

Toril Aasheim Nymark

Chinese development assistance – a hard or a soft power grab?

An analysis of the relative effect of Chinese aid on health outcomes and equal access to health (2000-2014)

Master's thesis in Political science

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Faculty of Social and Educational Sciences
Department of Sociology and Political Science

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Abstract

China has expanded its development assistance considerably in the last 20 years, and is now the second largest bilateral donor after the OECD's Development Assistance Committee (DAC), which have raised questions about its true motives. Apparently, China claims its «peaceful rise», to become one of the world's two superpowers should not cause alarm. Development assistance is known to be strategical and designed to make allies. The US has characterized as corrupting, less ethical and of poor quality. This paper aims to contribute to the debate about the motive behind Chinese development assistance, and use access to health and health outcomes in the recipient countries as a proxy for assessing China's aid motivation. If Chinese aid appears not to be associated with any improvement in health access and outcomes, it can be argued that its main motive is to gain hard power through alliances with uncaring governments. If Chinese assistance is in fact improving health in the recipient countries, we might infer that its motive is likely to be promotion of soft power as well. The results show that Chinese aid in fact is associated with lower under-5 mortality rates in the recipient countries, this result being robust when controlling for endogeneity, different samples, and are independent of aid flow type. The association between Chinese development assistance and pro-poor and pro-female policies, such as equal access to health and access to four antenatal care visits however, is not robust. I argue that China faces the same problems that other donors face, but is not unduly involved in assisting bad regimes. It is most likely that Chinese aid is designed to generate both hard and soft power for itself. Through stressing its principles of sovereignty and non-interference, it creates alliances, while its goal of mutual gain is helping governments provide health services, perhaps hoping to gain popularity among the recipient countries.

Sammenheng

Kina har siden 2000 økt sin utviklingsassistanse betydelig, og er nå verdens nest største bilaterale bistandsdonor. I den samme perioden har Kina gjennom det det selv kaller en «fredfull fremvekst» på samme tid vokst til å bli en av verdens to supermakter. Bistand er kjent for å være strategisk og designet for å skape allianser. Dette har ført til at det har blitt stilt spørsmål rundt landets motiver, og USA har beskrevet kinesisk bistand som korrumpierende, mindre etisk og av dårligere kvalitet enn sin egen. Denne avhandlingen har som mål å bidra til debatten rundt Kinas motiv for bistandsarbeidet sitt, gjennom å bruke tilgang til helsetjenester i mottakerlandene som indikasjon på Kinas motiv bak bistandsmidlene. Dersom kinesisk bistand ikke er forbundet med bedre tilgang til helsetjenester kan en argumentere for at det er hardt makt gjennom allianser som er motivet bak prosjektene. Dersom kinesisk bistand derimot er assosiert med bedre helsetjenester, er det sannsynlig at China har et ønske om å oppnå «myk makt» også. Resultatene viser at kinesisk bistand er assosiert med lavere dødelighet for barn under 5 år i mottakerlandene, et resultat som også er robust når man kontrollerer for endogenitet, forskjellige utvalg og er uavhengig av bistandstype. Sammenhengen mellom kinesisk bistand og politikk som gagnar ofte marginaliserte grupper, som fattige og kvinner, er derimot ikke robust. Det konkluderes derfor med at Kina møter de samme utfordringene som andre stater i sitt utviklingsarbeid, men er ikke skyldig i å støtte «dårlige» regimer. Kina designer sannsynligvis bistanden sin for å vinne både hardt og myk makt. Ved å fokusere på statlig suverenitet vinner det allierte, og ved å fokusere på gjensidig vinning og å hjelpe styresmakter å tilby helsetjenester, gjør de seg populær blant folket og vinner dermed myk makt.

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Abbreviations and acronyms

APEC	Asia-Pacific Economic Cooperation
CDB	China Development Bank
CMT	Chinese Medical Teams
DAC	Development Assistance Committee
DRC	Democratic Republic of Congo
DRG	Democracy, Human Rights and Governance strategy
FOCAC	Forum on China-Africa Cooperation
GATHER	Guidelines for Accurate and Transparent Health Estimates Reporting
GDP	Gross Domestic Product
HAQI	Health Access and Quality Index
ICPD	International Conference on Population and Development
IHME	Institute for Health Metrics and Evaluation
IMF	International Monetary Fund
IRT	Bayesian Item-Response Theory
IV	Instrumental Variable test
ODA	Official Development Assistance
OECD	Organization for Economic Cooperation and Development
OLS	Ordinary Least Squares
OOF	Other Official Flows
RFR	Recommended for research
RPF	Rwandan Patriotic Front
MDG	Millennium Development Goal
SSC	South-South Cooperation
UN IGME	United Nations Inter-agency Group for Child Mortality Estimation
V-Dem	Varieties of Democracy
WDI	World Development Indicators

1. Introduction

China is not a new development assistance donor, but since the 2000s, Chinese activity in developing countries has increased significantly. From sending medical teams on two-year missions to Africa in the 1960s (Sidibe and Hesketh 2018; Zou, McPake, and Wei 2014), China has expanded its activity, and is now financing infrastructure projects all over Africa, Asia and South-America. Both the motivation behind this sudden rise as a development actor, and what impact this activity has in the recipient countries, are widely debated among politicians, scholars and the media. The US government describes Chinese involvement in developing countries as bribes and opaque agreements, which are «riddled with corruption and does not have the same ethical standard as their own projects (Bolton 2018). Others blame the Chinese for being on a hunt for natural resources (Naím 2007; Norad n.d.), and that their development assistance is a way to secure their access to oil, copper and other natural resources (e.g. Davies 2007).

Aid in general, has for long been known to not be distributed solely on the basis of the recipient needs – Morgenthau (1962, 301) argue that only humanitarian foreign aid «is *per se* nonpolitical». This seemingly fits the Chinese aid pattern, as China has development projects in all development countries that recognizes the One China policy (Bräutigam 2010, 279; Dreher and Fuchs 2015), while at the same time supporting countries recognizing Taiwan, like Haiti, in the time of humanitarian crisis. China's rise as an economic and military power in the same period as its expanded activity as a development actor makes some argue that the rise in development assistance is a part of their strategy to rise as a superpower.

In this paper I aim to investigate whether Chinese development assistance is just a way to assert its influence in the world by making diplomatic ties, or whether it is actually doing citizens in the recipient countries good. Of course, doing good can also be strategic because it gains allies among the people in a form of soft power acquisition. On the other hand, if Chinese money only bolsters its presence and wins allies among the states that it gives aid to, then one might argue that China's intentions are to expand hard power by winning hard power among the recipient country's political elite. Thus, the core question this paper seeks to explore by assessing Chinese aid is whether China's presence in developing countries is a hard or soft power grab.

To test this, I will use equality of access to health and actual health outcomes as proxies for whether the Chinese are achieving altruistic objectives designed to build soft power. As

health assistance is known to be a means for both soft and hard power, I use three different measures, where two of them are dependent of an inclusive policy change on the government level, while the third is more result based, estimating the overall health in the population by measuring the under-5 mortality rate.

China does not tie conditions of good governance to their aid, and in theory, that means that the recipient governments are free to use the money as they want. However, if China does see a benefit to aid reaching the citizens in the recipient country, for example to build soft power, they would have the mechanisms in place to see that through. If China's only motive is to expand its hard power through alliances and diplomacy, the fact that their money is benefiting the citizens will not be its priority. And, even though China is potentially getting involved in developing countries for their own benefit, in a quest for natural resources or diplomatic ties, if the assistance is in fact benefitting the citizens as well, then the West's claims about China might be spurious. In a world fast approaching a new multipolarity, understanding the true motives of a rising giant relative to strategic manoeuvring by other great powers, particularly other rivals such as the US, is critical. This study hopes to contribute to this debate.

The approach used by China in its development assistance is more of a cooperation than that of the West – China values state sovereignty, mutual respect and mutual gain, while the West sets conditions for policy change in exchange for development assistance. This has made scholars fear that Chinese aid will be more attractive for recipient governments, which in turn will hurt the West's effort to promote democratic and good governance policy change in the recipient countries. Gamso (2019) finds that trading with China is worsening physical integrity rights abuses in developing countries, which is supported of Gehring, Kaplan and Wong's (2019) findings, who find that Chinese aid is associated with increased government repression and increased acceptance of authoritarian norms. However, when comparing Chinese aid and ODA from DAC, Dreher (et al. 2017) find that both types of aid has positive effects on economic growth in recipient countries.

Good health is not important just in and of itself, but also enables people to be active in civil society, in addition to help generating growth through longer life expectancy and higher productivity. China is one of the ten largest health donors in Africa, and some studies show that it have a slightly different approach to health projects, than the traditional donors (Grépin et al. 2014; Zou, McPake, and Wei 2014). By comparing Chinese aid to aid from the traditional donors, this paper contributes not only to the debate of the motives behind the Chinese aid, but also to the ongoing debate on the effect of aid in general.

The results show that Chinese development assistance is positively associated with lower under-5 mortality rates, the result being robust controlling for endogeneity and a variety of other robustness checks. This means that China's presence in developing countries is improving the populations overall health, which might help building its soft power among recipient countries' citizens. However, the association between Chinese development assistance and policies securing women and poor access to health, is not robust. This indicate that while Chinese aid projects does in fact benefit the recipient countries' population, China does not have any impact on governments policy towards marginalized groups. This is in line with the Chinese spoken goals – mutual benefit while respecting state sovereignty.

In the next chapter I will present relevant theory and previous work, in addition to explain the main differences between Chinese and Western aid. I will then precede to describe the methods used, and the variables included in the models. The last part of the thesis will consist of results, robustness checks and discussion, ending with concluding remarks.

2. Theory and literature review

2.1 What is China doing abroad?

In Africa, we are already seeing the disturbing effects of China's quest to obtain more political, economic, and military power (Bolton 2018)

Since the early 2000s China has considerably increased its diplomacy with extending assistance to developing countries. The year 2000 marked the start of the Forum for Chinese-African Cooperation (FOCAC), held in Beijing (Ministry of Foreign Affairs PRC n.d.), and they proceeded to a «charm offensive» in Pacific Asia, expanding trade and economic ties and increasing engagement with regional institutions (Jian 2015, 8). Numbers collected from China's own Ministry of Finance suggests that between the period from 2000 until 2009, China more than quadrupled its yearly aid transfers (Zimmermann and Smith 2011, 728), which means that in 2009, China's total aid was about 26 % of the aid from the 24 members of OECD's Development Assistance Committee (DAC) (Zimmermann and Smith 2011, 724). This makes China the second largest aid donor in the world in absolute dollar values. China also continues funding projects, especially in the infrastructure sector – in 2013 the Chinese president, Xi Jinping, announced what is now commonly known as the Belt and Road Initiative (BRI), a contemporary version of the Silk-Road trade routes (Yu 2017, 353). This increase in development assistance coincides with the change in Chinese foreign policy, from nothing to what Beijing articulated as a 'peaceful rise' – a rise to great power status without destabilizing the existing international order, causing wars and great power rivalries (Jian 2015, 8). Indeed, theory and empirical evidence suggest that «power transitions» among great powers can be dangerous, particularly when a rising power is «dissatisfied» with the status quo (De Soysa, Oneal, and Park 1997; Kugler and Organski 1989).

It is no real secret that aid has its origins in the Cold War rivalry between the two superpowers that emerged out of World War II. The US and the Soviets used aid as carrots and sticks for gaining and keeping allies for geo-strategic reasons. The US's Marshall Plan was designed to strengthen the economies of allies quickly so as to defeat internal and external communist threats. There is plenty of evidence of development assistance being strategic, rather than being based only on the recipient country's needs (Alesina and Dollar 2000; Strand and Tuman 2012). Thus, it is very easy to see similar processes behind the increase in foreign development assistance undertaken by China. Chinese officials insist on aid being part of the

plan towards China's 'peaceful rise'. In 2007, President Hu Jintao told the party congress of the Communist Party that China needs to increase its soft power. Since 2008 China has established Confucius institutes in many parts of the world, to teach Chinese language and culture all around the world (Nye 2014). President Xi Jinping has been focused on China's lack of 'discourse power', which Rolland (2020, 10) defines as the «ability to exert influence over the formulations and ideas that underpin the international order», which is closely related to Nye's definition of soft power, what he terms as; «when a country gets other countries to want what it wants» (Nye 1990, 166).

