). It does not use the methodology defined by the DAC for calculating ODA, making Chinese development finance flows unaligned with the well-defined OECD-DAC definitions of ODA and other official flows (OOF). This confounds efforts to catalogue and measure Chinese aid (Horn et al., 2021; OECD, 2012).

These issues make accurate estimation of total aid flows from China complex, leading to speculation and incorrect estimates. AidData's Global Chinese Development Finance Dataset may already guide us in the right direction, but it remains crucial to always approach the data critically and consider possible pitfalls. For instance, the construction of AidData dataset is heavily based on Chinese and English language sources which could lead to an underrepresentation of aid flows toward countries where other languages are more often used in media outlets, business relations, and politics (Strange et al., 2017).

## 6. Empirical strategy

The main idea of this research is to examine whether Chinese official development assistance (ODA) flows have a significant influence on taxation systems in Sub-Saharan Africa. The empirical methodology used in this paper is largely based on the work of Thornton (2014). Following the research of Tavares (2003) and Larraín and Tavares (2004), that study uses both an ordinary least squares (OLS) and an instrumental variables (IV) specification.

### 6.1. The OLS specification

The baseline model posits that tax revenue in relation to GDP is a function of foreign aid inflows in relation to GDP and control variables. The equation to estimate the effect of official development assistance can be denoted as:

$$TAX/Y_{it} = \alpha + \beta_1 AID/Y_{it} + \varepsilon_i \quad (1)$$

in which  $TAX/Y_{it}$  is the ratio of tax revenue to GDP and  $AID/Y_{it}$  is the ratio of net foreign aid inflows to GDP.  $\varepsilon_i$  is the error term. Following Thornton (2014), I control for several other factors that have been shown to affect tax revenue. Ultimately, this estimation specification is obtained:

$$TAX/Y_{it} = \alpha + \beta_1 AID/Y_{it} + \beta_2 GDPpc_{it} + \beta_3 open_{it} + \beta_4 industry_{it} + \beta_5 natural_{it} + \beta_6 GDPgrowth_{it} + \beta_7 IMF_{it} + \beta_8 corruption_{it} + \varepsilon_i \quad (2)$$

in which  $TAX/Y_{it}$  is the ratio of tax revenue to GDP. I employ non-resource tax revenue, excluding social contributions, in order to isolate the impact on taxes without natural resource rents. Further, data related to social contributions are frequently incomplete and incomparable.  $AID/Y_{it}$  is the ratio of foreign aid inflows to GDP. Real GDP per capita,  $GDPpc_{it}$  serves as a proxy for a country's overall level of development and thus acts as an indicator of the total tax base (Cobbe & Goode, 1985; Landefeld et al., 2008).  $open_{it}$  represents the level of openness, considering that many developing countries still impose direct taxes on internationally traded goods. Additionally, higher levels of openness are often linked to increased productivity and economic growth (Melitz, 2003; Tahir & Pg Haji Omar Ali, 2014). Finally, open countries are often associated with larger governments (Alesina & Wacziarg, 1998; Rodrik, 1998).  $industry_{it}$  indicates the industry value added to GDP ratio, as the industrial sector of the economy is easier to tax than agriculture (Greenwald & Stiglitz, 2006). The share of government revenue derived from natural resource rents is represented by  $natural_{it}$ . In developing countries, a significant portion of government revenue comes from natural resource rents. However, this revenue source can potentially undermine domestic tax effort (Jensen, 2011; Knack, 2009). Moreover, it can contribute to increased corruption levels within a country, ultimately undermining the quality of institutions and, consequently, efforts to mobilize tax revenue. (Bornhorst et al., 2009; Brockington, 2008).  $GDPgrowth_{it}$  displays real GDP growth, in order to control for business cycle fluctuations.  $IMF_{it}$  is a dummy variable set to 1 when the country was part of an IMF-supported economic programme, capturing key economic and fiscal policy reforms. Finally,  $corruption_{it}$  is a composite index of the perceived overall level of corruption. The political corruption index values lie between 0 and 1, with an increase in the index corresponding to a raise in the level of corruption (Coppedge et al., 2022). A detailed description of the index is provided in *Appendix 2*.  $\varepsilon_i$  is the error term. Estimation is done by pooled ordinary least squares. In order to avoid groupwise heteroskedasticity in the standard errors, I implement cluster-robust standard errors by recipient country. When data are grouped into clusters, default standard errors can greatly overstate estimator precision: they will typically be too small, magnifying the reliability (significance) of the least squares estimates.

## 6.2. *The IV specification*

A key challenge in estimating the aid–tax relationship is overcoming the issue of reverse causality, which arises when aid inflows may also be influenced by the level of taxation. For instance, donors may adjust their level of foreign aid in response to fluctuations in domestic revenue mobilisation. As highlighted in section 4.2, there is a possibility of an aid curse, wherein a significant influx of net aid can diminish the motivation to establish a well-functioning tax system. However, one cannot ignore that the poorest countries with the least developed tax institutions often receive the highest amount of net aid. This raises a valid concern regarding the direction of causality and prompts further examination.

There might also exist difficult-to-observe omitted variables contained within the error term that explain tax effort, while being correlated with aid flows (Benedek et al., 2014; Tagem, 2017). Both in the case of reverse causality and the case of omitted variable bias, the issue of endogeneity arises. Endogeneity implies that the independent variable is correlated with the error term, resulting in biased and inconsistent OLS estimates of specification (2). The issue of endogeneity related to foreign aid has given rise to a separate body of literature dedicated to establishing an unbiased connection between the variables of interest. Typical methods used are the difference generalized method of moments (GMM) estimator (Arellano-Bond), the system GMM estimator or the instrumental variable (IV) estimation.

In this research, the issue of endogeneity is addressed by instrumenting for the endogenous variable (ratio of foreign aid to GDP) with an instrumental variable. It is crucial to find instruments that do not have a direct link with the dependent variable, tax effort. In a preferable setup, there are no other links with tax effort than through the ratio of foreign aid to GDP. Moreover, the instrument cannot be correlated with the error term of the main regression and needs to have a sufficiently strong correlation with the endogenous variable, the ratio of foreign aid to GDP. To achieve this, I build three variables that are likely to affect foreign aid but can at the same time be reasonably seen as completely exogenous to a country’s policy choices and therefore tax effort. The procedure I employ was presented by Thornton (2014), who followed the strategy by Tavares (2003) and Larrain and Tavares (2004).

I calculate for each China-developing country pair three variables that reflect their geographic and cultural proximity. The variables are the inverse of the bilateral distance between them, a dummy variable taking the value of 1 if the African country has been Marxist between their independence and 2017 (Cogneau et al., 2021) and a dummy variable taking the value of 1 if the African country is adjacent to the Indian Ocean. I then take the constant 2015 US dollar value of Chinese ODA and multiply that by the three constructed variables. For bilateral distance, I multiply the flows by the inverse of the distance. Finally, all three categories constitute instruments for the tax to GDP ratio for each receiving country in the sample. While



the first two capture the geographical proximity and accessibility, the third one encompasses cultural proximity.

The logic behind this construction is that if China increases its ODA outflow, Sub-Saharan nations that are culturally and/or geographically closer receive exogenously higher aid inflows. This approach gets its inspiration from the gravity model, which has been employed in a variety of specifications and situations to analyse trade patterns and anticipate trade potentials, and is considered as a prominent empirical model in economics discussing international trade flow (Anderson, 2011; Feenstra et al., 2001). The model is both compelling by its very intuitive nature and its structurality in addition to having a strong theoretical basis. A simple gravity model tries to explain trade by implying that countries will trade more if they are larger, and also if they are geographically and culturally closer to each other.

Employing the three constructed variables as instruments for the aid to GDP ratio, estimation of specification (2) is done by the two-stage least squares (2SLS) or instrumental variables (IV) method. Again, in order to avoid groupwise heteroskedasticity in the standard errors, I implement cluster-robust standard errors by recipient country.

Ultimately, by estimating (2) using the two different methods, I will be able to look into the impact of Chinese net ODA on tax revenue in Sub-Saharan Africa. Anticipating the results of the econometric analysis, I can say that I expect to find a negative influence of an increase in Chinese ODA on Sub-Saharan tax revenue. In turn, a positive relationship between tax revenues and real GDP per capita is expected. The same is expected for real GDP growth and tax revenues, and openness and tax revenues. Furthermore, I anticipate that tax revenue will rise with an increase in the share of industry in total value added, while it will decrease with a rise in corruption levels and an increase in the share of revenue derived from natural resource rents. Additionally, being part of an IMF-supported economic program is expected to positively influence tax revenue. When estimating the specification, this is of course all reasoned under the assumption that the relationship between the variables is linear, and does not for example show a quadratic pattern. In that situation, the abovementioned expected signs could potentially change.