Others, such as Snyder (2004, 55), however, argue that China's foreign policy is grounded in realist ideas – it is expanding its military slowly, while avoiding a confrontation with superior US forces. Lately, it has been argued that China has risen to be one of the world's two superpowers (Shambaugh 2013; Tunsjø 2018): since China's economic reform in 1978, the country has experienced an annual growth of approximately 10 percent (The World Bank 2019), and while China and the former superpower Russia, have approximately the same nominal GDP in 2013, in 2016 China's GDP was more than ten times larger than Russia's (Tunsjø 2018, 16). China is the world's second largest economy, with 14.14 trillion US dollars in nominal GDP, only ranking behind the United States with 21.44 trillion US dollars in 2019 (Silver 2019). China is also the second in the world when it comes to military expenditure, spending 250 billion US dollars in 2018, which constitutes roughly 2 % of GDP, only bested by the United States, which spends 649 billion US dollars, or 3.4 % of GDP, on military spending (Stockholm International Peace Research Institute 2018). Based on these numbers, the Chinese military spending was approximately 38 % of the U.S. military spending in 2018, which is in sharp contrast with 2000, when the U.S. defence budget was more than ten times that of China (Tunsjø 2018, 57). Tunsjø (2018) argues that China's rise as an economic and military power makes it one of two superpowers in the world. One might easily argue, that given the trade tensions between the US and China currently, a new Cold War might be brewing in the future.

In international relations theory there are three main competing views – realism, liberalism and constructivism (Snyder 2004; Walt 1998). The realists view international affairs as a struggle for power among self-interested states, and when a state grows vastly more powerful than any opponent, it is expected to use that power to expand its sphere of domination (Snyder 2004, 55). Constructivists, however, argue that «individuals and groups become powerful if they can convince others to adopt their ideas» (Snyder 2004, 60). While realists argue that state's main instrument in international relations are military power and state

democracy, constructivists argue that ideas and values are the most important instruments (Snyder 2004, 59).

While realists emphasises the importance of states ability to exercise *hard power*: make people do what they otherwise would not do (Dahl 1957) by displaying military power, constructivists emphasizes Joseph Nye's (1990) idea of the importance of *soft power*. As mentioned earlier, Nye defines soft power as when a country gets other countries to *want* what it wants (Nye 1990, 166), which could be done by instruments such as communications, organizational and institutional skills, and manipulation of interdependence (Nye 1990, 158). A state will encounter less resistance to its wishes if it is able to make its power seem legitimate in the eyes of others, which an attractive culture and ideology may help with (Nye 1990, 167). Today, American culture is perhaps the best example of culture as a soft power resource – Norwegian youth wear sweaters with the acronym of the University College of Los Angeles on the back, watch American movies produced in Hollywood and eat fast food at McDonalds. When others automatically identify with you, they also adopt your causes and interests, making costly use of force and threats unnecessary.

It may be argued that an important reason for the huge amount of soft power the U.S. has in the world today, is their effort to help economic growth in Europe through the Marshall plan after World War II. The plan did not simply bring economic growth, but also a period of “Americanization” in Europe in the 1950s – Americans were able to project their way of life and made it easily accessible (Ellwood 2018, 7-8). It is argued that after the end of World War II, the West went on a discourse offensive to suppress socialist and developing countries political power by constantly broadcasting western values, political opinions and lifestyle (e.g. Rolland 2020, 8).

Chinese officials seems to think that soft power is primarily generated by diplomacy and government policies (Nye 2014). In 1996 the Chinese Ministry of Commerce admitted that grants are used to coordinate diplomatic work and that the creation of some public institutions had helped in creating political influences. However, in 2011 the Chinese State Council stated foreign aid has never been used as a means to seek political privileges (e.g. Dreher and Fuchs 2015, 996).

2.2 What's so bad about the Chinese assistance?

In February 2020 the US Secretary of State, Mike Pompeo, completed his first trip to Africa, warning about «authoritarian regimes with empty promises» (Nyabiage 2020). This is not the first time US state officials express their concern about Chinese involvement in the continent – while the Trump administration seems to be less concerned about social, economic and political development in Africa, the administration is concerned about the Chinese influence (Campbell 2020). In a briefing to the National Security Council about the Trump Administration's New Africa Strategy, National Security Advisor Ambassador John R. Bolton (2018) stated that

China uses bribes, opaque agreements, and the strategic use of debt to hold states in Africa captive to Beijing's wishes and demands. Its investment ventures are riddled with corruption, and do not meet the same environmental or ethical standards as U.S. developmental programs.

And during the Asia-Pacific Economic Cooperation (APEC) CEO Summit held in Papua New Guinea in 2018, the US Vice President, Mike Pence, stated that

As we speak, as we're all aware, some are offering infrastructure loans to governments across the Indo-Pacific and the wider world. Yet the terms of those loans are often opaque at best. Projects they support are often unsustainable and of poor quality. And too often, they come with strings attached and lead to staggering debt (Pence 2018)

Two days after these accusations were stated at the summit, the Chinese embassy in Sri Lanka published a letter from the Chinese Foreign Ministry Spokesperson, Hua Chunying's, who answered that «On regional cooperation, the Pacific Ocean, the Indian Ocean and the Atlantic Ocean should all serve as the stages for win-win cooperation rather than the arenas for geopolitical competition or confrontation» (Hua 2018).

The Trump Administration is not alone in viewing the Chinese involvement in developing countries in Africa, Asia and South America as something negative. In 2007, editor of the journal Foreign Policy, Moisés Naím, described development assistance from China, Venezuela and Saudi Arabia as «nondemocratic in origin, and nontransparent in practice», and that «its effect is typically to stifle real progress while hurting average citizens» (Naím 2007, 96). The Chinese are also criticized for supporting governments responsible for severe human rights violations, like Sudan and Guinea (The Economist 2009), while it is argued that its goal is to spread autocracy (Skartveit 2020).

China values state sovereignty, and unlike the West, China offers assistance with no strings attached, making their assistance more attractive to recipient countries. The presence of another source of loans and financial relief is argued to be hindering the West's effort to promote democracy in developing countries, as could be seen after the fall of the Soviet Union, when the effectiveness of Western aid on democratic reform was enhanced (X. Li 2017). Testing this argument, using data from Sub-Saharan Africa, Li (2017) finds that the democratizing effect of OECD's development assistance has diminished after China's increase in development assistance after 2000. Sharshenova and Crawford (2017) tested whether this is true also for Central Asia, and found that Chinese aid in fact challenge Western effort to promote democracy, but in an indirect way. They point to two reasons why this is true: in contest with Chinese aid, Western aid seems ungenerous and as an infringement of sovereignty, and through the Shanghai Co-operation Organisation, China offers «institutional support and normative endorsement to domestic government officials through regional cooperation institutions» (Sharshenova and Crawford 2017, 465).

2.2.1 It isn't aid, it is cooperation

As for friends from developing countries, we treat them as our equals with sincerity and never interfere in their internal affairs. We seek to link our own development closely with the development of other developing countries and provide them with assistance and support to the best of our ability. Whenever we make a commitment, we always make sure that it is fully implemented to the letter (Foreign Minister Wang Yi 2013).

As this quote from the speech Foreign Minister Wang Yi held in the 37th Foreign Ministers' Annual Meeting of the G77 indicates, China has a different approach to development assistance than that of the West. China stresses respect, mutual benefit and equality in their South-South Cooperation (SSC) (CIDCA 2019; FAO 2019; Z. Li 2004; Ministry of Foreign Affairs of the People's Republic of China 2015), and has avoided making FOCAC pledges appear as aid, or development assistance (Carbonnier, Carton, and King 2014), and rather emphasize the fact that they are parts of a joint agreement between two partners. Through this mutual cooperation, China's spoken goal is to promote the «collective rise of developing countries and generating a robust, sustained, balanced and inclusive growth of the world economy» (Ministry of Foreign Affairs of the People's Republic of China 2015). The promise to stay out of internal affairs stems from China's own experience with western interference,

their own political problems with Taiwan and Tibet, which they view as domestic, in addition to the fact that they have been able to rise to be one of the world's richest countries without facing any conditionalities (Davies 2007, 14).

This makes Chinese aid more attractive to many governments than aid from DAC: after being approved a grant of \$ 90 million for helping provide social housing for the people of Antigua and Barbuda in 2019, Prime Minister Browne stated that «No other government, no other country in the history of our country would have done more for the government and people of Antigua and Barbuda than the government and people of the People's Republic of China» (The Daily Observer 2019). Browne also stressed that Antigua and Barbuda highly recognizes the peaceful development and win-win cooperation advocated by China, after receiving port and airport inspection equipment from China earlier this year (CIDCA 2020). The same goes for the member of the National Executive Committee of the Rwandan ruling party, Rwandan Patriotic Front (RPF), who stated that RPF highly appreciates the bilateral cooperation between the two countries (CIDCA 2019). China's willingness to provide African states with resource-backed loans without any conditions of good governance has in fact in many cases stopped aid agreements between western donors and African governments (Lyman 2006, 136).

2.2.2 Securing resources and generating business?

The Chinese aid practise has been widely criticised by scholars and western aid workers, mainly for promoting autocracy, hunting natural resources and undermining the World Bank and the western donor's effort to promote democracy and reduce corruption in the aid receiving countries through their conditions (X. Li 2017; Naím 2007). Bräutigam and Tang (2012, 801) presents three views on why China involves itself economically in other states: to strengthen resource security, to enhance political relationships and soft power, and to boost commercial opportunities for national firms abroad.

During 1993 China became a net oil importer, importing about 200 000 barrels a day, for the first time since the 1960s (Wang 1993, 81). With a growing population, it is argued that resource security is high on the agenda of the Chinese government. Many African countries has signed so called «infrastructure-for-resources» loans, and in 2003, over 50 percent of Chinese financing in Africa was commodity backed (Kärkkäinen 2016, 190). In Angola a \$2 billion unconditional loan signed in 2003 was to be repaid by the proceeds from oil sale from the state owned Angolan oil company Sonangol to the Chinese company UNIPEC (Sinopec). This loan from China Exim Bank made Angola able to rebuild infrastructure like roads, sanitation,

railways, housing, irrigation and electricity supply lines (Alves 2013, 214). Despite the infrastructure projects were not directly related to the oil industry, Alves (2013, 214) argues that «the deal served as a gate-opener for Sinopec to enter Angola's oil sector», because it acquired its first equity stake in Angolan oil industry after the loan was extended in 2007. These loans often means that a Chinese company builds the roads with the money from the Chinese Exim Bank, while a Chinese company gets access to natural resources or commodities (Kärkkäinen 2016, 191).

This is what Bräutigam presents as the «mutual benefit» approach – China's motive is to generate business (Brautigam 2010, 279), and while the presence of natural resources in some cases might be a prerequisite for getting a loan from China, the Chinese are not interested in importing the resources, only the money earned from selling it (Kärkkäinen 2016, 193). The fact that it is the Chinese Ministry of Commerce that is the head agency in the provision of bilateral aid is also strengthening the argument that China's activity in developing countries is motivated by commercial interest (Dreher and Fuchs 2015, 995).

However, Alves (2013, 218) argues that African governments are not capable of negotiating contracts with China, and that the contracts therefore benefits China rather than the recipient country. This concern is also raised by Rolland (2020, 41), who states that even though Chinese involvement seems to be without any strings attached, the loans include free trade agreements, and financial and currency swap negotiations.

Bräutigam (2010, 279) and Dreher and Fuchs (2015) argues that the Chinese aid does not seem to target resource rich countries, and point out that China gives aid to all African countries that follows the One China policy. However, there are examples of China being interested in importing the natural resources. In 2008, the Democratic Republic of Congo (DRC) and China signed an agreement worth 9 billion dollars, securing China's access to copper and cobalt. The deal also involved major infrastructure investment in the DRC, including health centres hydropower dams, airports, roads and hospitals (Raine 2009, 28). But even before the deal was made, Chinese companies controlled 60 out of 75 processing plants in the resource rich region Katanga, while 90 % of Katanga's minerals were exported to China (Raine 2009, 28-29).