## 7. Results

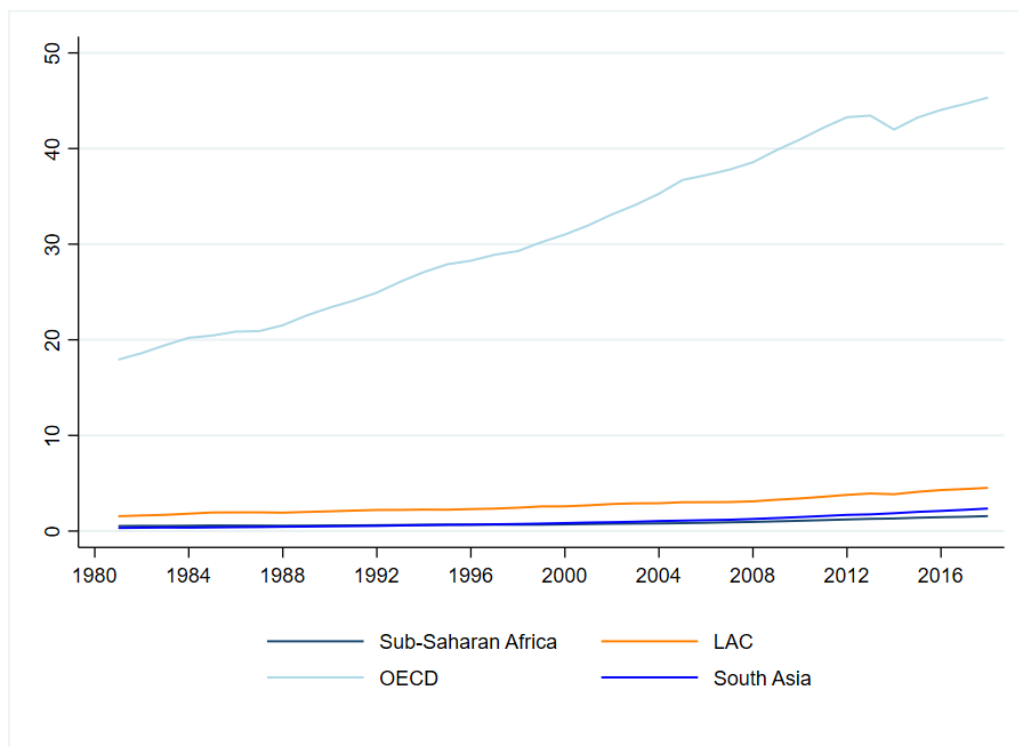
I conduct the empirical analysis in two steps. In the first subsection I present an overview of the general trends tax revenues and foreign aid, with the aim of evaluating whether the analysis for the countries used in this particular study is consistent with the discussion of theory, context and previous research I presented before. The analysis covers the years 1980 to 2017, with the intention of providing a slightly longer time

perspective than 2000 to 2017. The analysis only runs from 1980 on because of availability of tax revenue data.

The second subsection entails the sample's descriptive statistics of (in)dependent variables and controls used in the main regressions. Moreover, it reports the discussion regarding the results of estimating specification (2) using the two methods discussed in section 6.

### 7.1. Descriptive trends

*Figure 2* presents the GDP trend for Sub-Saharan Africa and three reference groups – OECD as group of developed countries, and the Latin America and the Caribbean (LAC) region and South Asia as groups with a great deal of development potential remaining. The specific countries comprising the reference groups can be found in *Appendix 3*. In terms of this measure, the developed countries belonging to the Organisation for Economic Co-operation and Development (OECD) outperform the LAC region, Sub-Saharan Africa and South Asia. The figure moreover displays how OECD members experience a strong increase throughout the time period, while only a very slight upward trend can be detected among the other regions. Especially South Asia and Sub-Saharan Africa perform very poorly compared to the others. Both regions were at the



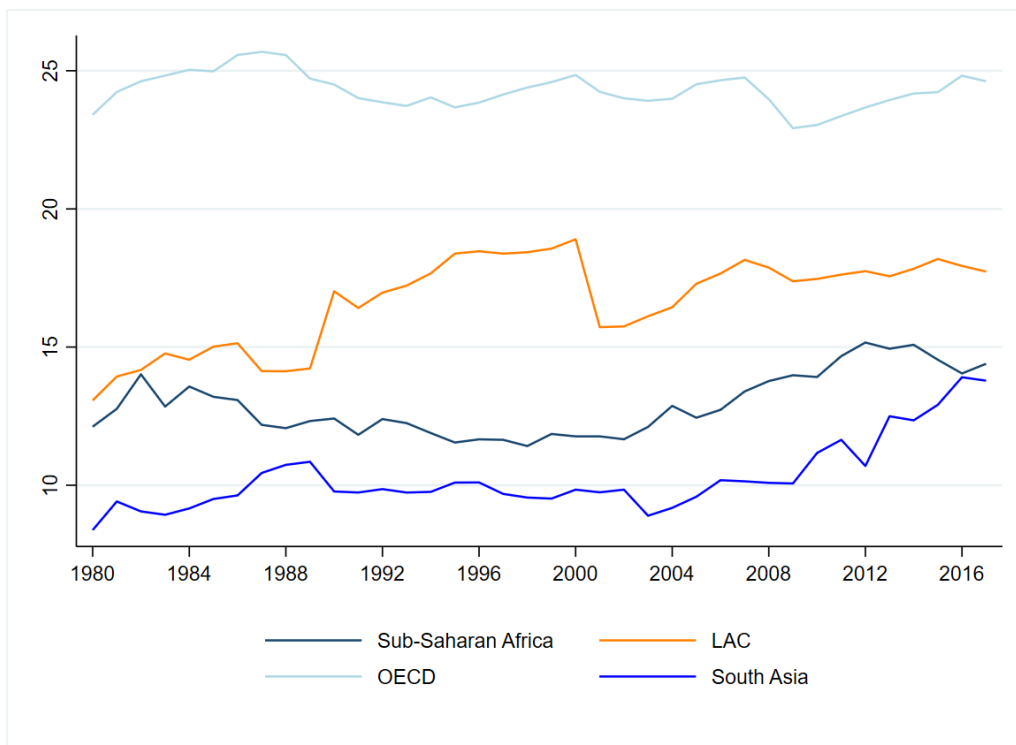
*Figure 2: GDP (constant 2015 trillion US\$), 1980-2017.*

**Source:** own composition on the basis of the World Bank World Development Indicators (World Bank, 2021a).

same level for quite some time until around the turn of the century South Asia's GDP experienced a rise, leaving Sub-Saharan Africa being the worst student in the class.

Sub-Saharan Africa's GDP growth and consecutive economic development thus appears to remain absent for the time being, and confirms that the group of countries continues to be the world's poorest region by the GDP measure.

As the lack of resources can inter alia be addressed by the development of well-designed taxation systems, the urgency of the shortfall of economic development is again reflected in *Figure 3*. Looking at the tax-to-GDP ratios, it becomes clear that Sub-Saharan Africa also presents very low figures in this regard. The OECD members perform significantly better than all three other regions, averaging around 25 percent throughout the whole time period. The LAC region knew a strong increase around 1990, to remain having figures between 15 and 20 percent afterwards. Especially the very low figures reported by Sub-Saharan Africa and South Asia are striking. In South Asia, the tax-to-GDP ratio is below ten percent most of the time, until it rises sharply from 2009 on to almost reach 15 percent in 2017. Likewise, Sub-Saharan Africa shows disappointing tax-to-GDP ratios: although the ratio starts increasing from 2002 on and arrives at 15 percent in 2012, most of the time period the ratio is closer to 10 percent.

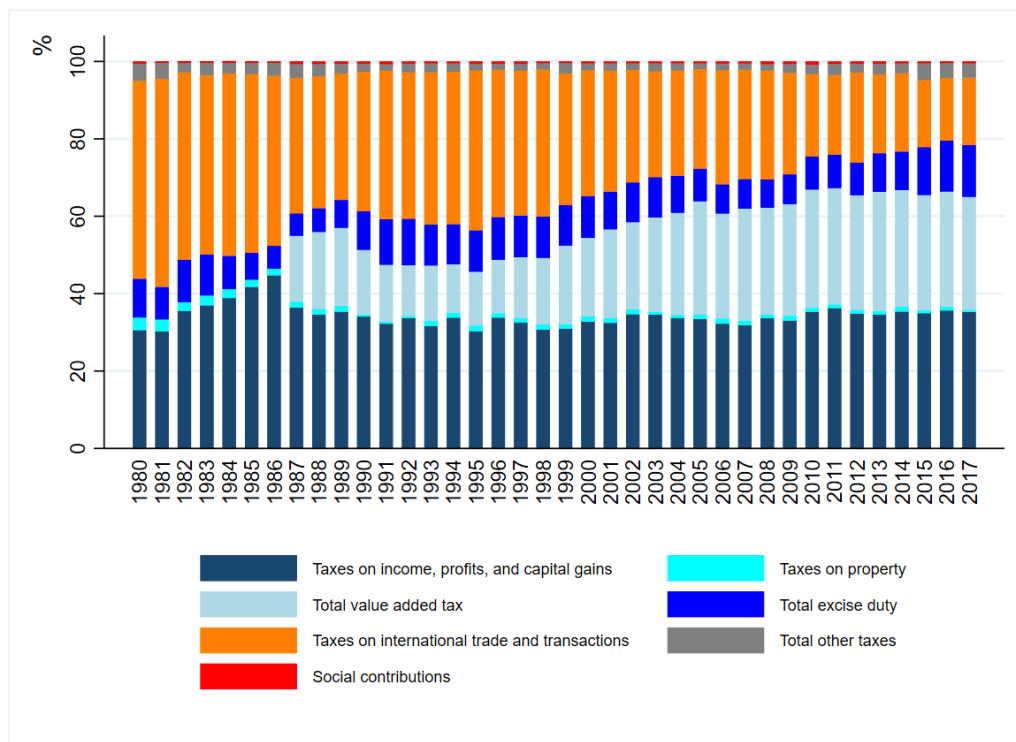


*Figure 3: tax-to-GDP ratio's (percent), non-resource tax excluding social contributions. 1980-2017.*  
**Source:** own composition on the basis of the UNU-WIDER Government Revenue Dataset (2022).

Tax collection in Africa is thus low and similar to other regions at a similar income level, which partly explains why Sub-Sahara African development has been disappointing (Okunogbe & Santoro, 2023). As discussed in section 2, the establishment of a comprehensive taxation system plays a vital role in creating an environment conducive to economic growth (Bird, 2013; Kaldor, 1963; Zolt & Bird, 2005). This notion is further supported by the observation that in the OECD region, which consists of developed countries, tax levels have remained consistently high (Myles, 2000).

Increasingly more, as described in section 4.1, the importance of taxes for economic development has been emphasised and emulated in recent years (Ayttey, 2005). All countries started to tax more after independence, but the lack of knowledge made that their approaches were not yet successful in generating significant revenue. From the 1970s to the 1990s, many Sub-Saharan African countries became heavily indebted as a result. Throughout this crisis, significant focus has been placed on replacing inefficient trade taxes, which were prevalent during the colonial era, with a less distorting indirect tax called the value-added tax (VAT) (Ahlerup et al., 2015; Araujo-Bonjean & Chambas, 2005; Bird & Gendron, 2006; Fjeldstad & Moore, 2009). This tax is levied at each stage of the production chain, and producers at each stage can credit taxes paid in the previous stages against their overall value added tax obligations (Ahlerup et al., 2015).