However, it is worth noting that the correlation between Chinese aid used in this paper and Chinese foreign direct investment¹ (FDI) is only 0.028, which indicates that China does not target their investments in the same countries that receive development assistance. Bräutigam

¹ Data on Chinese FDI can be found at: <https://www.aei.org/china-global-investment-tracker/>

argues that much of the critique of and scepticism towards Chinese aid stems from the fact that many struggle to differentiate between the investment and the development assistance provided by China (e.g. Overn 2012)

2.2.3 Chinese and Western aid – what is the difference?

Chinese development cooperation takes many forms – as medical teams on 2-year missions, infrastructure projects, humanitarian aid, training programmes and concessional loans (Bräutigam 2011, 753-754). The implementation of the projects are monitored by the Chinese Embassies, and the progress is reported to the Chinese government (P. Davies 2007).

China is including more in its «external assistance» than what could be classified as Official Development Assistance by the OECD. The Chinese Ministry of Finance defined in 1998 funding that classified as external assistance as a) plants, cash, military and general goods, b) training expenses for economic, medical, military or science trainees from recipient countries, and salaries for experts sent from donor country, c) cost of interest subsidies for concessional loans, d) funding of specified items in foreign aid-funded joint investment and cooperation projects and e) administration costs for the firms that are contracted to aid projects (Bräutigam 2011, 755; Kobayashi 2008, 2-3).

2.2.3.1 Official Development Assistance

Only roughly 28 percent of Chinese official flows in the period between 2000 and 2014 qualifies as Official Development Assistance (ODA) in the eyes of OECD (AidData 2019). ODA is defined as grants, concessional loans (soft loans) where minimum 25 % of the loan are grants, and technological assistance. Only aid to developing countries with per capita income below USD 12 276 in 2010 is counted as ODA (OECD 2020a) – which currently is the 150 countries that are classified as lower or upper middle income. In addition, ODA is «provided by official agencies, including state and local governments, or by their executive agencies», and «administered with the promotion of the economic development and welfare of developing countries as its main objective» (OECD 2019, 6).

2.2.3.2 Other Official Flows

The remaining 72 percent of the Chinese Official Finance consist of what is called Other Official Flows (OOF). OOF is defined by OECD as loans with a grant element of less than 25 percent, or «official bilateral transactions, whatever their grant element, that are primarily export-facilitating in purpose» (OECD 2020b). The majority of OOF from China is funded by the Chinese Export-Import (Exim) bank and China Development Bank. The Export-Import bank is a state-owned and state-funded policy bank, and its mission statement is that

Its financial support goes to foreign trade, cross-border investment, the Belt and Road Initiative, international industrial capacity and equipment manufacturing cooperation, science and technology, cultural industry, “going global” endeavors of small and medium enterprises, and the building of an open economy (The Export-Import Bank of China n.d.)

As the mission statement indicates, most of these projects are infrastructure projects or economic production sectors, projects financed with loans (Dreher et al. 2017, 10). The same goes for the Chinese Development Bank (CDB), which is China’s largest bank for financial cooperation, long-term lending and bond issuance (China Development Bank n.d.a). CDB’s core values are «responsibility, innovation, green growth, prudence and win-win development» (China Development Bank n.d.b), and its mission is to enhance national competitiveness and improve people’s livelihood (China Development Bank n.d.c). The CDB was originally set up to provide finance for China’s own development, but in recent years, it has started to provide credits overseas (Bräutigam 2011, 757).

In contrast to 72 percent of China’s official flows being categorized as OOF in the period from 2000 until 2014, the same could be said for only 7 percent of the official finance from the US (AidData 2019). For the members of DAC OOF is typically credits for exports, given by official state-supported export credit agencies to promote exports. For the US this typically goes through its Export Import Bank, which offers assistance to exporters by either using its own funds at a fixed rate, or by providing cover to private financiers who then charge exporters or buyers a variable rate (Bräutigam 2011, 756).

In sum, most Chinese official finance is characterized as OOF and is mostly aimed at commercial and export-oriented purposes, while most of the official finance from the DAC countries are classified as ODA. It is therefore only a fraction of the official finance from China that is directly comparable to that of DAC. However, as the effect of ODA is still debated (Easterly 2006; Moyo 2009), comparing China’s more commercial approach to DAC is of high

interest. China is focusing on the importance of infrastructure and «connectivity», which is an area that has been overlooked or ignored by Western countries in their development assistance in the last decades (Zeng 2019, 369-370).

2.2.4 The West knows best

While China emphasise sovereignty, mutual benefit and respect, western donors are no stranger to meddling in the recipient countries' domestic affairs. The US has for a long time seen itself as a «nation set apart by its values and principles from the rest of the world, and thus has both a moral duty and a practical need to spread democracy to the ends of the earth» (Hamilton 2013, 6). Promotion of democracy is therefore an important part of the US foreign aid, and stems from Woodrow Wilson's wish to promote democracy to end war, as autocratic nations were seen as less peaceful than democracies (Walt 1998; Wilson Center 2003). Through its democracy, human rights and governance (DRG) strategy, USAID (2013, 4) states that its goal is «to support the establishment and consolidation of inclusive and accountable democracies to advance freedom, dignity, and development». This will be done by encourage and facilitate reformer's and citizen's participation and inclusion in politics, so that they can have a greater say in how they are governed from the bottom up (USAID 2013, 13). Studies have shown that this democracy promotion by the US in fact has a positive impact on democratization in the recipient countries (Finkel, Pérez Liñan, and Seligson 2007). However, Knack (2004) finds that even though aid could theoretically impact democratization through improving per capita income, through conditionality or «technical assistance focusing on electoral processes, the strengthening of legislatures and judiciaries as checks on executive power, and the promotion of civil society organizations, including a free press», there are no evidence of aid having any impact on democratization.

Members of the DAC, the World Bank and the International Monetary Fund (IMF) often impose conditions as a part of their loans or grants. Conditionality is an exchange of policy changes for external resources, or «trying to buy reform with aid» (Selbervik 1999, 12). These conditions are either imposed unilaterally or by mutual agreement between the donor and the recipient, and bind the recipient to certain actions or results in order to receive assistance (Shah 2017, 7). The conditions may be imposed both before (ex ante) or after (ex post) the assistance is given – the conditions imposed before is typically requirements of transparency, reporting and auditing and financial management, while conditions imposed after is connected to service delivery results (Shah 2017, 7). Selbervik (1999, 13) points to the fact that the ex post

conditions are contradictory in terms, because «conditions, strictly speaking, can only be imposed in advance». But what ex post conditions really mean, is that donors express beforehand that they expect certain conditions to be met, and that the donor will decide afterwards what reaction to make if the conditions are not met (Selbervik 1999, 13). Democracy is an example of ex ante condition imposed by donors since the 1990s (Selbervik 1999, 13).

Often the conditionality applied by can be a so-called «cross-conditionality», which means that the bilateral aid is dependent on the receiving country reaching agreements with the IMF and the World Bank. This has been the case for the Norwegian bilateral aid to Tanzania since the mid-1980s (Selbervik 1999).

The conditions the West imposed do however not always work as intended. An example of this is when the World Bank tried a one size fits all approach with what has been called the Washington Consensus in the 1980s and 1990s. The Washington Consensus was first written about by John Williamson in 1989, when he summarized ten policies that had long been advocated by the OECD, among them trade liberalization, privatization tax reform and deregulation (Williamson 2009). These policies have shown to be ill-suited to secure economic growth, deal with the public health emergency and to reduce poverty in the aid receiving countries (Rodrik 2006). Rodrik (2006) does however point to the fact that the world did experience immense economic growth in this period, but this was in the countries not undergoing policy reform – like China and India. This is also pointed out in the 2005 World Bank report «Economic growth in the 1990s – learning from a decade of reform», where the authors argue that the principles of macroeconomic stability, domestic liberalization and openness were interpreted to be to minimize deficits, inflation, tariffs while maximizing privatization and trade liberalization (World Bank 2005, 11), and they further argue that the means were mistaken for ends, and that not everything needs to be «right» at once, for a country to experience economic growth (World Bank 2005, 11).

How efficient conditions are imposed, might be dependent on both donor goals and the receiver's regime type. Montinola (2010) finds that conditions are more likely to be imposed by democracies, than autocracies, because democrats are more dependent on immediate spending to stay in power than autocrats, which is in line with Bueno de Mesquita and his colleagues (2003) theory of regime survival. Autocrats are able to stockpile some of their aid received, for later use, because their selectorate are much smaller than that of the democrats. Democrats are therefore more vulnerable to donor pressure, in order to receive the next aid transfer.

It is found that during the Cold War, Western governments had political and strategic motives behind their development assistance, rather than the economic needs of the recipient country (Alesina and Dollar 2000), while Japan is more likely to give development assistance to states that vote with Japan in the International Whaling Commission (Strand and Tuman 2012). More recent empirical evidence suggests that the US is more likely to vote for multilateral development bank packages to countries that have signed on to China's Belt and Road Initiative when the aid flow to these countries are still low, in order to compete for countries that is still «in play» (Vadlamannati et al. 2019).

Donor goals might also influence the donor's ability to make the receiver impose the policy changes tied to their development assistance. When donors have other competing goals, other than help development in the receiving country, the receiving government could use that as leverage, making it able to resist the policy conditions imposed. Bearce and Tirone (2010) argues that foreign aid might promote economic growth in recipient countries by facilitating economic reform, only when the donor's strategic benefits associated with providing aid are small.

And, despite their focus on good governance when it comes to the conditions they set while giving aid, Neumayer (2003) found that perceived levels of corruption does not play a role in the aid allocation the four regional development banks and the three UN agencies investigated, while Isopi and Mattesini (2008) found that especially countries as Germany, Italy and Netherlands is putting strategic considerations above being concerned about the recipient's corruption level. In the case of China aid however, which has been blamed for targeting autocrats and corrupt regimes (e. g. Davies 2007; Naím 2007), Dreher and Fuchs (2015) find no bias toward autocratic or corrupt regimes in its aid allocations. This is consistent with the findings of Dreher, Nunnenkamp and Thiele (2011, 1960), who find that corruption has no differential impact on the aid allocation of new or old donors, however there are differences within the group of new donors – Asian and Latin American donor countries favour less corrupt recipients, while Eastern and Central European donors grant more aid to more corrupt countries.

However, there are differences in how the US and China initiate its projects – USAID consult the recipient government and develops country specific strategies to program its aid, while China to a higher degree responds more to local leaders' requests, and «has a small standard portfolio of turn-key projects, primarily focused on infrastructure» (Bräutigam 2011b, 3).

2.3 Aid and government behaviour

2.3.1 Aid curse?

Whether aid has a positive or negative effect on development outcomes is fiercely debated. Easterly (2006, 132-133) criticise the fact that Official Development Aid (ODA) is given to autocracies – that money is transferred from the best governments in the world, to the worst. Bueno de Mesquita and Smith (2012, 527) argue that aid to developing countries is «easy money» for their governments, and that aid could be compared to natural resources. The presence of natural resources, like oil and minerals, often have a negative impact on the development and democratization (Teorell 2010, 58-59), because then the government is not dependent on the productivity of the people to bring in money. This could be the same for aid (Bueno de Mesquita and Smith 2013) – when the government is receiving money from external sources, it has no incentives to provide the people with a baseline of healthcare and education, for the people to be productive workers that the government may tax. Without taxation, the expression «no taxation without representation» may be turned around, and people’s power over the government may be weakened (Moyo 2009, 66). When this is the case, allocation of money to health would probably not be prioritized.

Bueno de Mesquita and Smith’s argument is supported by evidence from Côte d’Ivoire, in the period between 1975 and 1999, which suggests that aid seems to induce a reduction in taxation efforts, and public saving (McGillivray and Ouattara 2005). These findings are supported by evidence from Papua New Guinea in the period from 1974 until 2008, where it is concluded that the accusations that grant aid seems to have undermined the Papua New Guinea government’s incentives to expand tax revenues are «well founded» (Batten 2010). However, Batten (2010, 158) suggests that this might be a result of the conditions of economic liberalism imposed on recipient countries in the 1990s. On the other hand, a widely cited study by Pack and Pack (1990, 193) states that in the case of Indonesia taxes are raised rather than lowered in response to aid, as officials in the Indonesian finance ministry have strong sentiments against Indonesia becoming reliant on foreign aid. Morrissey (2015, 102) concludes that there is no reason to fear a decrease in taxation as a consequence of grant aid, because replications of studies finding a tax reduction shows that the result is not robust.

In the case of Chinese development assistance, the risk of a aid curse might be even more likely, due to the lack of conditions of policy change. Brazys and Vadlamannati (2018) have investigated whether the presence of Chinese aid flows affect broader economic reform in

the recipient countries, and find that Chinese aid flows in fact inhibit economic reform. This supports their hypothesis that governments prioritize short-term political support, rather than undergoing unpopular economic reform, when they have alternative incomes that allow them to remain in power (Brazys and Vadlamannati 2018, 6).

2.3.2 Fungible money

In a World Bank report from 1998, the authors conclude that when aid goes mostly to government spending, «the spending funded by aid is largely fungible between consumption and investment» (David Dollar and Pritchett 1998). What is meant by the term *fungible*, is that money is interchangeable – aid allocated to one project by a donor country may be reallocated by the recipient country (David Dollar and Pritchett 1998). The fear is that while donor countries are giving grants to development projects in the recipient countries, the recipient countries will use the money on other investments. However, many studies find that fungibility is not a large problem (Morrissey 2015; Pack and Pack 1990; Ouattara 2006). On the contrary, Ouattara (2006) finds that aid flows have a positive impact on governments' development spending, while having a negative impact on non-development expenditure.

When it comes to government spending McGillivray and Ouattara (2005) find that the majority of aid inflows are allocated to debt servicing in Côte d'Ivoire, while aid is not used as a substitute for lending, as they find an increase in public debt. In Papua New Guinea however, Batten (2010, 157) finds that an increase in grant aid decreases domestic lending, both in long and in short term. However, some evidence suggests that Chinese aid is in fact more fungible than aid from traditional donors, as it contributes to stabilising weak governments (Strange et al. 2017, 950).

2.3.3 Political capture

As already mentioned, aid might be strategically distributed by the donor – donors might reward countries for voting in international organizations (Strand and Tuman 2012) or aid might be a part of countries' larger foreign policy agenda (Alesina and Dollar 2000). This is perfectly in line with Morgenthau's realist view of international relations: «the transfer of money and services from one government to another performs here the function of a price paid for political services rendered or to be rendered» (Morgenthau 1962, 302). Even though this might impact the donors' ability to impose conditions, it does not necessarily mean that the effectiveness of

the project itself is reduced. Dreher (et al. 2013) find that aid with a political motive is only less effective when the recipient country is economically vulnerable in the first place.

Strategic allocation of money does not only happen from donor government to receiving government, but also from the government of the receiving country to the different regions within the recipient country. By using geocoded data for Chinese aid projects, Dreher (et al. 2016) find that the birth region of the leader receives substantially more aid from China, than other subnational regions. The findings are the same for areas populated by individuals with the same ethnicity as the leader, while the same favouritism is not found when testing the aid from the World Bank (Dreher et al. 2016). However, the fact that the aid is allocated for strategic or political purposes, does not mean that it is less effective than aid allocated for other purposes. Using the same geocoded data on Chinese aid in the period from 2000 until 2012, Dreher (et al. 2019) find that Chinese aid improves local development outcomes, such as per capita night-time light emission, regardless of whether the aid is allocated to politically strategic areas.

However, it is still worth noting that Chinese aid is more vulnerable to political capture than Western aid (Dreher et al. 2016; 2019), which might make it vulnerable to corruption.

2.4 Why health?

Recent studies, among them working papers by researchers at AidData, have looked at the relationship between Chinese aid and the economy in the recipient countries (Dreher, et al. 2017; Brazys and Vadlamannati 2018) and Chinese aid and trade and government repression (Ganso 2019; Gehring, Kaplan and Wong 2019). When comparing Chinese aid and ODA from DAC, Dreher (et al. 2017) found that both types of aid has positive effects on economic growth in recipient countries, while Brazys and Vadlamannati (2018) find that the presence of Chinese aid flows inhibits broader economic reform in the recipient countries.

2.4.1 Endogenous growth theory

In this paper the focus will be on health access and health outcomes. Good health is not just important in and of itself, but also for both democratic and economic development. Acemoglu and Robinson (2012) argues that inclusive institutions must be in place for a country to experience economic growth – institutions cannot be inclusive if the health is too poor for people to participate. This is in line with the endogenous growth theory – growth comes from within the country, and is dependent on human capital (Romer 1989; 1994). Human capital is assets like education, training, intelligence and health (Kenton 2019). The logic behind this theory is that countries with lower levels of human capital also tend to have lower levels of physical capital accumulation (Sachs and Warner 1997, 185). Citizens who have no access to health services, and thereby have generally poor health, does not have the same productivity as citizens with good health – neither when it comes to physical production nor innovating ideas. Countries with a rapid increase in human capital are therefore likely to experience rapid economic growth (Sachs and Warner 1997, 185). Leung and Wang (2010, 12) argue that even though «health investment directly diverts resources away from productive use, it results in a prolonged life expectancy, which in turn encourages capital formation», and their results suggest that welfare is raised through advancements in medical technologies.

China has parallel to its rapid economic growth prioritized health expenditure, and have seen results in lower infant, under-5 and maternal mortality rates and higher life expectancy. In the period from 1978 until 2004, China increased its health expenditure from 3.04 percent of GDP to 5.55 percent – as the country's GDP has increased dramatically in the same period this means that the Chinese health expenditure has increased times 51 from 1978 until 2004 (Yan 2007, 3). Studies have found increase in health expenditure to be closely correlated with

regional economic growth in China, especially in the Western parts of the country (Y. Wang and Xuguang 2004).

Good health is also important for people to engage in political and civil society organizations (Coppedge, et al. 2019, 193). This might however not be China's biggest concern - Gamso (2019) finds that trading with China is worsening physical integrity rights abuses in developing countries, which is supported of Gehring, Kaplan and Wong's (2019) findings, who find that Chinese aid is associated with increased government repression and increased acceptance of authoritarian norms.

2.4.2 Chinese health assistance

The importance of health is also reflected in the United Nations Millennium Development Goals (MDG) – the third goal is to provide good health and well-being for all (FN-Sambandet 2019). China has been working for bettering health in developing countries since the 1960, by sending medical staff to middle- and low-income countries (Bräutigam 2011b; Sidibe and Hesketh 2018; Zou, McPake, and Wei 2014). And in the period between 1976 and 1997 China sent medical teams to 25 new countries in Africa, in addition to building hospitals, clinics and pharmaceutical factories (Bräutigam 2011b, 4). The Chinese link its aid funding to the United Nations summits on financing the MDGs and meetings in FOCAC (Bräutigam 2011b, 5), while also cooperating with developing countries to reach the International Conference on Population and Development (ICPD) goals, which states that all people should have access to reproductive health care, including voluntary family planning, safe pregnancy and child service, and treatment and prevention of sexually transmitted infections (UNFPA 2019). The Chinese offer short-term training programs in «population and family planning, malaria treatment and prevention, traditional Chinese medicine and other health-related topics» (Bräutigam 2011b, 7) and in line with the ICPD goals, they have a particular focus on reproductive health and family planning.

Zou, McPake and Wei (2014) argues that the Chinese approach is innovative and differ from the traditional donor approach in the way that they promote the implementation of population- and system-based health strategies (2014, 1461). Grépin and her colleagues also argues that the Chinese health aid to Africa differs from the aid from the DAC donors because of their focus on health system projects and human resources for health, rather than disease-specific programs (Grépin, et al. 2014, 8). However, Sidibe and Hesketh (2018) argues that

there needs to be a formal evaluation of the Chinese medical teams (CMT) that is currently working in Africa, to maximize utility. By carrying out in-depth interviews with 12 Malian doctors and 12 Malian nurses, all the members of the CMT, four stakeholders and ten patients at a hospital in Bamako financed by Chinese government aid, they found that the CMT was viewed on as a positive presence, but that it is a lack of agreed objective on the role of the CMT – particularly the CMT's role as teachers and members of staff (Sidibe og Hesketh 2018).

Youde (2010, 151) argues that governments use health diplomacy to extend both their hard and soft power in developing countries. The same is the case for Bräutigam (2011b, 8), who argues that the motivation behind the health programmes in Africa is not only to provide development assistance, but also as a tool of soft power. She argues that both China and the US shape some of their health programmes to «boost friendship and goodwill» - the programmes have been praised by political leaders in Africa, «some of whom have come to use Chinese doctors as their personal physicians» (Bräutigam 2011b, 8). Public opinion polls suggest that China is viewed positively by Africans (Bräutigam 2011b; Afrobarometer 2015), but providing health care does not only better China's image in the eyes of Africans in general, it also inclines them to trust medical products produced by China (Youde 2010, 158). Introducing Chinese pharmaceuticals to the African market also makes China an economic payoff, while Africans gain access to needed drugs (e.g. Dreher and Fuchs 2015, 995; Youde 2010, 158), making health assistance a mutual gain.

2.4.2.1 Not only health projects

As mentioned earlier, many studies have investigated whether aid has an impact on government spending, using budgets as dependent variable. But, as money are easily fungible, I choose to focus on actual outcomes in this paper. There is however not only money directed at hospitals and training of medical personnel that impact health, infrastructure is also an important factor when it comes to health access and outcomes. Improved roads make it easier for medical staff to do home visits in rural areas or travel between cities, but also make it easier for patients to reach the hospital to get treatment (Agénor 2014, 105). As China has been criticised for only hunting natural resources, they have also been criticised for building roads only to the mines or the oil fields, as the colonizers did. This is however argued not to be true, as China is financing roads to hospitals and irrigation in Angola, where the oil is located miles from the coast (Brautigam 2010, 214). A common problem in developing countries is power shortage and power cuts (Heffner et al. 2010). This might be due to natural phenomenon's like

drought and unusually cold weather, or simply lack of investment (Heffner et al. 2010, 1585). Power shortages is severe for hospitals, as it may leave them unable provide proper health care to their patients (Agénor 2014, 105). Lack of electricity might also cause a health risk at home, as traditional stoves lead to indoor pollution that could be avoided with clean energy (Agénor 2010, 933; Agénor 2014, 105; Easterly 2006, 110). Access to sanitation and clean water is also necessary to improve and maintain good health (Agénor 2010).

2.5 Hypotheses

As presented in this literature review, there is a lack of theoretical and empirical unity when it comes to Chinese development assistance. In this chapter I will present the different competing hypothesis based on the theory and literature previously presented.

2.5.1 Is China doing any good?

The question of whether China is doing any good in the countries receiving its aid is the core question of interest in this thesis. The view taken on by most western media and many scholars seems to be that China do more harm than good in the countries receiving its loans and grants (e.g. Davies 2007; Naím 2007; Skartveit 2020). The Trump Administration has several times described Chinese development assistance as «unsustainable and of poor quality» (Pence 2018), while National Security Advisor Ambassador Bolton (2018) argues that «China uses bribes, opaque agreements, and the strategic use of debt to hold states in Africa captive to Beijing's wishes and demands».

In an international relations perspective, a realist would argue that China's expansion of development assistance can be viewed as a hard power grab – China is expanding its military and as they aim to rise as a superpower, they are in need of allies. In this point of view, China's development assistance is merely strategic, with the aim to make foreign governments more friendly towards China.

H1: Chinese development assistance is a strategical part of its search for hard power, and is therefore either negatively or not associated with better health access and outcomes in the recipient countries

However, many of the empirical studies on Chinese development assistance find that it is not as bad as its reputation says. Dreher (et. al 2015) find that Chinese development assistance seems to be independent of the recipients natural resources or institutional characteristics, and

this is also argued by Bräutigam (2010). Nevertheless, Chinese aid might still be strategically allocated. In 2007, President Hu Jintao stated that China should aim to increase its soft power in the world (Nye 2014), while Xi Jinping has focused on the country's lack of «discourse power» in the world (Rolland 2020). Soft power is not necessarily gained only through making allies on a government level – making citizens in other countries identify with you, making them adopt your causes and interest is also making them a powerful tool, as costly force and threats becomes unnecessary. A way to effectively make this happen is to provide them with better health services, enhancing their life quality.