*Figure 4*, which concerns the tax structure in the 46 Sub-Saharan countries covered in this analysis, one can clearly see the effect of this tax innovation. The VAT takes a large, and ever-increasing share in total tax revenue from 1987 onwards. This is indicative of the fact that most African countries adopted their VATS

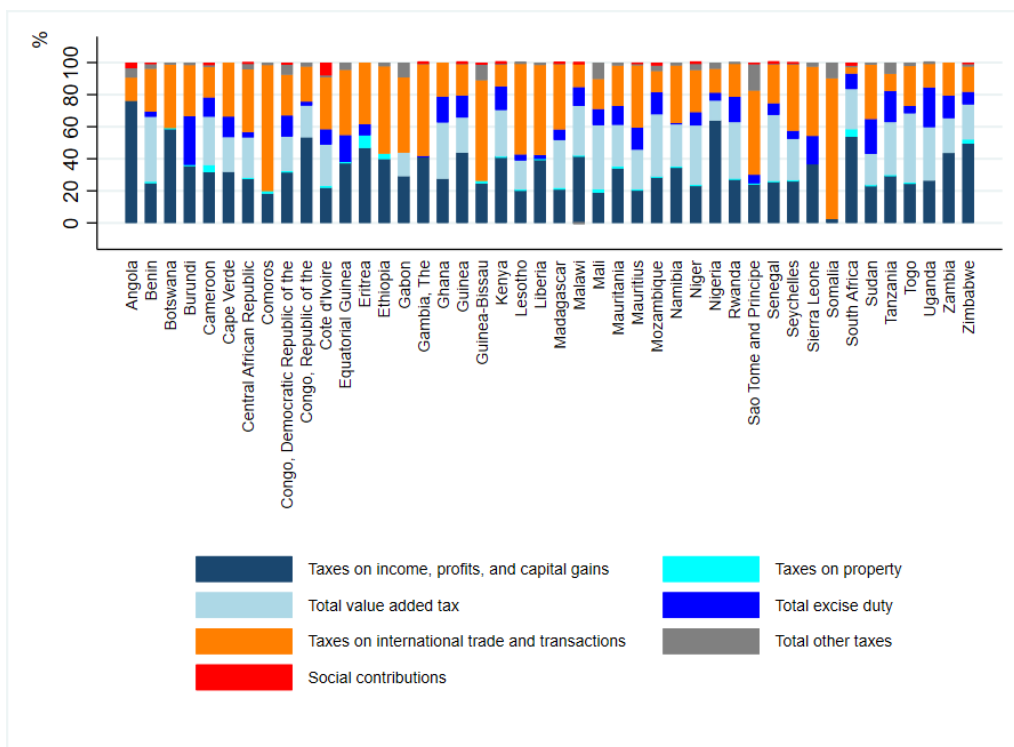


*Figure 4: tax structures for Sub-Saharan Africa (% of total tax revenue), 1980-2017. Total other taxes comprise tax revenues that are not otherwise classified or identified. Source: composition on the basis of the UNU-WIDER Government Revenue Dataset (2022).*

during the 1990s under the structural adjustment and stabilization policy conditionalities of the IMF and the World Bank (Ahlerup et al., 2015; Emran & Stiglitz, 2005).

More so, this innovation has the desired effect, as the increase in VAT comes at the expense of the share of tax on international trade and transactions in total tax revenue. Furthermore, there is also a decline in the direct tax on income, profits and capital gains after 1986, consistent with the fears that excessive tax rates would restrict investments by national and multinational companies leading structural adjustment programmes to decrease in the tax pressure on profits (Cogneau et al., 2021; Moore et al., 2018). The share of taxes on income, profits and capital gains remains fairly stable after the decline, as do in general property taxes, social contributions and other taxes, all of which only contribute to a minor part of total tax revenues.

Looking at the tax structure for the same time period by Sub-Saharan African country displayed in *Figure 5*, I detect a more diverse picture. While the graph demonstrates that VAT taxes constitute a significant portion of total tax revenue in multiple countries, it is important to note that in other countries, taxes on international trade and transactions remain prevalent. Moreover, some countries such as Burundi, Sudan and Uganda exhibit a large share of excise duties. This variation reveals how not all countries are already at the same level in terms of structural tax innovations. What all countries have in common is that social contributions and other taxes are negligible - except in Côte d'Ivoire, which receives a remarkably large share of social contributions compared to the other countries.



*Figure 5: tax structures (% of total tax revenue) per Sub-Saharan country, 1980-2017. No observations for South Sudan and Chad.*

*Source: composition on the basis of the UNU-WIDER Government Revenue Dataset (2022).*

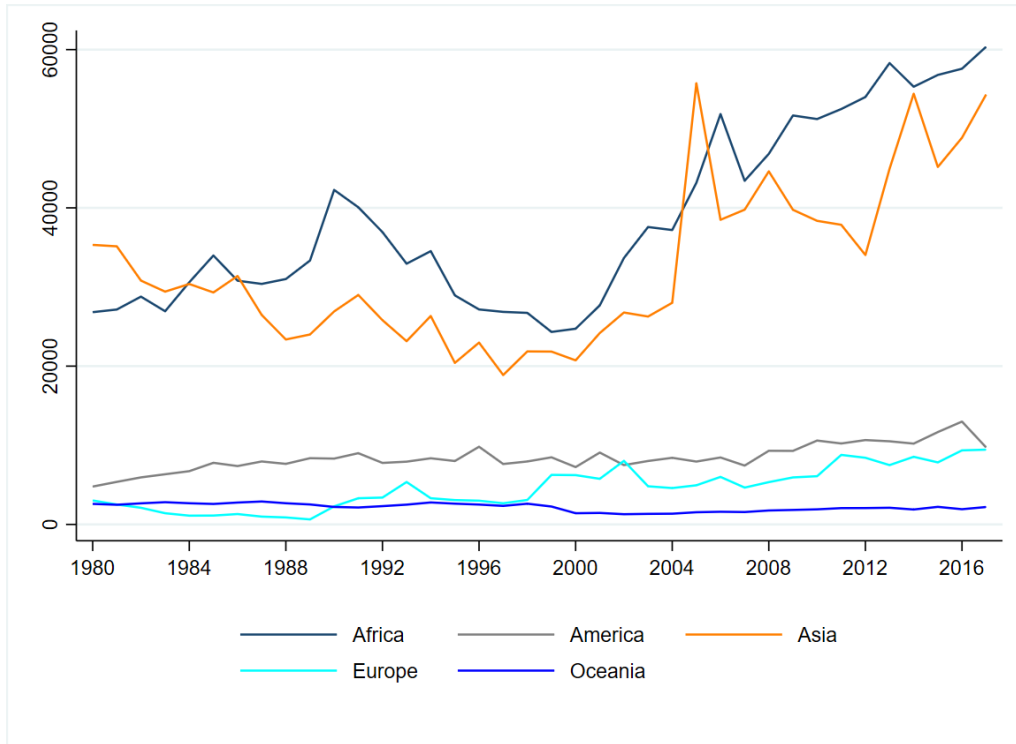
As outlined in section 4.1, in contrast to the 1980s and 1990s in which the reforms were focused on dealing with high debts, more recent efforts have been driven by a growing recognition of the importance of domestic revenue mobilization for financing development (Fjeldstad, 2016). Part of this recognition are (semi-)autonomous revenue authorities ((S)ARA), which are (semi-)private agencies that are tasked with revenue collection (Fjeldstad & Moore, 2009). The idea is to give the task of collecting taxes to an agency that is less politicised and presumably more professional than the traditional public sector (Ahlerup et al., 2015; von Haldenwang et al., 2014). They were first introduced mid-1980s in Sub-Saharan Africa and are nowadays still less common than VATS (Ahlerup et al., 2015). This might be the reason why their expected positive result on tax-to-GDP ratio's fails to materialise (Baskaran, 2014; Jeppesen, 2021). Going back to *Figure 3*, one can observe a slight increase since the turn of the century, but the ratio remains very low compared to other regions.

A glimpse of the effect of tax reforms and innovations can thus already be detected in the data, but a clear upward trend in both VAT as the tax-to-GDP ratio as a consequence of the implementation of VAT or (S)ARA remains absent. Moreover, not all countries are moving at the same pace, and there are persistent differences among Sub-Saharan African countries. It seems as though Sub-Saharan Africa in general, and some countries in particular, still have a lot of work to be done when it comes to a well-designed tax system (Addison & Levin, 2012; Feger, 2014).

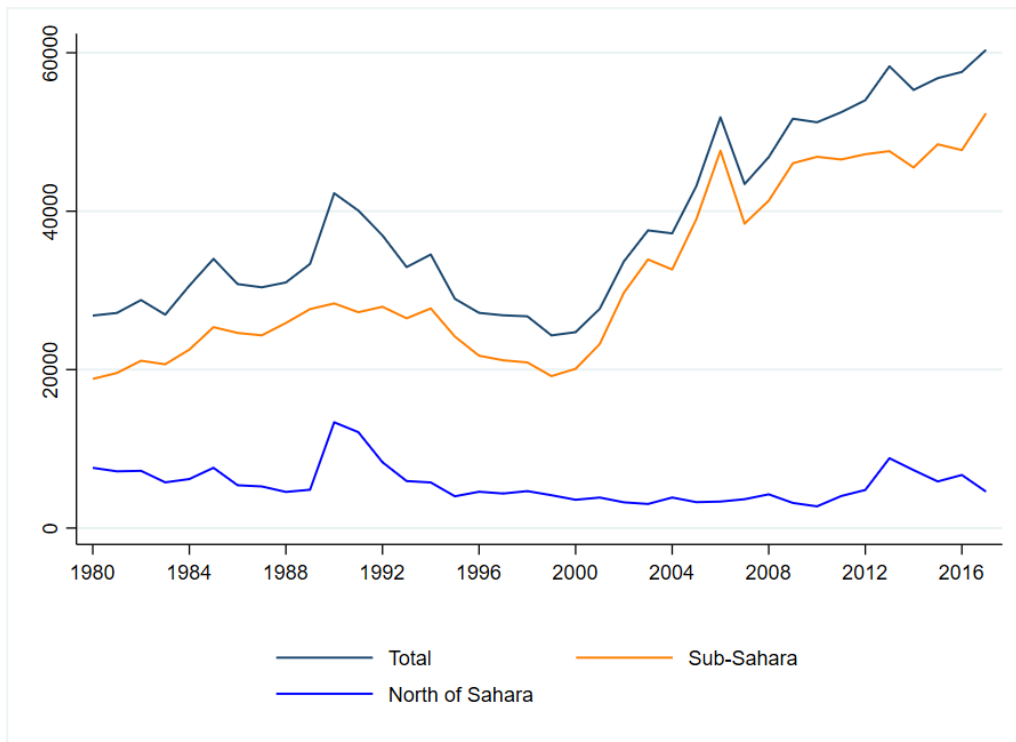
This gives rise to many Sub-Saharan African countries heavily relying on alternative sources of revenue. Next to dependence on natural resource revenues if possible, foreign aid in the form of ODA is a popular refuge. That many Western powers and multilateral organisations include foreign aid as an important item on their agenda is apparent on *Figure 6*, displaying the total net ODA flows by receiving continent. After a crisis of legitimacy throughout the 1990s, aid is popular again in the policy community (Moss et al., 2006). Below, a vast increase in total net ODA to developing countries from the turn of the century becomes evident. Especially noticeable is how both Africa and Asia experience a sharp increase in the received amount of aid after the 1990s. In particular Africa is a huge recipient: in 2016, it receives more than double what it received in 1980. In Europe and Oceania, the level of receipts is relatively low, and only slightly more aid is flowing to the Americas.

Taking a closer look into the African continent, I find that within Africa, the Sub-Saharan region is by far the largest total net ODA recipient (*Figure 7*). Sub-Saharan Africa receives the majority of total funds flowing into Africa, while the quantities north are much lower. This is a logical implication of the fact that the north performs better economically, and, in socio-economic terms, leans more towards the Middle East. Also, it aligns with the idea that as Sub-Saharan Africa struggles to mobilise sufficient domestic resources, the general reliance on ODA flows is large. Emphasising how important aid is to Sub-Saharan economies is

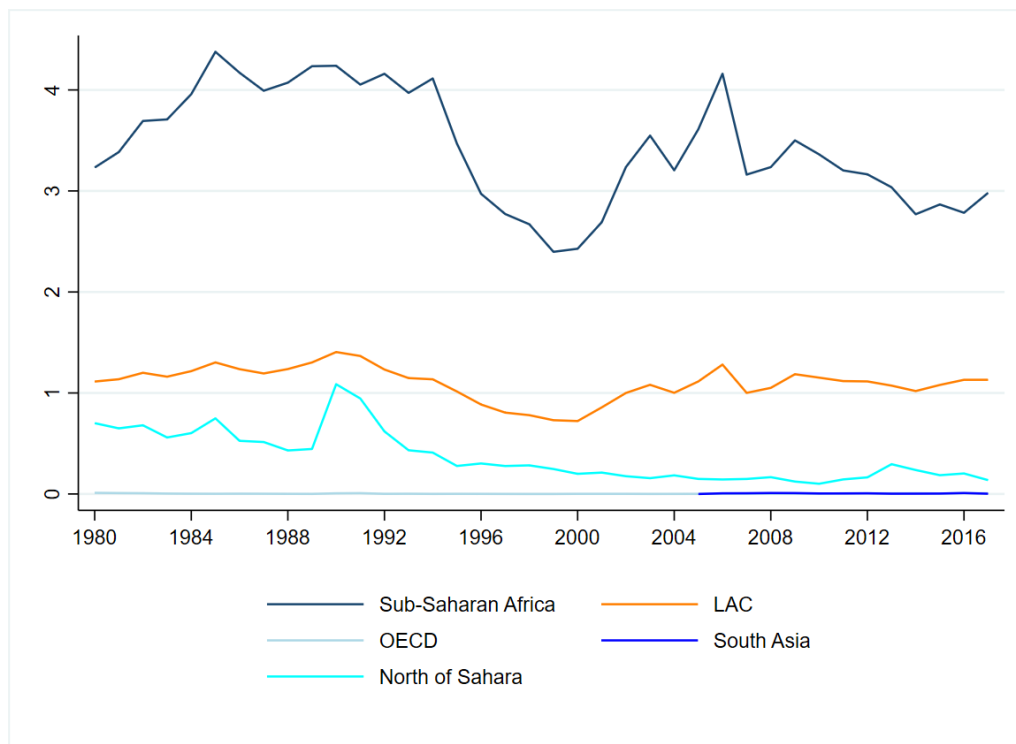
also what *Figure 8* does. At the beginning of the time period, the region's ratios were around 4 percent, to be around three per cent after the legitimacy crisis. In contrast, the ratios of the reference groups are a lot lower: the rates of OECD and South Asia are edging towards 0 percent, as are those of the North of Sahara towards the end of the time period. The LAC region's ratios are slightly higher, but still significantly lower than those of its Sub-Saharan peers.



*Figure 6: recipients of total net ODA by continent (constant 2021 million US\$), 1980-2017*  
**Source:** own composition on the basis of the OECD.Stat database (OECD, 2021).



*Figure 7: recipients of total net ODA by African region, 1980-2017 (constant 2021 million US\$).*  
**Source:** own composition on the basis of the OECD.Stat database (OECD, 2021).

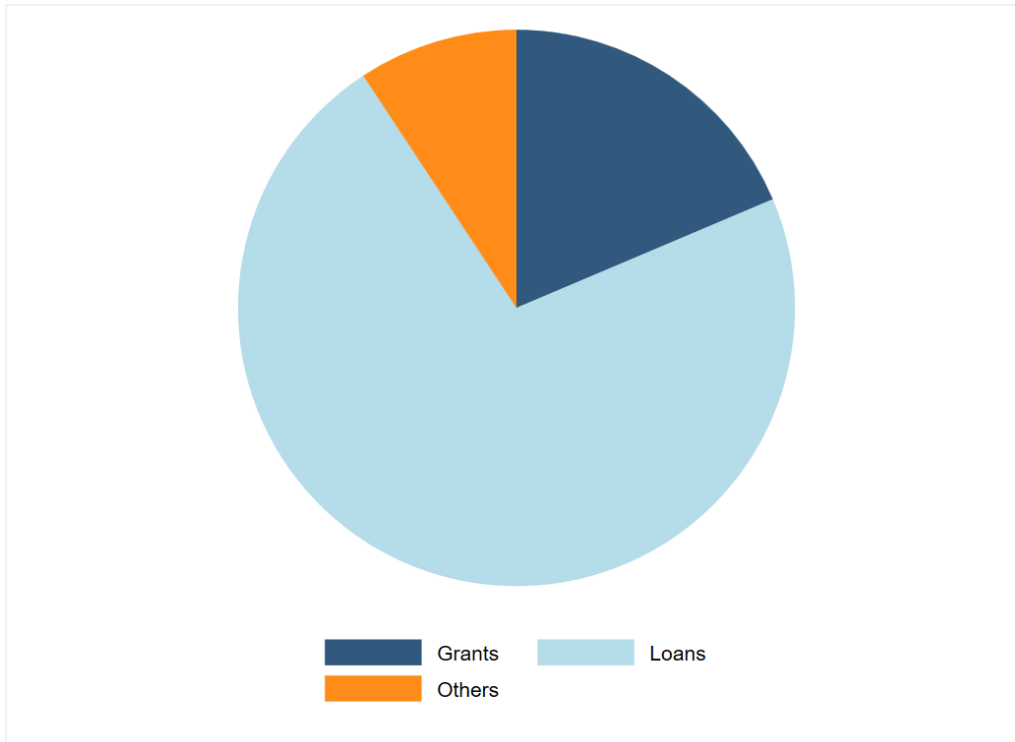


*Figure 8: net-ODA-to-GDP ratio's (percent). From official donors, 1980-2017.*  
**Source:** own composition on the basis of OECD.Stat database (OECD, 2021) and the World Bank World Development Indicators (World Bank, 2021a).

While African aid from Development Assistance Committee (DAC) members has been rather stagnating since the start of the century, especially to least developed regions such as Sub-Saharan Africa, China, already focusing on ties with Africa since the 1950s, provided increasingly more aid. Although current Chinese aid is much lower than aggregate aid from OECD, it has increased rapidly over the past two decades as OECD disbursements have declined (Khan, 2015). This is a massively interesting evolution. As China has developed its own strategy in terms of aid, analysing to what extent this different approach compared to traditional western donors affects tax revenues in the Sub-Saharan region, can lead us to crucial policy insights.

As explained in section 4.2, China's aid is provided in the form of grants, interest-free loans and concessional loans. In African context, there is generally a large use of export credits and concessional loans (Guillon & Mathonnat, 2020). This perception is validated by *Figure 9*, which depicts the Chinese net ODA to Sub-Saharan Africa per flow type: nearly 75 percent of all Chinese ODA projects in Sub-Saharan are loans. The second largest share consists of grants, while the smallest share corresponds to other foreign aid flows. That category includes debt forgiveness, freestanding technical assistance, scholarships/training in the donor country and aid that is not otherwise classified.