H2: Chinese development assistance is a strategical part of its search for soft power, and is therefore positively associated with better health access and outcomes

In this paper I will test the effect of Chinese aid on three different dependent variables – equal access to health as a proxy for pro-poor policy, access to four or more antenatal care visits as a proxy for pro-female policy, and the under-5 mortality rate as a measure of health outcomes. As the Chinese government states that they its development partners as «equals with sincerity and never interfere in their internal affairs» (Foreign Minister Wang Yi 2013), it might be reasonable to believe that Chinese development assistance will not have an impact on pro-poor and pro-women policies, and only be positively associated with lower under-5 mortality rates, as this is less dependent on policy.

H3: Chinese development assistance is more likely to be positively associated with lower mortality rates than with pro-poor and pro-women health policies

As mentioned earlier, this focus on non-interference is one of the reasons Chinese development assistance has gained a bad reputation in the west. Western donors tie conditions to their loans and grants, making the recipient better corruption, democracy or go through economic reform. Conditions are imposed to secure the effectiveness of the aid, making governments able to effectively handle the money. Empirical evidence is also suggesting that new donors, like China, care less of recipient need than old donors, like the West (Dreher, Nunnenkamp, and Thiele 2011). Based on this, it is reasonable to argue that

H4: ODA from DAC is overall more positively associated with better access and lower mortality rates than Chinese development assistance

3. Methods

To answer how Chinese aid affects health access and outcomes I will use time-series cross sectional regression analysis, with unbalanced data from 136 and 138 countries in the period between 2000 and 2014. For the purpose of not creating biased results by including countries that already have relatively good health services and are not receiving any aid, the 28 members of OECD's Development Assistance Committee (DAC), in addition to China, who are aid donors, are excluded from the analysis. North Korea is also excluded, to avoid bias, as Chinese aid to North Korea is likely to be underestimated (Dreher et al. 2017; A. Strange et al. 2017).

When using time-series cross-sectional data there are often two phenomena present in the data, which violates the assumptions of an ordinary least squares (OLS) regression, namely autocorrelation and heteroskedasticity. An OLS regression assumes that the observations are independent of each other – which means absence of autocorrelation, and that the observation is normally distributed, or homoscedastic (Mehmetoglu and Jakobsen 2017, 235). This is often not the case for longitudinal data, as the observation for one country in one year, often is dependent on the observation for the same country in the past year. This is likely to be the case for all the variables included in the analysis - the value for 2005 is dependent on the value for 2004, for example. To test for the presence of autocorrelation, I conduct the Wooldridge test for autocorrelation in panel data, as proposed by Drucker (2003). As shown in Appendix A, the Wooldridge test rejects the null hypothesis of no autocorrelation, which means that there is autocorrelation present in the data. To test for the presence of heteroscedasticity, I perform a Breusch-Pagan/Cook Weisberg test (Breusch and Pagan 1979; Cook and Weisberg 1983) which rejects the null hypothesis of constant variation, as one can see in Appendix B – which means that there are in fact heteroscedasticity present in the model.

To account for the autocorrelation and the heteroscedasticity, I will use the Driscoll-Kraay standard error estimator, which accounts for unknown forms for heteroskedasticity and autocorrelation, while also solving the problem of spatial correlation, which may occur in cross country data (Hoechle 2007). The Driscoll-Kraay² standard errors account for the fact that countries in specific regions might be connected to each other, due for example to the region's adverse climate which may cause poor health (Collier and Gunning 1999, 6) – and thereby the

² Nevertheless, this estimator is based on an asymptotic theory, and one should be cautious applying this estimator to panels with large N and small t (Hoechle 2007, 286) , which is the case in this data.

error term may be correlated across units (Beck 2008, 480), which leads to incorrect standard errors.

Another aspect that has to be accounted for, is the time trends we can see in Figure 1, where both aid from China and aid from DAC, as well as the proportion of women who get four antenatal check-ups are increasing, while the under 5 mortality rate is decreasing, throughout the 15 years from 2000 to 2014. The non-stationary data might lead to false positive results, only because health outcomes are improving at the same time as aid is increasing. The problem with the time trends will be solved by including a dummy for time, or so called time fixed effects. By doing this, the values for each year will be compared to the values in the reference category, which will be the year 2000.

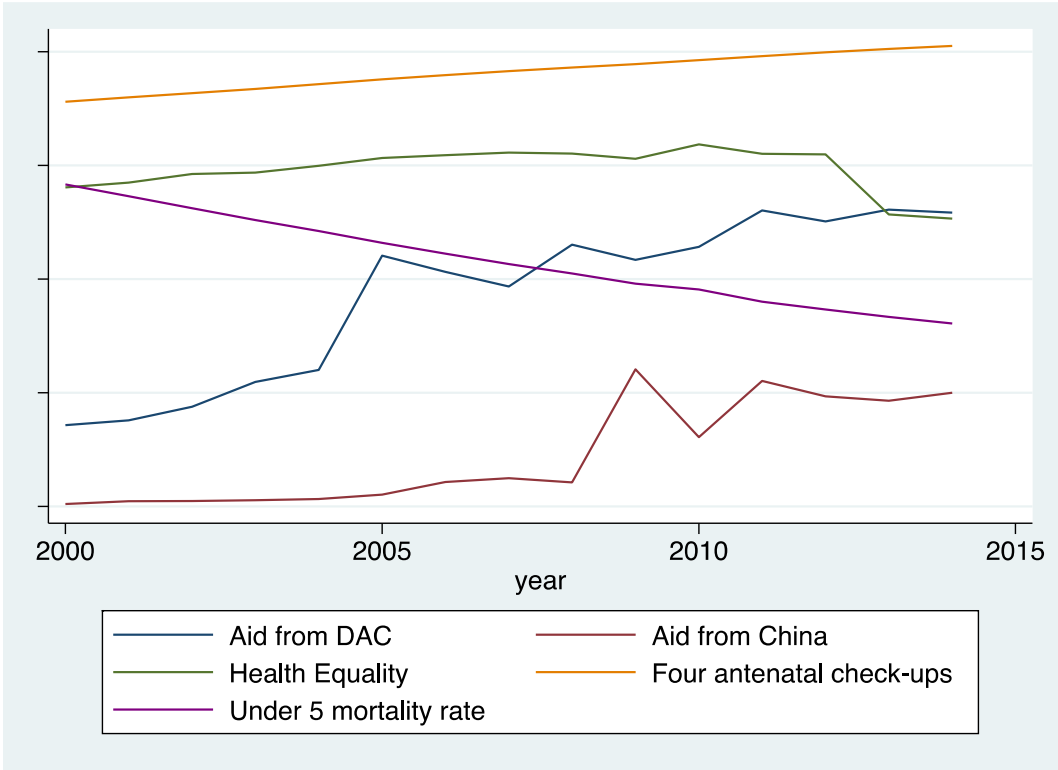


Figure 1 - Graph illustrating the upward time-trend in the data for aid and health care access³, showing the cross-country average by year

Fixed effects will also be included in the models, which on a country level this means that cultural and historical heritage which is unique for every country is controlled for. If a country has a particularly bad history with colonialism (an unobserved time-invariant variable), which make the health quality and access much worse than the other countries, an OLS

³ The values for antenatal check-ups and health equality are multiplied by 10⁹, while the values for under 5 mortality rate are multiplied by 10⁷, to better illustrate the time trend

regression will be biased as the aid variable also catches the effect of this variable. A fixed effects regression, on the other hand, only compares the country's own aid values against its own health access and quality values, and investigates if change in the independent variable leads to change in the dependent variable, in each country, suggesting that all the unit-level heterogeneity is accounted for.

The baseline regression equation estimated in this paper will therefore be:

$$Health_{i,t} = \beta_1 Aid_{CHN,i,t-1} + \beta_2 Aid_{DAC,i,t-1} + \beta_3 \eta_i + \beta_4 \mu_t + \varepsilon_{i,t}$$

where $Health_{i,t}$ is recipient country i 's under-5 mortality rate, health equality or ANC in year t ; $Aid_{CHN,i,t-1}$ is measure of (logged) Chinese aid commitments one year before, and $Aid_{DAC,i,t-1}$ is DAC's (logged) aid commitments one year before. η_i and μ_t represent country- and time-fixed effects, respectively, and $\varepsilon_{i,t}$ represent the error term.

3.1 Data

3.1.1 Dependent variable: health access and outcomes

In this paper, I am using three variables to measure health outcomes and access – under 5 mortality rate, access to four or more antenatal check-ups and pro-poor policy measured as equality of access to health. The variable measuring the under 5 mortality rate is collected from the World Development Indicators online database⁴, and the measures «the probability per 1,000 that a new born baby will die before reaching age five, if subject to age-specific mortality rates of the specified year» (World Bank 2019c). Under-5 mortality rate is included because it is an indicator of child health, as well as the overall development and the well-being of the population as a whole (OECD and WHO 2018). The variable is a weighted average, predicted by United Nations Inter-agency Group for Child Mortality Estimation (UN IGME) as estimates available for each country for each year often varies. UN IGME has therefore developed a statistical method to obtain the best estimate trend line of mortality rates by fitting a country specific regression model to their reference dates (World Bank 2019c). The data on mortality rates have some limitations – developing countries often lack complete vital registration systems, and data therefore often are obtained through sample surveys or by applying indirect

⁴ Could be found at: <https://databank.worldbank.org/source/world-development-indicators>

estimation techniques or registration, census or survey data (World Bank 2019c). Survey data might be subject to recall and sample errors (Eide et al. 2018; World Bank 2019c), which may make the data unreliable.

The four or more antenatal check-ups (ANC) variable measures the proportion of pregnant women receiving four or more antenatal care visits from a skilled provider (IHME 2016). This variable is collected by the researchers behind the Global Burden of Disease dataset, and is also created by combining data from different national and global surveys (IHME 2016), and might be subject to recall errors (Eide et al. 2018) in the same way the data from the World Development Indicators are. The researchers has since 2015/2016 followed the Guidelines for Accurate and Transparent Health Estimates Reporting (GATHER) statement provided by Stevens and her colleagues (2016). These guidelines are necessary because health data is rarely available for every population for each year, and estimates are often calculated for missing values, which somewhat weakens the reliability of the data.

The health equality variable is an expert coded variable from the Varieties of Democracy dataset, which measures to what extent high quality basic healthcare is guaranteed to all, and sufficient to enable them to exercise their basic political rights as adult citizens (Coppedge et al. 2019, 193). The variable is coded on a scale from 0-4, where 0 is extreme inequality, where 75 % of the citizens are unable to exercise their political rights as a consequence of poor-quality health care, and 4 is equal health equality, where less than 5 % of the citizens are unable to exercise political rights because of poor health care (Coppedge et al. 2019, 193). The expert coded data is converted to an interval-level point estimate that varies from -5 to 5, through a Bayesian Item-Response Theory (IRT) estimation strategy (Maxwell, Marquardt, and Lührmann 2018, 2-3). To ensure reliability in the expert coded variables, V-DEM uses five country experts per observation, which makes them able to statistically account for the potential biases and uncertainty around estimates, using the IRT model (Maxwell, Marquardt, and Lührmann 2018, 1).

These three variables will function as dependent variables in this analysis: under-5 mortality rate will serve as a measure of health outcomes, while ANC and health equality will serve as a measure of health access and pro-women and pro-poor policy. As Eide (et al. 2018, 2) points out, accessibility to health services is a fuzzy term, and measures of health access are typically based on survey data, which suffers from recall errors, and their results show that there often is discrepancies between perceived and actual access to health services. The data on ANC is based on a variety of national and global surveys, which might suffer from the recall errors pointed out by Eide (et al. 2018) and the World Bank (2019). The fact that many developing

countries lack a good system of reporting data such as ANC might also weaken its reliability. Since health data often lack data for all countries in all years, both GBD and WDI have extrapolated estimates for the missing values, GBD using the GATHER guidelines, while WDI rely on UN IGME to obtain the best estimate mortality rates (World Bank 2019c). The health equality estimator by V-Dem is a expert coded variable, which might lower its reliability, but V-Dem has statistical procedures to detect coder bias, and the fact that it correlates by 0.84 with the health access and quality index (HAQI), which is coded by medical researchers in the Global Burden of Disease project (Fullman et al. 2018), makes the variable sufficiently reliable.

In Table 1 the correlation between the three different dependent variables are shown. The correlation is over +/- 0.6 for all the variables, which indicates each measures different aspects of health access. The proportion of women who receive four or more antenatal care visits are, as one might expect, relatively highly correlated with under-5 mortality rate – higher rate of women receiving antenatal care correlates with lower under 5 mortality rate. Both these variables do catch the gender aspect of health access – women in developing countries do have lower health than men, while consuming less health resources (Nash Ojanuga and Gilbert 1992). Obstetric haemorrhage, both post- and antepartum, accounts for 20-25 percent of all maternal deaths worldwide, and the death rate in developing countries is 100 times that in developed countries (Baysinger 2019). Antepartum haemorrhage occur in 5-20 percent of pregnancies, and is a threat to both the baby and the mother. Antenatal care is important to secure a safe pregnancy both for the child and the mother, by diagnosing and treating diabetes during the pregnancy, chronic hypertension, malnutrition that may cause prematurity and other diseases that causes perinatal death (Pinotti and Faúndes 1984). As women in general has poorer access to health than men (Nash Ojanuga and Gilbert 1992), the proportion of women who received four or more antenatal care visits function as an indicator of the gender equality in the health access. A health system that care about women, also care about men.

Under-5 mortality rate might also capture a gender aspect of health access, in addition to capture the overall development and the well-being of the population as a whole (OECD and WHO 2018). Equal access to health captures the aspect of pro-poor policy, that the two other dependent variables do not.

Table 1 - Correlation between the three different dependent variables

	Equal access to health	Four or more antenatal care visits	Under-5 mortality rate
Equal access to health	1.0000		
Four or more antenatal care visits	0.6671	1.0000	
Under-5 mortality rate	-0.6957	-0.7390	1.0000

3.1.2 Main explanatory variables

3.1.2.1 Chinese development assistance

While the DAC countries report their donations to the OECD Creditor Reporting System (CRS), China does not (Strange, et al. 2017, 1). AidData has therefore developed a methodology called Tracking Underreported Financial Flows (TUFF), to collect project-level data from suppliers of official finance who does not participate in global financing systems (Strange, et al. 2017, 1). TUFF has three stages, (1) first the projects are identified either through records of the recipient country or the donor country, or news reports, (2) then one synthesise and search for additional sources for the projects found in stage one, and at the end (3) the projects undergo a quality control (Strange, et al. 2017, 4-5).

AidData's Chinese Official Finance data version 1.15 consists of 5466 projects from 2000 to 2014. 84 of these projects are on a regional level⁶, and they are therefore dropped from the analysis. This leave us with 5381 projects in 132 countries. The data rely on commitments, not disbursements, as disbursements is impossible to measure with open-source data collection methods (Dreher et al. 2017, 15).

Earlier studies on Chinese aid have divided the aid by flow class (Dreher et al. 2017; Dreher and Langlotz 2017). There are three different types of aid classes: Official Development Aid (ODA), other official flows and vague official finance. ODA is the type of aid given by the OECDs Development Assistance Committee (DAC), and is defined as grants, concessional loans (soft loans) where minimum 25 % of the loan are grants, and technological assistance

⁵ AidData's Global Chinese Official Finance Dataset, 2000-2014, Version 1.0 is found at <https://www.aiddata.org/data/chinese-global-official-finance-dataset>

⁶ Example: «Africa, regional» and «Asia, regional»

(OECD 2019b). Most of the aid from China is classified as Other Official Flows (OOF), which is non-concessional loans, where less than 25 % are grants. ODA is first and foremost meant as development aid and to promote foreign policy interests (Dreher, et al. 2018), while OOF is primarily given to promote commercial interests (AidData 2019). However, the projects in the dataset are also divided into four types of donor intent – development, commercial, representational and mixed. The projects with commercial intent are meant to serve commercial interests in the donor country, while the ones with representational intent are meant to serve the representational interests of the donor country, like building Confucius centres, or a donor-recipient relationship (Strange, et al. 2017). In this paper, I choose to divide the aid by donor intent, as well as by flow class. The fact that the loan has a grant element of less or more than 25 % should not affect the loans ability to be used to better health outcomes. And, by dividing the aid by intent, the energy related projects that is labelled as OOF-like, but with a development intent, is included in the analysis. This is for example the case for Chinese funding for rehabilitation and expansion of the electricity network in Luanda in Angola in 2006 (AidData 2017).

I therefore will use three different measures of Chinese aid in my initial analysis. The first one contains of all aid, except the projects the researchers behind the dataset has labelled as not recommended for research, because they are part of umbrella projects⁷, projects with status as pledged, cancelled or suspended, or never fully committed/implemented. Including these projects could lead to double counting or including projects never implemented (Dreher, et al. 2017). This means that 1067 projects which are not recommended for research will be excluded from the analysis, as shown in Table 2.

Table 2 - Only projects recommended for research

Intent	Frequents	Percent
Development	3675	85.19
Commercial	92	2.13
Representational	278	6.44
Mixed	269	6.24
	4314	100

⁷ Umbrella projects: «where some agreement was signed between two countries but the funds were not allocated at the original agreement date, only to be allocated through smaller projects later on» (Dreher, et al. 2017)

The second measure will be more specific. This will consist of only the financial flows with development or mixed intent. As a consequence, the 370 projects with commercial and representational intent are excluded from the variable, to create a new measure with only those projects most likely to influence health quality and access included. This leaves us with 3944 projects, where 93.18 % of the projects included in the variable have a development intent, as shown in Table 3.

Table 3 - The number of projects included in the data after removing irrelevant projects

Intent	Frequents	Percent
Development	3675	93,18
Mixed	269	6,82
	3944	100

The third measure contains only those projects Dreher (et al. 2017) has labelled as ODA-like. This leaves us with 3150 projects, which is financed by grant or loans with at least 25 % grant element, and excludes most projects in the infrastructure and economic production sector which is financed by the China Development Bank and China Exim Bank (Dreher et al. 2017, 10). 2780, which is most for the 3150 projects that classifies as ODA-like, is funded by «Unspecified Chinese Government Institution, Government Agency», while 251 projects are funded by the Exim Bank and 52 are founded by the Chinese Embassy/Consulate. The remaining 67 projects are financed by different Chinese government agencies, like for example the Ministry of Commerce (Dreher et al. 2017). In the case of significant results, I will show the separate effect of OOF as well, to determine which types of flows and which mechanisms are behind the results.

This paper will focus on the financial value of the projects, in constant 2012 US dollar. However, since many of the health-related projects lack information on their financial value, it may be necessary to control for number of projects (Dreher, et al. 2017, 12). The financial value of Chinese aid and the number of projects have a relatively low correlation (0.3421), which may indicate that China is more committed to the countries where they have few aid projects, as pointed out by Grépin and her colleagues (2014, 8-9).

3.1.2.2 Official Development Assistance (ODA) from the Development Assistance Committee

Aid from the Development Assistance Committee (DAC) is included in the analysis to control for another type of aid giving than Chinese aid. If only including Chinese aid without

controlling for the other big aid donor on the market would give a wrong picture of the effect of Chinese aid. However Chinese and DAC aid is not highly correlated, with a correlation of only 0.1234. This indicates that China and DAC concentrate their aid in different countries, which also is consistent with the accusations that China has other motivations than DAC (Naím 2007).

Data on aid from DAC is collected from the World Bank's World Development Indicators⁸ (The World Bank 2019b). DAC consists of 24 members – 23 individual economies – Australia, Austria, Belgium, Canada, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Japan, Republic of Korea, Luxembourg, Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, United Kingdom and the United States – and one multilateral institution – the European Union Institutions (The World Bank 2019a). The data are collected using a Creditor Reporting System (CRS), whereby the bilateral donors report all their development co-operation using a single file format, and «item-level reporting is validated against key aggregates also reported by donors and then serves as the basis for producing various other aggregate statistics» (OECD 2019a). DAC aid includes values below zero, which is if countries pay back more than they receive (The World Bank n.d.). For the purpose of this analysis those values are set to zero.

3.1.2.3 Chinese and Western aid compared

I follow Brazys and Vadlamannati (2018) and use population⁹ to standardize aid. Both Chinese and DAC aid is therefore divided by population, and the values used in the model is thereby Chinese and DAC aid per capita – both in constant 2012 US dollar.

In Figure 2 below, we can see a map displaying the mean distribution of aid per capita from DAC in the period from 2000 until 2014. The highest level of aid per capita is concentrated in sub-Saharan Africa, in addition to Bolivia, Guyana, Surinam and Nicaragua in North- and South-America, Syria, Iraq, Afghanistan, Tajikistan, Kirgizstan, Mongolia, Sri Lanka, Cambodia and Laos in Asia, and Papua New Guinea in Oceania.

⁸ World Development Indicators are found at <https://databank.worldbank.org/source/world-development-indicators>

⁹ Which is also collected from the World Development Indicators (2019)

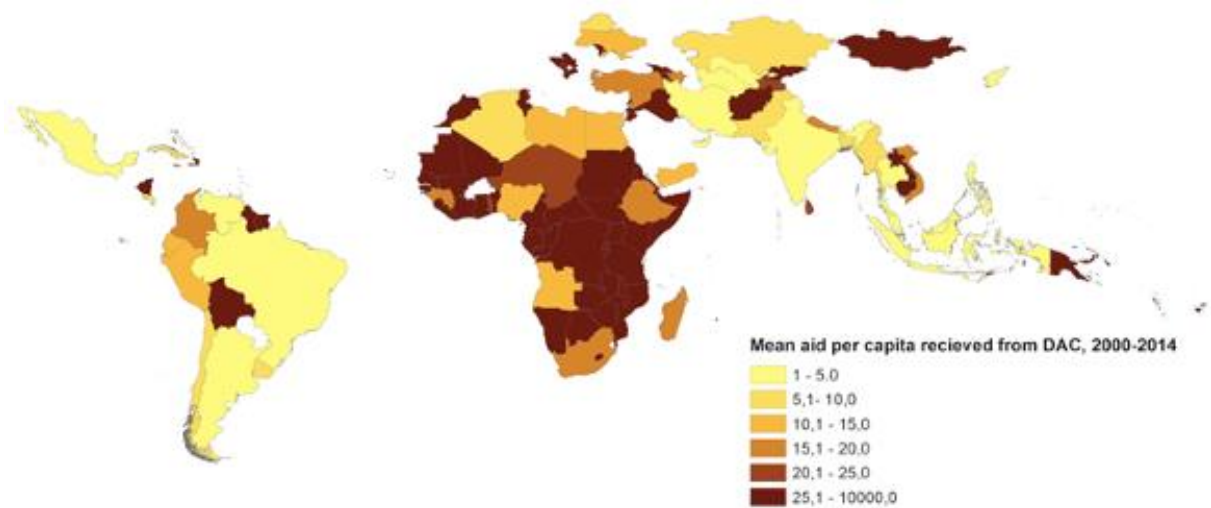


Figure 2 - Map comparing mean aid per capita from DAC in each receiving country

In contrast, China focus its aid in just a few countries in sub-Saharan Africa, namely Angola, Congo, Gabon, Equatorial Guinea and Botswana, as one can see in Figure 3. It is worth noting that resource rich Angola receives more aid from China than from DAC in the period from 2000 until 2014. The same is the case for Sri Lanka, Kazakhstan and Turkmenistan in Asia, while Mongolia, Laos and Cambodia receive more than 25 US dollar per capita from both DAC and China. And in South-America, Venezuela and Ecuador receive above 25 US dollar per capita from China, while only receiving on average between 1 and 5 and between 10 and 15 US dollar per capita from DAC. Ecuador and Venezuela, together with Brazil has the three largest oil reserves in South America (EIA 2017), and the amount of Chinese aid to these countries may strengthen the hunt for resources argument (Naím 2007).