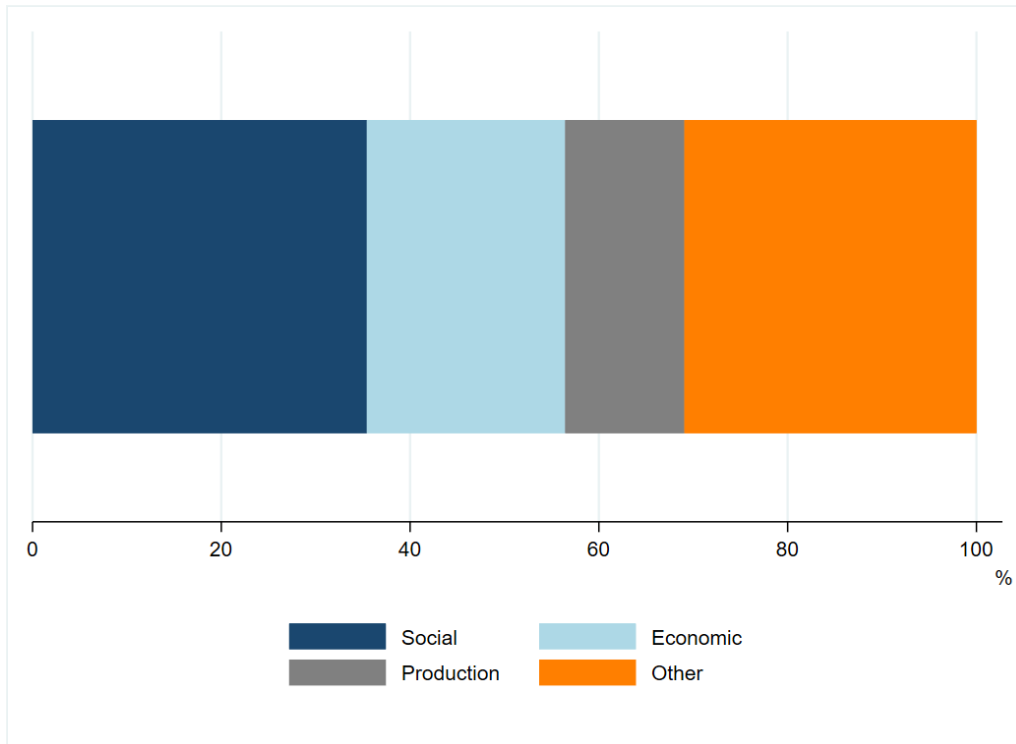


*Figure 9: Chinese net bilateral ODA flows to Sub-Saharan Africa, per aid type. 2000-2017.*  
**Source:** own composition on the basis of the AidData's Global Chinese Development Finance Dataset (Custer et al., 2021).

This is opposed to foreign aid coming from the DAC. Most bilateral ODA is provided as grants, which is an offshoot of the debate on the effectiveness of foreign aid revolved around the relative efficiency of loans versus grants (Cutts, 2022; Pivovarsky et al., 2003). I will delve deeper into this matter under section 7.2.

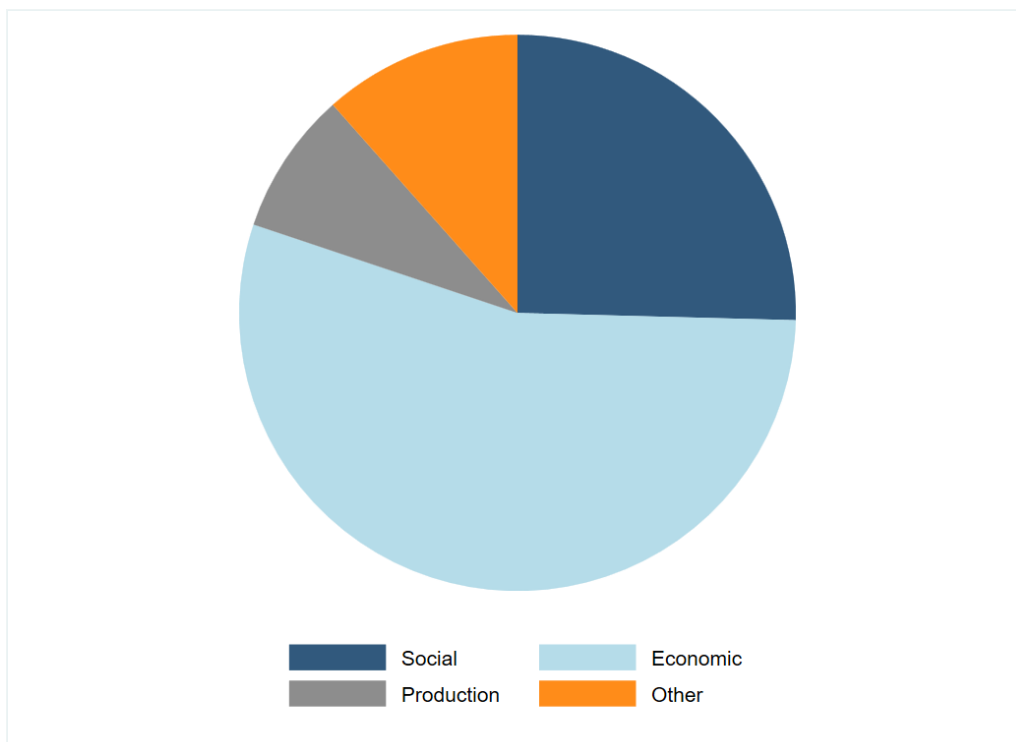
Interestingly, in its relations with developing countries the architecture of Chinese aid flows frequently has hybrid forms of financing arrangement - including grants, concessional loans, buyer credits and supplier credits (Carter, 2017; Dollar, 2016; Kimura & Todo, 2010). As economic and production sectors offer more opportunities for the use of those hybrid forms of aid financing than social sector interventions, and because they include sectors that are of specific economic interests for China, more Chinese aid tends to flow in that direction (Bräutigam, 2010; Guillon & Mathonnat, 2020). This is also the story *Figure 10* and *Figure 11* tell us: while the majority of the amount of bilateral ODA flows from the official donors goes into the social sector, China focuses on the economic. More than half of the total amount of Chinese ODA goes into the economic sector, compared to approximately twenty percent for the traditional Western donors. In fact, this also ties in nicely with the grant-focus that DAC countries exhibit - while (concessional) loans are linked to economic incentives and the idea of building longer-term bilateral economic ties, the idea behind grants is

more often humanitarian (Pivovarsky et al., 2003). A detailed overview of the specific sectors grouped under social, economic, production and other can be found in *Appendix 4*.



*Figure 10: total bilateral net ODA from DAC donors to Sub-Saharan Africa, per sector. 1980-2017 (percentage).*

**Source:** own composition based on the OECD.Stat database (OECD, 2021).



*Figure 11: total bilateral net ODA from China to Sub-Saharan Africa, per sector. 2000-2017 (percentage).*

**Source:** own composition on the basis of the AidData's Global Chinese Development Finance Dataset (Custer et al., 2021).

The analysis on the basis of the above charts motivates the potential issue of tax-aid nexus on a deeper level and shows general consistency with the theory and events discussed in sections 2, 3 and 4. However, these are preliminary trends, which cannot be interpreted causally. Further analysis will provide more robust evidence regarding the relationship between ODA flows and tax revenues.

## 7.2. Analysis

*Table 1* reports the descriptive statistics of the (in)dependent variables and controls used in the main regressions. Non-resource tax revenues excluding social contributions in the forty-six Sub-Saharan countries in the sample average approximately 12 percent of GDP. Chinese net ODA flows to that region are averagely equivalent to 0.27 percent of GDP, varying from 0.0021 (South Africa) to 8.75 (Republic of the Congo) percent. Displaying substantial income differences across recipients, the real GDP per capita in constant 2015 US\$ ranges from 255.10 (Ethiopia) to 16267.20 (Seychelles), with an average of approximately 958 constant 2015 US\$. The real GDP growth shows a mean of 4.82 percent, and spans from -46.082 to 63.38. Within the sample, the countries are on average relatively open (mean exports plus imports to GDP of 68.66 percent), have relatively small industrial sectors (mean industry value added equivalent to 24.52 percent of GDP) and rely heavily on natural resource rents (mean of natural resource rents to GDP of 12.62 percent). A minority of countries was part of an IMF-supported economic programme during the sample's time period, and corruption is prevalent across many countries. The bilateral distances span from 7873 (Asmara, Eritrea) to 13306 (Khartoum, Sudan) kilometres, with an average of 11233 kilometre. A minority of the sample countries is adjacent to the Indian Ocean, and Marxist ideologies were not that common. The average total Chinese net ODA flowing out amounts to 1.240e+13 constant 2015 US\$. Not all variables have an identical number of observations due to data availability. However, the minimum number of observations equals 1214, which is a more than decent amount that enforces the validity of this analysis.

*Table 1: descriptive statistics.*

<b>Variables</b>	<b>Mean</b>	<b>Median</b>	<b>Min</b>	<b>Max</b>	<b>Std. Dev.</b>	<b>Obs</b>
Non-resource tax excluding social contributions (% of GDP)	11.73	10.49	0.54	60.95	6.70	1391
Net ODA flow (% of GDP)	0.27	0.037	0.0021	8.75	0.69	1547
Real GDP per capita (constant 2015 US\$)	1751.95	958.069	255.10	16267.20	2364.015	1547
Real GDP growth (annual %)	4.82	4.86	-46.082	63.38	5.094	1547
Openness (% of GDP)	68.66	59.27	1.38	225.023	33.47	1407
IMF programme (dummy)	0.17	0	0	1	0.38	1567
Industry value added (% of GDP)	24.52	21.45	4.56	84.35	12.47	1499
Political corruption index (0: less corrupt - 1: more corrupt)	0.67	0.721	0.14	0.97	0.22	1567
Natural resource rents (% of GDP)	12.62	9.26	0.001	58.69	10.98	1545
Bilateral capital distance (kilometer)	10905.83	11233	7873	13306	1351.91	1567
Indian ocean dummy	0.20	0	0	1	0.40	1567
Marxist dummy	0.14	0	0	1	0.35	1567
Total Chinese net ODA (constant 2015 US\$)	1.240e+13	9.03e+12	6.448e+11	4.000e+13	1.160e+13	1567

*Source: own calculations based on the basis of the several databases.*

The non-resource tax excluding social contributions is the dependent variable, the net ODA flow is the independent one. The Indian Ocean dummy, the Marxist dummy and the total Chinese net ODA are used in the calculations of the instruments for the IV approach. Real GDP per capita, real GDP growth, openness, IMF programme, industry value added, political corruption index and natural resource rents are added as controls. The motivation of those controls can be found under section 6.1. *Table 2* documents the baseline results using the pooled ordinary least squares method with cluster-robust standard errors by recipient country over the period 2000-2017. I first estimate a specification without control variables in (1), to then add them one by one in (2) – (8). The coefficients on aid are not significant in all eight specifications, implying that an increase in Chinese inflows of aid does not affect tax effort. This result aligns with Leuthold (1991) and Teera and Hudson (2004) who fail to find any significant impact of aid on tax effort in the context of developing countries.