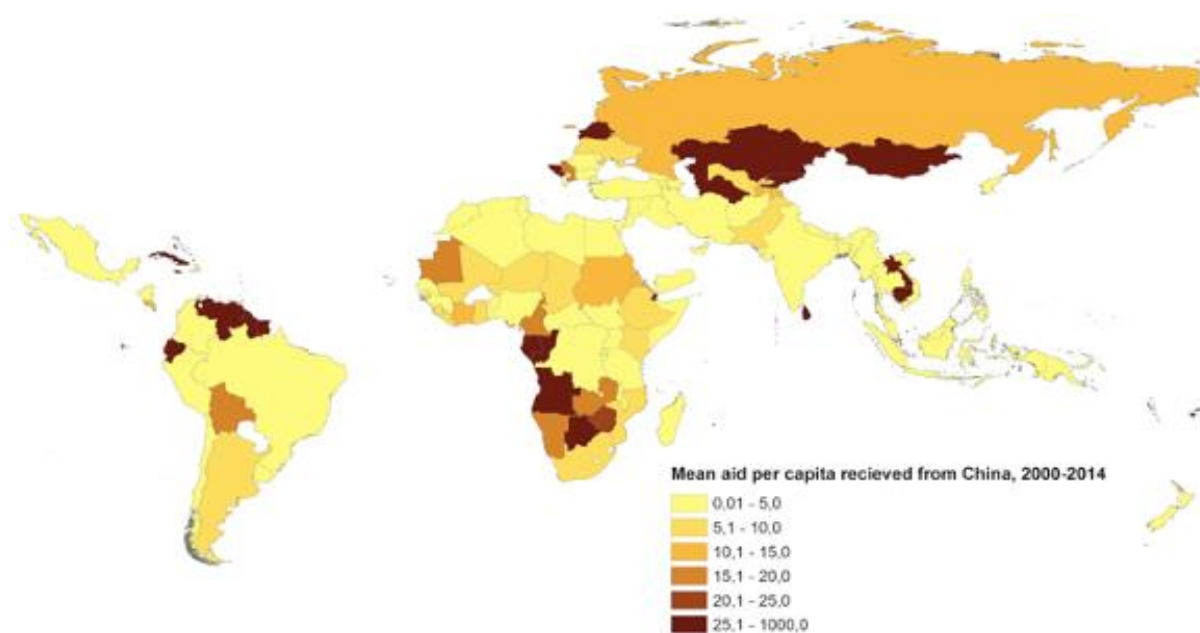


Figure 3 - Map comparing mean aid per capita from China in each receiving country

3.1.3 Controls

As there are many other factors that might affect health outcomes and access, not just aid, it is necessary to include controls to ensure that the results are robust. GDP per capita, democracy and years of peace will therefore be included in the models, as displayed in Figure 4 below.

3.1.3.1 GDP per capita

GDP per capita is included in the model because governments have different starting points when it comes to economy and their ability to prioritize health services. Countries with higher levels of GDP per capita have more money to use to improve health systems and quality – which the relatively high correlation between the health equality variable from V-Dem and GDP per capita (0.6149) indicates. The data on GDP per capita is from World Development Indicators, and is the sum of gross value added by all resident produces in the economy, in addition to any product taxes, and excluded any subsidies not included in the value of the product, divided by population midyear (World Bank 2019b). The GDP is calculated without making deductions for depreciation of fabricated assets, or for depletion and degradation of natural resources (World Bank 2019b). The data is downloaded in current US dollar, and

transformed into constant 2012 US dollars for the purpose of applying fixed effects in the regression models. It is however worth noting that GDP is not be the best measure of economic performance in all economies, especially if production occurs at the expense of consuming capital stock, and the data might have inaccurate estimates as data collection methods might vary from country to country (World Bank 2019a).

3.1.3.2 Electoral democracy

Democracy is included because Easterly (2006, 132-133) is critical of the fact that bilateral aid is given from the best governments in the world, the members of DAC, to the worst. Bueno de Mesquita and Smith (2011) argues that the only difference between autocracies and democracies are the amount of supporters that has to be satisfied in order to stay in power. As autocrats key to stay in power is to keep their inner circle small, while democracies rely on popular support, it is more likely that democracies will use aid to better health outcomes than autocrats. However, Bueno de Mesquita and Smith (2011) also argues that autocracies is forced to acquire a minimum of health and education to their people for them to be productive in order to earn money to keep their supporters loyal. But, when receiving aid, the incentive to keep up production may be weakened, as they receive money from aid rather than from their citizens.

The variable measuring democracy is collected from V-Dem dataset version 9¹⁰ (Coppedge et al. 2019). V-Dem has a number of variables measuring different types of democracy: electoral democracy, liberal democracy, deliberative democracy, participatory democracy and egalitarian democracy. The democracy-variable included in this study is electoral democracy, also called polyarchy. This variable measures the degree of how responsible rulers are to their citizens, electoral competition in free and fair elections, extensive suffrage, freedom of organization, freedom of expression and of the media (Coppedge et al. 2019, 39; Teorell et al. 2019). This is the most valid definition of democracy based on the hypothesis that rulers that are more dependent on their citizens to stay in power, are more likely to use aid to better health outcomes in their country. However, it is worth mentioning that all the variables measuring democracy are highly correlated (>0.9442).

Electoral democracy is expert coded, and measured on a scale from 0, low levels of democracy, to 1, high levels of democracy. To ensure reliability in the expert coded variables, V-DEM uses five country experts per observation, which makes them able to statistically

¹⁰ V-Dem dataset version 9 is found at <https://www.v-dem.net/en/data/data-version-9/>

account for the potential biases and uncertainty around estimates, using the IRT model (Maxwell, Marquardt, and Lührmann 2018, 1).

3.1.3.3 Years of peace

Peace years will be included to control for the presence of armed conflict. War is development in reverse, people are forced to leave their homes, and are more exposed to diseases (Collier 2007, 27-28). Countries with war may receive more aid, and a potential negative effect of aid may come from the presence of war if not controlled for. The data is collected from UCDP/PRIO Armed Conflict Dataset 19.1¹¹ (Gleditsch et al. 2002; Pettersson, Höglbladh, and Öberg 2019), where armed conflict is defined as «the use of armed force between two parties, of which at least one is the government of a state, results in at least 25 battle-related deaths in a calendar year» (Pettersson 2019, 1).

3.1.4 Log-transformations

As many of the variables are positively skewed, I follow the literature (Brazys and Vadlamannati 2018; De Soysa and Midford 2012; Dreher et al. 2017; Gehring, Kaplan, and Wong 2019) and log-transform them, for the purpose of avoiding biased results. When normally distributed, the skewness is 0 and kurtosis 3 (Mehmetoglu and Jakobsen 2017, 326-327), which is not the case for any of the aid per capita variables, nor GDP per capita. The values for skewness are all between 2.90 and 13.32, which means they have a positive skewness. The kurtosis is also very high for all these variables, which means that the distribution has too many observations close to the mean. The kurtosis should ideally be 3, (Mehmetoglu and Jakobsen 2017, 327), and as we can see in Appendix D, all the variables have a kurtosis above 15.21. When variables are very positively skewed, very high values might have a bigger influence than they should.

A common solution to this problem is to log-transform the variables, by using the natural logarithm of their values (Longhi and Nandi 2017, 150; Mehmetoglu and Jakobsen 2017, 329). The natural logarithm of negative numbers and zero is undefined, and because Chinese and DAC aid per capita has a lot of zeros, a constant of 1 is added when log-transforming these variables. However, this is not necessarily an easy solution, and Feng and his colleagues (2014, 106) criticises the fact that many scholars log-transform variables without checking if the

¹¹ UCDP/PRIO Armed Conflict Dataset 19.1 is found at <https://ucdp.uu.se/downloads/index.html#armedconflict>

transformation actually reduces the skewness. In this case, as we can see in Appendix D, the skewness is much closer to 0 on all variables, and the kurtosis is also close to 3. The highest skewness belongs to Chinese aid per capita, which because of all the zeros, still is somewhat skewed and the kurtosis is somewhat high.

3.2 Endogeneity concerns and robustness checks

Using regression analysis in social science, we are applying a rather straight forward method to complex problems, while using messy data. This is also the case here. While I am interested in Chinese aid's effect on people's access to health services, the results might be affected by the fact that aid might not be randomly distributed. Even though aid is found to be strategically distributed (Alesina and Dollar 2000; Strand and Tuman 2012), it is ideally given to states where the health services should be improved. In other words, aid might be dependent on health access and outcomes. In Figure 4, I try to present all the ways the variables included in the analysis might affect one another. While democracy might have an effect on health access and outcomes, because democratic leaders are more dependent on delivering services to their people to stay in power, democracy might also be affected by the main independent variable, Chinese aid. It is argued that China uses economic assistance to spread autocracy (Naím 2007), and Chinese aid might therefore be negatively affecting democracy, as China values state sovereignty, and does not impose any conditions of bettering democracy for the recipient to receive development assistance (X. Li 2017; Naím 2007).

The aid from DAC, who does impose conditions, might however have an effect on democratization (Li 2017; Finkel, et al. 2007), at the same time as aid to some degree should be based on performance, and therefore dependent on how states are democratizing. While both GDP per capita might affect DAC and Chinese aid, and DAC and Chinese aid might affect GDP per capita, GDP per capita might affect health quality and outcomes. The number of peace years might have an impact on GDP per capita, at the same time as it might affect health access and quality. To see if the results are robust or not, the controls will be added one at the time, to see if the results of Chinese aid changes.

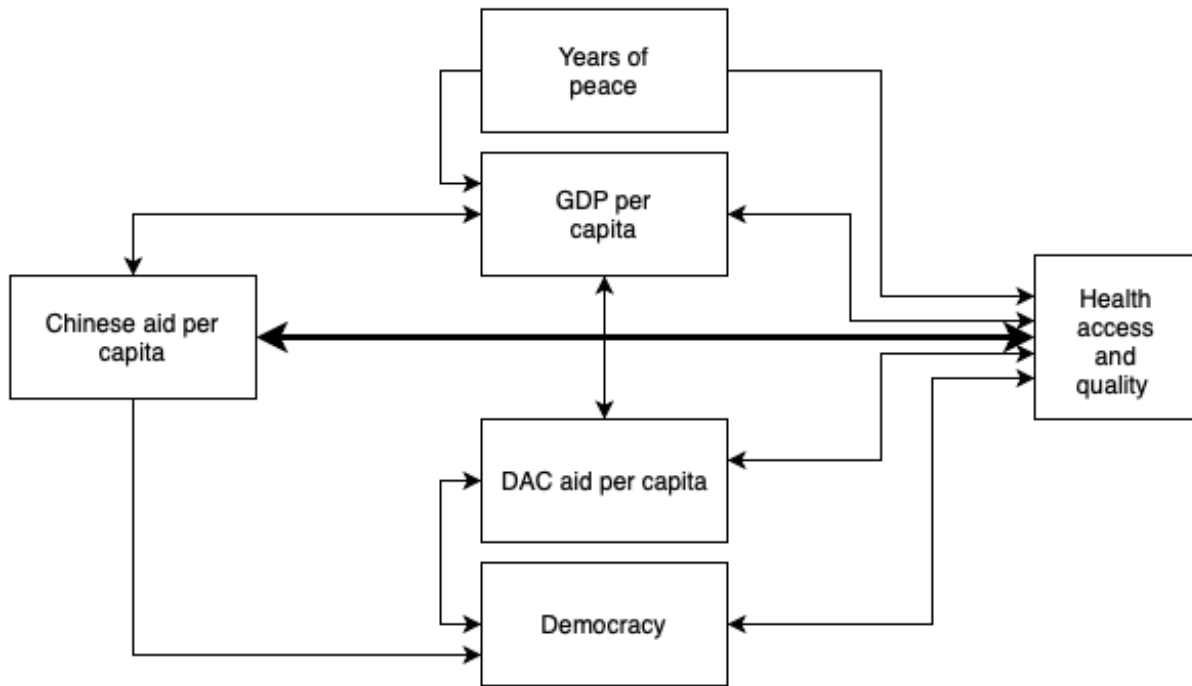


Figure 4 - Causal diagram illustrating the problems of endogeneity and bad controls

Geocoded data is seen by Parks and Strange (2019) as the future of aid research. They argue it takes care of omitted variables in a more effective way, and enable us to see that aid is not randomly distributed within countries. In this paper however, geo coded data will not be used, as the interest lies in the government’s ability to distribute its aid money in a way that benefits the populations health. It may also be argued that by investigating aid at a geocoded level, one will more often see a positive effect of aid - health will in fact be improved in the area around the new hospital, and literacy will be higher in the area around the new school. The real question is whether the government allocates money to these projects, and whether one can see an improvement on the country level. It is change in government behavior that will help future macro-level policies and outcomes. Otherwise, aid will simply take the form of «emergency» assistance due to recurring need for aid.