Table 2: OLS estimates, 2000-2017.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	$TAX/Y_{it}$	$TAX/Y_{it}$	$TAX/Y_{it}$	$TAX/Y_{it}$	$TAX/Y_{it}$	$TAX/Y_{it}$	$TAX/Y_{it}$	$TAX/Y_{it}$
$AID/Y_{it}$	-0.00242 (0.0841)	0.00422 (0.0868)	-0.00183 (0.0827)	-0.0309 (0.0794)	-0.0333 (0.0805)	-0.0279 (0.0751)	-0.0686 (0.0717)	-0.00511 (0.0876)
$GDPpc_{it}$		0.000781 (0.0005)	0.000794 (0.00049)	0.000908* (0.000495)	0.000905* (0.000495)	0.000908** (0.000416)	0.000675* (0.000369)	0.000626* (0.000366)
$GDPgrowth_{it}$			0.0156 (0.0173)	-0.00762 (0.0253)	-0.00768 (0.0252)	0.0222 (0.0371)	0.0225 (0.0358)	0.0385 (0.0365)
$open_{it}$				0.0237 (0.0223)	0.0236 (0.0224)	0.0352* (0.0213)	0.0365 (0.0222)	0.0457* (0.0240)
$IMF_{it}$					0.120 (0.221)	-0.0587 (0.166)	-0.0856 (0.151)	-0.0332 (0.155)
$industry_{it}$						-0.104** (0.0526)	-0.0964* (0.0502)	-0.0481 (0.0576)
$corruption_{it}$							-10.12*** (3.247)	-9.601*** (3.147)
$natural_{it}$								-0.0929* (0.0521)
Observations	540	540	540	501	501	485	485	485
$R^2$	0.02	0.03	0.03	0.05	0.05	0.06	0.07	0.08

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Nevertheless, theory, previous research and the empirics presented in section 7.1 lead me to believe that in reality there might be an impact, entailing that OLS may be a biased and inconsistent estimation method. In particular, as deeply discussed under section 6.2, there might be the issue of endogeneity due to reverse causality, which arises when donors adjust their level of foreign aid in response to fluctuations in domestic revenue mobilisation. A substantial amount of net aid can undermine the motivation to establish a well-functioning tax system. However, it is important to acknowledge that the poorest countries with the least developed tax institutions are the ones that receive the highest amount of net aid. This observation raises valid concerns regarding the direction of causality.

Considering the robustness of the baseline estimates, I build upon the results in [Table 2](#) by instrumenting for aid-to-GDP with three instrumental variables that reflect geographical and cultural proximity. In [Table 3](#), the results using the instrumental variable method are documented. Again, the control variables are introduced one by one.

Table 3: second-stage IV estimates, 2000-2017.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	$TAX/Y_{it}$	$TAX/Y_{it}$	$TAX/Y_{it}$	$TAX/Y_{it}$	$TAX/Y_{it}$	$TAX/Y_{it}$	$TAX/Y_{it}$	$TAX/Y_{it}$
$AID/Y_{it}$	-6.255* (3.405)	-5.276 (3.217)	-5.065 (3.195)	-7.287* (4.061)	-7.304* (4.103)	-7.111* (3.932)	-6.481** (3.024)	-6.985* (3.939)
$GDPpc_{it}$		0.000603 (0.000706)	0.000652 (0.000657)	0.000293 (0.000724)	0.000292 (0.000722)	0.000383 (0.000524)	-4.93e-05 (0.000454)	-9.48e-05 (0.000560)
$GDPgrowth_{it}$			0.0833 (0.0644)	0.0460 (0.0614)	0.0443 (0.0620)	0.0679 (0.0634)	0.0512 (0.0577)	0.0267 (0.0721)
$open_{it}$				0.0541 (0.0408)	0.0541 (0.0413)	0.0812* (0.0421)	0.0626* (0.0379)	0.0647 (0.0509)
$IMF_{it}$					1.292 (1.041)	1.041 (1.050)	0.863 (1.005)	0.766 (1.018)
$industry_{it}$						-0.181** (0.0787)	-0.102* (0.0603)	-0.168 (0.117)
$corruption_{it}$							-20.08*** (5.842)	-21.81*** (7.511)
$natural_{it}$								0.131 (0.192)
Sargan test (p-value)	0.1897	0.2565	0.2114	0.5025	0.4841	0.6362	0.9650	0.8694
Observations	540	540	540	501	501	485	485	485
$R^2$	0.025	0.03	0.01	0.05	0.03	0.13	0.18	0.11

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

This immediately paints a very different picture. According to [Table 3](#), the coefficients for instrumented aid are negative and statistically significant, although this is not the case for (2) and (3). As Thornton (2014) found, the coefficients on instrumented aid are somewhat larger in absolute value than those on actual aid. In terms of economic magnitude, the results of the estimation imply that a 1 percent Chinese ODA increase leads to an offset of the total non-resource tax revenue of around 7 percentage point of GDP. The exact figure depends on the particular specification, but the figures remain stable when adding more controls. The magnitudes of  $R^2$  are in line with Thornton's (2014) findings.

Across the board, the controls fail to report significant results. Only in specification (6) and (7) openness seems to have a positive significant influence, while the industry value added to GDP ratio affects total tax revenue negatively. As the industrial sector of the economy is easier to tax than agriculture, this is not in line with the anticipated result (Greenwald & Stiglitz, 2006). In specification (7) and (8) the political corruption index shows significance, implying that a decrease in the level of corruption corresponds to an increase in total tax revenue. That last result is in line with the expectations (Baskaran, 2014).

As discussed in section 6.2, for the IV strategy to be valid the utilised instruments need to be exogenous, meaning that it is crucial to find instruments that do not have a direct link with the dependent variable, tax effort. In a preferable setup, there are no other links with tax effort than through the ratio of foreign aid to GDP. Moreover, the instrument cannot be correlated with the error term of the main regression. I formally test this with the Sargan overidentification test, of which the p-values are reported in *Table 3*. The p-values of 0.1897, 0.2565, 0.2114, 0.5025, 0.4841, 0.6362, 0.9650 and 0.8694 imply that we cannot reject the null-hypothesis that the instruments are exogenous. I therefore conclude that the instruments are valid and that the IV estimates are accurate.

The main result therefore supports the idea that aid provides an alternative, non-earned source of revenue for governments in addition to tax revenue and consequently reduces taxes. The reduction in taxation is a welfare-optimal response to aid: aid-recipient governments face costs of taxation and benefits of expenditure and choose a fiscal policy that balances the two at the margin, with aid used partially to relieve governments and citizens of the burden of taxes and partially to fund expenditure (Collier, 1999; Kimbrough, 1986). These empirical findings are in line with what was previously found by Ghura (1998), Remmer (2004), Bräutigam and Knack (2004), Moss et al. (2006) and Pivovarsky et al. (2003).

However, all of these aforementioned studies have been done in the context of traditional Western donors, both bilateral and multilateral. Since the niche of this study deals with China, it is indeed very interesting to discover that China's ODA flows also hamper tax revenues in developing countries. But, it is now even more of interest, especially from a policy perspective, to examine where in China's aid architecture this issue may lie.

That is why in *Tables 4* and *5*, I separate the impact of ODA flows on total non-resource tax revenue in ODA grants and ODA loans. As discussed in section 4.2, China's aid is provided in the form of grants, interest-free loans and concessional loans. In African context, there is generally a large use of export credits and concessional loans (Guillon & Mathonnat, 2020). This is opposed to foreign aid coming from the DAC. Most bilateral ODA is provided as grants, which is an offshoot of the debate on the effectiveness of foreign aid revolved around the relative efficiency of loans versus grants (Cutts, 2022; Pivovarsky et al., 2003).

According to *Table 4*, the coefficients for instrumented aid are negative and statistically significant. This is the case in all specifications. In terms of economic magnitude, the results of the estimation imply that a 1 percent Chinese ODA grants increase leads to an offset of the total non-resource tax revenue of around 4 percentage point of GDP. The coefficients on instrumented aid are thus somewhat smaller than the ones documented in *Table 3*. The exact figure depends on the particular specification, but the figures remain stable when adding more controls. Again, across the board, the controls fail to report significant results.

Table 4: second-stage IV estimates for net ODA grants, 2000-2017.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	$TAX/Y_{it}$	$TAX/Y_{it}$	$TAX/Y_{it}$	$TAX/Y_{it}$	$TAX/Y_{it}$	$TAX/Y_{it}$	$TAX/Y_{it}$	$TAX/Y_{it}$
$AID/Y_{it}$	-4.042 (2.513)	-3.934* (2.384)	-3.945* (2.271)	-4.085* (2.254)	-5.108* (2.981)	-5.644* (3.306)	-3.721** (1.836)	-2.791** (1.301)
$GDPpc_{it}$		0.00104** (0.000514)	0.00104** (0.000501)	0.00107* (0.000639)	0.000976 (0.000715)	0.000879 (0.000735)	0.000765 (0.000616)	0.000943 (0.000713)
$GDPgrowth_{it}$			0.106 (0.0998)	0.194 (0.120)	0.200 (0.125)	0.205 (0.133)	0.185* (0.112)	0.182* (0.104)
$open_{it}$				0.0312 (0.0536)	0.0374 (0.0586)	0.0538 (0.0601)	0.0295 (0.0484)	0.0195 (0.0571)
$IMF_{it}$					2.605 (1.631)	2.675 (1.801)	1.622 (1.449)	1.134 (1.600)
$industry_{it}$						-0.0641 (0.0850)	-0.0472 (0.0563)	-0.0657 (0.0964)
$corruption_{it}$							-11.65*** (3.967)	-12.00*** (3.923)
$natural_{it}$								0.0219 (0.175)
Sargan test (p-value)	0.0705	0.0563	0.0595	0.0618	0.08	0.0667	0.0883	0.0856
Observations	200	200	200	188	188	183	183	183
$R^2$	0.02	0.055	0.056	0.072	0.077	0.168	0.0616	0.0466

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Only in specification (2), (3) and (4) real GDP per capita seems to have a very small positive significant influence. In specification (7) and (8) real GDP growth shows significancy, implying that an increase in GDP growth corresponds to an increase in total tax revenue. Also in (7) and (8), the political index estimates imply that a decrease in the level of corruption corresponds to an increase in total tax revenue. Sign-wise, all these results are in line with the expectations. Moreover, the p-values of the Sargan overidentification test tell me that the instruments are value and the IV estimates therefore accurate.



*Table 5: second-stage IV estimates for net ODA loans, 2000-2017.*

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	$TAX/Y_{it}$	$TAX/Y_{it}$	$TAX/Y_{it}$	$TAX/Y_{it}$	$TAX/Y_{it}$	$TAX/Y_{it}$	$TAX/Y_{it}$	$TAX/Y_{it}$
$AID/Y_{it}$	1.800 (5.425)	1.754 (6.176)	1.764 (6.498)	-2.081 (9.056)	-2.042 (9.036)	-1.847 (7.541)	0.518 (6.054)	0.241 (5.885)
$GDPpc_{it}$		0.000839* (0.000500)	0.000841* (0.000495)	0.000699 (0.000542)	0.000717 (0.000535)	0.000567 (0.000484)	0.000198 (0.000454)	4.51e-05 (0.000470)
$GDPgrowth_{it}$			-0.0118 (0.0335)	-0.00471 (0.0355)	-0.00528 (0.0352)	0.0320 (0.0362)	0.0150 (0.0364)	0.0484 (0.0439)
$open_{it}$				0.0315 (0.0300)	0.0299 (0.0294)	0.0777* (0.0469)	0.0617 (0.0423)	0.0747* (0.0442)
$IMF_{it}$					0.140 (0.274)	-0.235 (0.267)	-0.284 (0.229)	-0.176 (0.207)
$industry_{it}$						-0.173* (0.0973)	-0.0899 (0.0719)	-0.0162 (0.0727)
$corruption_{it}$							-14.44*** (3.653)	-12.89*** (3.137)
$natural_{it}$								-0.153* (0.0788)
Sargan test (p-value)	0.4531	0.4833	0.4675	0.3653	0.5298	0.5501	0.3102	0.1744
Observations	481	481	481	445	445	431	431	431
$R^2$	0.14	0.04	0.08	0.108	0.077	0.068	0.074	0.028

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Nevertheless, the main idea of *Table 4* no longer holds true for *Table 5*: the coefficients on instrumented aid are not significant in all eight specifications, meaning that an increase in Chinese inflows of loans does not affect tax effort. This is not in line with the empirical evidence from Pivovarsky et al. (2003), Thornton (2014), Khan and Hoshino (1992) and Odedokun (2003), who found that loans have a significant positive impact. The results from *Table 5* imply that the overall significant negative effect of Chinese ODA on tax revenue from *Table 2* is driven by the negative impact that Chinese grants have and seamlessly matches the debate on the effectiveness of foreign aid revolved around the relative efficiency of loans versus grants (Pivovarsky et al., 2003).

Since the early 1960s, there has been a recurring belief that loans are utilized more effectively than grants due to the expectation of repayment. This expectation of repayment motivates governments to select projects or programs that offer benefits surpassing the associated costs, as noted by Schmidt (1964). However, recent discussions have revived the debate on shifting from loans to grants. According to some observers, excessive lending has resulted in substantial debt accumulation in many developing countries while failing to achieve the intended developmental objectives. Consequently, it has been argued that aid should primarily be driven

by humanitarian objectives and provided in the form of grants. This approach would also avoid exacerbating the debt sustainability concerns of these countries, as suggested by Rogoff (2003). In 2000, the International Financial Institution Advisory Commission concluded that financial assistance from multilateral development banks should exclusively be provided in the form of grants (International Financial Institution Advisory Commission, 2000).

Certain donor countries and researchers have raised concerns about the transformation of concessional lending into grants (Kapur, 2002) and suggest that the debate has not adequately addressed the fiscal consequences of such proposals. Specifically, an escalation in grants could impact the domestic fiscal revenue efforts of recipient countries. It has been argued that grants, being free resources, act as substitutes for domestic revenues, while the obligation to repay loans in the future motivates policymakers to generate tax revenue or, at the very least, safeguard existing levels of revenue collection (Bräutigam, 2009).

This the exact idea behind the tax-aid nexus, and seems to be the narrative that China, unsuccessfully, wants to avoid. It appears as if the grants they offer, even if it is a much smaller share of their total ODA, have a disproportionate effect compared to loans. Although, whether China largely provides concessional loans to Sub-Saharan Africa because they are better for meeting the objectives underlying development assistance can be questioned when we take another aspect into account (Singer, 1961).

As previously discussed, interestingly, the architecture of Chinese aid flows in its relations with developing nations frequently has hybrid forms of financing arrangement - including grants, concessional loans, buyer credits and supplier credits (Carter, 2017; Dollar, 2016; Kimura & Todo, 2010). Due to the greater potential for utilizing hybrid forms of aid financing in economic sectors compared to social sector interventions, and considering that these sectors align with China's commercial ties with African countries, Chinese aid tends to be directed more towards economic sectors (Bräutigam, 2010; Guillon & Mathonnat, 2020). The fact that a lot of loans flow towards the economic sector is once again supported by the estimates in *Table 6*. As in *Table 5*, when only ODA loans were considered, the coefficients on instrumented aid are not significant in all eight specifications, meaning that an increase in Chinese ODA inflows in the economic sector does not affect tax effort.

*Table 6: second-stage IV estimates for net ODA aimed at the economic sector, 2000-2017.*

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	$TAX/Y_{it}$	$TAX/Y_{it}$	$TAX/Y_{it}$	$TAX/Y_{it}$	$TAX/Y_{it}$	$TAX/Y_{it}$	$TAX/Y_{it}$	$TAX/Y_{it}$
$AID/Y_{it}$	-9.183 (6.008)	-9.046 (6.000)	-8.457 (5.851)	-4.609 (4.327)	-5.558 (5.980)	-6.772 (7.133)	-3.420 (3.888)	-2.684 (4.779)
$GDPpc_{it}$		0.000815** (0.000382)	0.000833** (0.000370)	0.000162 (0.000703)	7.90e-05 (0.000873)	-9.44e-05 (0.000962)	-4.12e-05 (0.000631)	-5.87e-05 (0.000571)
$GDPgrowth_{it}$			-0.0937 (0.100)	-0.105 (0.157)	-0.107 (0.190)	-0.112 (0.213)	-0.0531 (0.131)	-0.0278 (0.174)
$open_{it}$				0.105* (0.0605)	0.112 (0.0766)	0.136 (0.0908)	0.0884 (0.0546)	0.0891* (0.0501)
$IMF_{it}$					1.855 (1.863)	2.130 (2.099)	1.010 (1.257)	0.680 (1.483)
$industry_{it}$						-0.0799 (0.105)	-0.0378 (0.0736)	-0.0231 (0.136)
$corruption_{it}$							-14.53*** (3.125)	-14.05*** (3.874)
$natural_{it}$								-0.0203 (0.181)
Sargan test (p-value)	0.7319	0.8214	0.8438	0.2183	0.4983	0.6580	0.6428	0.7385
Observations	233	233	233	216	216	212	212	212
$R^2$	0.14	0.19	0.19	0.34	0.31	0.23	0.16	0.14

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

The logic that loans, with no significant effect, flow into the economic sector while grants, with a statistically significant negative effect, flow towards the social sector is then reaffirmed by the estimates in [Table 7](#). While no effect can be detected in [Table 6](#), here, the coefficients on instrumented aid are negative and significant in all eight specifications, implying that an increase in Chinese ODA inflows in the social sector negatively affects tax effort.

Table 7: second-stage IV estimates for net ODA aimed at the social sector, 2000-2017.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	$TAX/Y_{it}$	$TAX/Y_{it}$	$TAX/Y_{it}$	$TAX/Y_{it}$	$TAX/Y_{it}$	$TAX/Y_{it}$	$TAX/Y_{it}$	$TAX/Y_{it}$
$AID/Y_{it}$	-11.94** (4.964)	-12.34** (5.197)	-12.55** (5.291)	-17.17** (8.674)	-13.97** (7.013)	-18.48** (8.604)	-20.09** (9.059)	-16.90** (8.219)
$GDPpc_{it}$		0.000775* *	0.000774* *	0.000343	0.000615*	0.000294	-0.000147	-0.000173
$GDPgrowth_{it}$		(0.000304)	(0.000305)	(0.000363)	(0.000333)	(0.000286)	(0.000271)	(0.000281)
$open_{it}$			-0.00533 (0.0474)	-0.0462 (0.0581)	-0.0395 (0.0497)	-0.0302 (0.0648)	-0.0589 (0.0722)	-0.0289 (0.0768)
$IMF_{it}$				0.0612** (0.0244)	0.0353* (0.0207)	0.123*** (0.0260)	0.111*** (0.0247)	0.106*** (0.0231)
$industry_{it}$					-0.287 (0.576)	-0.611 (0.908)	-0.539 (0.965)	-0.433 (0.725)
$corruption_{it}$						-0.266*** (0.0543)	-0.192*** (0.0475)	-0.126 (0.0804)
$natural_{it}$							-16.06*** (2.970)	-14.74*** (3.275)
Sargan test (p-value)	0.0564	0.3323	0.3653	0.1804	0.0982	0.6644	0.9089	0.9417
Observations	707	707	707	643	643	626	626	626
$R^2$	0.03	0.043	0.043	0.04	0.047	0.06	0.066	0.085

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

This whole discussion could lead one to the subdiscussion of the definition and effectiveness of ODA as such. According to Severino and Ray (2009), we are currently witnessing the transformation of an outdated concept that was based on obsolete assumptions about the unity, clarity, and purity of the international community's goals. This transformation is giving rise to a new and intricate set of public policies aimed at addressing the challenges of a globalized world. As the contours of the landscape of foreign aid are rapidly shifting, there is a triple revolution in official development assistance (ODA): goals, players and instruments are all evolving. First, non-traditional actors are increasingly powerful, from donors such as China, to numerous private foundations and philanthropists. Moreover, new financing and delivery modalities have been, if not fully implemented, then widely and seriously discussed. Third, scepticism over the impact of foreign assistance has heralded the creation of a series of nascent aid institutions, (Severino & Ray, 2009; Sumner & Mallett, 2013).

Focusing on the new financing and delivery modalities, other international financial flows have surpassed official development assistance (ODA) in terms of scale. Remittance inflows to developing countries

reached \$326 billion in 2010, while net equity inflows were estimated at \$571 billion. Development relevant contributions beyond ODA also include Climate Assistance and Security Assistance spending, and a diverse range of innovative financing mechanisms (Vanheukelom et al., 2012). Moreover, there have been some readily identifiable shifts in donor approaches, such as the growing linkage between ODA and trade. Conservative governments in Australia and Canada integrating their Aid Departments into the Foreign Affairs and Trade entities illustrates this (Jakupec & Kelly, 2016). All these developments highlight the importance of considering ODA not in isolation but in relation to the broader context of international financial flows and their interplay (Manning, 2011). As development assistance is likely to constitute a smaller proportion of external financing for development in the future, it becomes crucial to monitor and analyse the volume and nature of the various financial flows (Vanheukelom et al., 2012).

In providing hybrid forms of aid, China thus seems to be ahead of traditional donors in shaping aid to contemporary needs. However, already, OECD-DAC has responded in a number of ways to these developments and influences (Vanheukelom et al., 2012). An example is the China-DAC Study group that has been established to provide such an international platform for synthesising available knowledge and exchanging experiences. In doing so, the Study Group aims to help improve the impact and effectiveness of aid (OECD, 2009). This seems to be a first step in the direction of letting go of the persistent Western narrative of China as a “rogue” (guided by self interest alone) donor, which has been proofed to be unjustified (Dreher et al., 2018; Dreher & Fuchs, 2015; Hoeffler & Sterck; 2022). Nevertheless, as the information and decision-making process concerning China’s foreign aid remains extremely vague, the idea of cooperation and information sharing for the sake of effectiveness in the future may be too optimistic.

## 8. Conclusion

Nowhere are the challenges in relation to battling poverty as pronounced as in Sub-Saharan Africa. A lot of efforts have been made ever since their wave of decolonization of the 1960s, although without the much hoped-for sustained acceleration of GDP growth. Fiscal policies, including tax policies, provide one of the most feasible tools available to governments for bringing in resources. Increasingly more, it has been claimed that taxation should be a key component of development strategies in low-income countries (Bird, 2013; Kaldor, 1963; Zolt & Bird, 2005).

In recognition of the above, two large tax innovations, the VAT and (S)ARAs were implemented in the decades after independence. A glimpse of the effect can already be seen in the data, but a clear upward trend in both VAT and the tax-to-GDP ratio as a consequence of the reforms' implementation remains absent. Moreover, not all countries are progressing at the same rate, resulting in persistent differences among Sub-

Saharan African countries. The fact that tax systems are currently inefficient and hence do little to mobilise domestic revenue, implies that foreign aid inflows to these regions are disproportionately substantial.

However, apart from a development boost, large aid inflows could also undermine the incentives to set up a sustainable tax system, as foreign aid is the easy way out. The issue of aid fungibility, namely the possibility that aid is used in ways not intended by donors, becomes more prominent when inflows of Official Development Assistance (ODA) are utilised to pay tax reductions rather than raising investments and government spending – the tax-aid nexus (Pivovarsky et al., 2003).

Ticking the boxes of both disappointing tax revenues and high aid-to-GDP ratio's, Sub-Saharan Africa is the perfect case for examining the dynamics of the tax-aid nexus. In terms of aid, China, tying itself to Africa since the 1950s, has become an increasingly prominent global aid actor in a world where aid from DAC members has stagnated. In portraying an aid architecture with specific characteristics and a vague decision-making process, the Chinese official development assistance's (ODA) impact on Sub-Saharan tax revenue makes up the innovative and niche research topic of this work.

Based on net foreign aid flow data regarding China and forty-six Sub-Sahara African countries over the period 2000-2017, I utilise both the OLS as the IV method in attempting to provide evidence of the tax-aid nexus. While according to the first method an increase in Chinese aid inflows does not affect tax effort, those estimates are likely biased and inconsistent due to endogeneity issues. Using the IV method to overcome this problem, I find that a Chinese ODA increase negatively affects tax revenue in Sub-Saharan Africa. The main result therefore supports the idea that aid provides an alternative, non-earned source of revenue for governments in addition to tax revenue and consequently reduces taxes. The reduction in taxation is a welfare-optimal response to aid: aid-recipient governments face costs of taxation and benefits of expenditure, and choose a fiscal policy that balances the two at the margin, with aid used partially to relieve governments and citizens of the burden of taxes and partially to fund expenditure (Collier, 1999; Kimbrough, 1986). These empirical findings are in line with what was previously found by Ghura (1998), Remmer (2004), Bräutigam and Knack (2004), Moss et al. (2006) and Pivovarsky et al. (2003).

Delving deeper into the Chinese aid structure, I consecutively separate the impact of ODA loans and ODA grants. The results imply that an increase in grants leads to an offset in the total non-resource tax revenue, while an increase in loans has no significant impact. This means that the overall significant negative effect of Chinese ODA on tax revenue is driven by the negative impact of Chinese grants and seamlessly matches the debate on the effectiveness of foreign aid revolved around the relative efficiency of loans versus grants, that nowadays weighs over in favour of grants (Pivovarsky et al., 2003). These results strengthen the

reservations regarding the conversion of concessional lending to grants some donor countries and researchers have expressed and add to policy recommendations.

One may argue that by providing more loans than grants China is attempting, albeit poorly according to this study, to circumvent the very idea of the tax-aid nexus. However, as a third research question I split up the analysis into the sectors China targets and find that this statement might be contested. As economic sectors offer more opportunities for the use of typical Chinese hybrid forms of aid financing, and because they include sectors that are of economic interest for China given its commercial ties with African countries, more Chinese aid tends to flow in that direction (Bräutigam, 2010; Guillon & Mathonnat, 2020). The logic that loans, with no statistically significant effect, flow into the economic sector while grants, with a statistically significant negative effect, flow towards the social sector is then reaffirmed by the estimates: while no effect can be detected in the economic sector, an increase in Chinese ODA inflows in the social sector negatively affects tax effort.

In its definition as such, it therefore seems as if the concept of ODA is outdated. In providing hybrid forms of aid, China is ahead of traditional donors in shaping aid to contemporary needs, especially on the African continent. Initiatives have been launched by the OECD-DAC with the idea of synthesising available knowledge and exchanging experiences with China (e.g., the China-DAC Study group), but there is considerable room for improvement. Furthermore, as the information and decision-making process concerning China's foreign aid remains extremely vague and the Western narrative of China as a "rogue" donor is persistent, the idea of cooperation and information sharing for the sake of effectiveness and redefinition may be a too optimistic future prospect. Nevertheless, one cannot deny that the contours of the landscape of foreign aid are rapidly shifting. Whether the result of these changes can undermine the tax-aid nexus and lead to new understandings remains scope for further research.

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## Appendices

### *Appendix 1: study countries*

#### **46 recipient countries**

Angola (AGO), Benin (BEN), Botswana (BWA), Burundi (BDI), Cabo Verde (CPV), Cameroon (CMR), Central African Republic (CAF), Chad (TCD), Comoros (COM), Democratic Republic of the Congo (COD), Republic of the Congo (COG), Côte d'Ivoire (CIV), Equatorial Guinea (GNQ), Eritrea (ERI), Ethiopia (ETH), Gabon (GAB), The Gambia (GMB), Ghana (GHA), Guinea (GIN), Guinea-Bissau (GNB), Kenya (KEN), Lesotho (LSO), Liberia (LBR), Madagascar (MDG), Malawi (MWI), Mali (MLI), Mauritania (MRT), Mauritius (MUS), Mozambique (MOZ), Namibia (NAM), Niger (NER), Nigeria (NGA), Rwanda (RWA), São Tomé and Príncipe (STP), Senegal (SEN), Seychelles (SYC), Sierra Leone (SLE), Somalia (SOM), South Africa (ZAF), Sudan (SDN), Tanzania (TZA), Togo (TGO), Uganda (UGA), Zambia (ZMB) and Zimbabwe (ZWE)

#### **1 donor country**

People's Republic of China (CHN)

### *Appendix 2: the political corruption index*

The political corruption index addresses how pervasive political corruption is. The directionality of the V-Dem corruption index runs from less corrupt (0) to more corrupt (1).

The corruption index includes measures of six distinct types of corruption that cover both different areas and levels of the polity realm, distinguishing between executive, legislative and judicial corruption. Within the executive realm, the measures also distinguish between corruption mostly pertaining to bribery and corruption due to embezzlement. Finally, they differentiate between corruption in the highest echelons of the executive (at the level of the rulers/cabinet) on the one hand, and in the public sector at large on the other. The measures thus tap into several distinguished types of corruption. The index is arrived at by taking the average of (a) public sector corruption index; (b) executive corruption index; (c) the indicator for legislative corruption; and (d) the indicator for judicial corruption. These four different government spheres are weighted equally in the resulting index. The index replaces missing values for countries with no legislature by only taking the average of (a), (b) and (d).

### *Appendix 3: reference groups*

#### **Organisation for Economic Co-operation and Development (OECD)**

Australia, Austria, Belgium, Canada, Chile, Colombia, Costa Rica, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea, Latvia, Lithuania, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Türkiye, United Kingdom and United States

#### **Latin America and the Caribbean (LAC) Region**

Antigua and Barbuda, Argentina, Aruba, The Bahamas, Barbados, Belize, Bolivia, Brazil, Cuba, Dominica, Dominican Republic, Ecuador, El Salvador, Grenada, Guatemala, Guyana, Haiti, Honduras, Jamaica, Nicaragua, Panama, Paraguay, Peru, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Suriname, Trinidad and Tobago, Uruguay and Venezuela

#### **South Asia**

Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka

### *Appendix 4: broad sectors (according to the OECD)*

#### **Social**

Education, government and civil society, health, population policies and water supply and sanitation

#### **Economic**

Banking, business, communications, energy, other social infrastructure and services and transport and storage

#### **Production**

Agriculture, industry, mining and construction, trade policies and regulations

#### **Other**

Action relating to debt, developmental food aid, disaster prevention, emergency response, general budget support, general environment protection, other commodity assistance, other multisector, reconstruction relief, and unspecified