3.2.1 Heckman Selection Model

As mentioned several times, the objective behind Chinese aid is highly debated, many claiming they favor oil-rich countries and corrupt governments. To test whether the potential negative effect of Chinese aid is due to countries already suffering from a resource curse or

high levels of corruption, I will perform a Heckman Selection Model (Heckman 1979; Longhi and Nandi 2017, 174).

3.2.2 Instrumental variable test

To control for the problem with endogeneity I will also use a two-stage least squares estimator, also called an instrumental variable test (Longhi and Nandi 2017, 180). Azam (2019) argues that models trying to predict the relationship between aid and a dependent variable, without taking endogeneity into account, might be highly misleading. He therefore propose using an instrumental variable test, to secure correct results in questions concerning aid.

Nevertheless, this test is provided that one finds a good instrument that is theoretically justified and statistically correlated with the endogenous variable of interest after controlling for all other exogenous regressors. The instrument also have to be uncorrelated with the disturbance term in the structural and outcome equation (French and Popovici 2011; Longhi and Nandi 2017).

Dreher and his colleagues used the annual production volume of Chinese steel, interacted with the recipient province in Africa's probability to receive aid (Dreher et al. 2016; 2017) while investigating the effect of Chinese aid on economic growth. Brazys and Vadlamannati (2018) follow Dreher (et al. 2016; 2017), and use Chinese steel production interacted with probability to receive aid as instrument for Chinese aid, in addition to using amount of visits by Dalai Lama as an alternative IV. Other potential IVs could be if a country voted with or against China in the UN, whether a state recognizes Taiwan or if a state has signed on to the Belt and Road initiative (BRI), as an instrument, as aid does not necessarily only have a humanitarian goal, but is a big part of promoting foreign policy interests (Mckinlay and Little 1977).

In this paper, I follow Dreher (et al. 2016), Dreher (et al. 2017) and Brazys and Vadlamannati (2018) in using Chinese steel production interacted with probability to receive aid, while I also use the number of visits by Dalai Lama in the period between 2000 and 2014¹², as Brazys and Vadlamannati (2018). Dreher (et al. 2016, 32) argues that «the Chinese government considers steel to be a commodity of strategic importance», and that an oversupply of steel often lead to the Chinese looking for places to «dump» their steel products overseas for artificially low prices. As many of China's development projects involves some kind of

¹² See Appendix C for descriptive statistics for the IVs

construction activity, the production of steel in China should increase official financing abroad in a given year. China uses its foreign assistance and infrastructure loans as a part of its «going global» strategy, which is designed to promote national exports and stimulate business for Chinese firms overseas (Davies et al. 2008, 22), and that makes Chinese steel credible as an instrument for Chinese aid (Dreher et al. 2016, 32).

Dreher (et al. 2016) follow Nunn and Qian (2014) when they interact Chinese steel production with the probability for a state to receive Chinese aid in the period between 2000 and 2014. Nunn and Qian (2014) interact the frequency that a country receives any US food aid with US wheat production lagged by one year, to instrument US food aid. This is what is called a difference-in-difference approach (Nunn and Qian 2014; Dreher et al. 2016), where the differential effect of changes in Chinese steel production on health outcomes between countries with high probability of receiving Chinese funding and a low probability of receiving Chinese funding are investigated (Dreher et al. 2016, 33). Health outcomes in the different countries included with differing probabilities of receiving Chinese aid will not be affected differently by changes in Chinese steel production, other than via the impact of Chinese funding, which is controlled for by the country-year fixed effects in the model (Dreher et al. 2016, 33).

The equation for this IV is:

$$IV_{Csteel} = \frac{1}{15} \sum_{y=1}^{15} (p_{it}) * \ln(chinese\ steel)_t$$

Where p_{it} is the probability for a country to receive Chinese aid in the period between 2000 and 2014¹³. The IV is lagged by 2 years in the regression. Numbers on the Chinese crude steel production is collected from World Steel Association¹⁴ (2010; 2015).

As Dreher (et al. 2016) points out, the probability of receiving Chinese aid might potentially have a direct effect the dependent variable, in this case access to health services. However, Dreher (et al. 2016) argues that the fixed effects included in the model control for the effect of the probability of receiving Chinese funding, and the fact that they control for the effect of the potential endogenous variable, makes them able to interpret the interaction between the endogenous and exogenous (Chinese steel) variable as exogenous. This is also argued by Nunn and Qian (2014) and Bun and Harrison (2014, 9).

¹³ p_{it} = number of years a country has received aid divided by 15 years

¹⁴ Could be found at: <https://www.worldsteel.org/steel-by-topic/statistics/steel-statistical-yearbook.html>

In addition, I will follow Brazys and Vadlamannati (2018) and use number of visits from Dalai Lama as the second instrument for Chinese aid. Fuchs and Klann (2013) find that official visits from Dalai Lama in fact reduces the host country's export to China, and this so called «Dalai Lama effect» is more prominent for the period after 2000 under president Hu Jintao compared to earlier periods, which coincide with the available data used on Chinese official financial flows. The data on Dalai Lama's visits are obtained from The Office of His Holiness the 14th Dalai Lama¹⁵ (2020a; 2020b). India is the country receiving most visits per year, while the others only receive one or two visits and not on a regular basis.

For DAC ODA, I follow Dreher (et al. 2017, 17), using the total sum of all ODA in a given year, interacted with the probability to receive aid:

$$IV_{DACaidbudget} = \frac{1}{15} \sum_{y=1}^{15} (p_{it}) * \ln(Total\ DAC\ aid)_t$$

3.2.3 Corruption, samples and a more parsimonious model

As illustrated in Figure 4, there are several different ways the controls can impact both the dependent and the explanatory variables. Dreher (et al. 2016; 2017) proposes a more parsimonious model only using Chinese aid (logged) and controlling for population (logged). The reasoning behind not standardizing Chinese aid by GDP or per capita, is based on Annen and Kosempel (2018) who argue that donors do not typically base their aid allocation on population or GDP. In addition, they argue that «from an empirical perspective it is obvious that multivariate regression analysis allows the introduction of proper controls for such economy or population size effects without the need of melting such controls with the aid measure» (Annen and Kosempel 2018, 3). Dreher (et al. 2016; 2017) also proposes to not include any other controls, because of the endogeneity concern. I therefore follow Annen and Kosempel (2018) and Dreher (et al. 2016; 2017, 15), and run an IV-regression only including the logged financial value of Chinese aid and the logged population size as a robustness check.

I will also test different samples to check if the results change from sample to sample. For example, the oil rich countries such as Saudi Arabia, Qatar or Singapore and Hong Kong that receives small or no amounts of aid from China, while also having relatively low mortality

¹⁵ Could be found at: <https://www.dalailama.com/the-dalai-lama/events-and-awards/travels/travels-2000-2009>

rates and good access to health services, might be the driver of the potential negative effect of Chinese aid. I will also test a sample without the Eastern European countries such as Ukraine, Croatia and Serbia, in addition to Cyprus, which in the period between 2000 and 2014 were on their way from lower to upper middle income countries.

As many have blamed Chinese aid to be corrupting, and theory suggest that aid is «easy money» for governments, legitimizing their regime without needing the support from their people (Bueno de Mesquita and Smith 2013), the negative effect of Chinese aid might be a consequence of increased corruption. I therefore perform an IV regression with corruption as dependent variable as a robustness check, to see if Chinese aid in fact is associated with increased corruption.

3.1.5 Descriptive statistics

In the table below the descriptive statistics for all variables included in the models are presented. The statistics is based on the regression models with the equal access to health variable from V-Dem as dependent variable. The number of units are 138, which are two more units than in the full models with antenatal care and under-5 mortality rate as dependent variables.

The maximum value for the three different log-transformed Chinese aid per capita variables are the same – 7.33, which indicates that the project with the largest value per capita in the data is in fact classified as ODA. The standard deviation indicate that the values of the ODA projects varies less than the projects included in the two other variables, while the mean is also lower for the Chinese ODA per capita. Compared to ODA from DAC, the maximum value of Chinese aid per capita is higher, while the mean of DAC ODA per capita is much higher than that of Chinese aid per capita.

Table 4 - Descriptive statistics

	N	n	min	max	Mean	St.Dev
(log) Chinese aid per capita	1438	138	0	7.33	0.98	1.47
(log) Number of Chinese aid projects	1589	138	0	3.58	0.82	0.81
(log) Chinese aid per capita (development projects)	1463	138	0	7.33	0.91	1.42
(log) Number of Chinese aid project (development intent)	1589	138	0	3.56	0.77	0.79
(log) Chinese ODA per capita	1438	138	0	7.33	0.54	1.06
(log) Number of Chinese ODA-like projects	1589	138	0	3.21	0.66	0.74
(log) Chinese OOF per capita	1400	138	0	7.13	0.52	1.19
(log) DAC aid per capita	1576	138	0	6.57	3.08	1.34
(log) GDP per capita	1588	138	4.51	10.71	7.47	1.22
Antenatal care (4 visits)	1579	138	0.08	0.99	0.70	0.23
Health equality	1589	138	-3.27	2.82	0.05	1.18
Under-5 mortality rate	1579	138	3	228.6	55.25	44.24
Electoral democracy	1589	138	.01	.93	0.46	0.22
Years of peace	1589	138	0	54	23.21	19.57

4. Results

4.1 Equal access to health services

Table 5 - Regression analysis with Driscoll-Kraay standard errors displaying the effect of all Chinese aid on equal access to health services

	1	2	3	4	5	6
	Equal access to health					
Chinese aid per capita (all) \log_A	-3.54 (4.15)	-1.88 (3.63)	-2.12 (3.44)	-3.56 (3.96)	-4.82 (3.94)	-5.78 (3.34)
DAC ODA per capita \log_A		14.97 (18.30)	16.09 (14.97)	15.25** (6.32)	18.08** (6.08)	17.91** (6.02)
Electoral democracy			-0.03 (0.20)	-0.13 (0.19)	-0.10 (0.17)	-0.10 (0.16)
GDP per capita \log				0.01 (0.03)	0.02 (0.03)	0.02 (0.03)
Years of peace					0.01** (0.00)	0.01** (0.00)
Chinese aid projects (all)						3.71 (6.90)
Constant	0.18 (0.01)	0.03 (0.06)	0.04 (0.14)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Within R-square	0.03	0.03	0.03	0.03	0.05	0.05
Observations	1796	1,614	1,611	1,589	1,589	1,589
Number of groups	144	138	138	138	138	138

Standard errors in parentheses

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

Note: ^A Chinese aid per capita, ODA per capita and Chinese aid projects are all multiplied by 0.001 to better illustrate the difference between the coefficients.

^B All variables are lagged by one year compared to the dependent variable

In Table 5 we can see the regression testing the effect of all Chinese aid, including OOF, and ODA from DAC on equal access to health in recipient countries. Chinese aid does not have a significant impact on access to health in any of the models, but the coefficients indicate that more Chinese aid in one year has a negative impact on health access in the next year. The opposite is true for ODA from DAC – more ODA in one year seems to have a significant and positive effect on health equality in the next year. The positive effect of ODA is constant through all the five models, but is only significant on a 0.05-level in model 4-6. However, it is worth noting that in model 5, the number of Chinese aid projects are included, and this coefficient is positive, but insignificant. Nevertheless, the fact that the projects seems to have a positive impact, which is the opposite of the dollar amount of Chinese aid has, may indicate

that the countries where China concentrate its aid, is not the countries where it reaches the citizens, or is where China has the most strategical motives. Neither electoral democracy and GDP per capita have a significant impact on access to health, while more years of peace have a positive effect that is significant on the 0.05-level when included in model 5 and 6.

The relative effect¹⁶ of DAC aid on equal access to health is by one standard deviation increase in aid from DAC (0.56) the health access increases by 5.04 percent. However insignificant, the relative effect of Chinese aid is by one standard deviation increase in Chinese aid (1.18) access to health decreases by 3.4 percent, and Chinese aid projects increases access to health by 0.96 percent if one standard deviation increase in Chinese aid projects (0.52).

The within R-squares in these models are very low, at only 0.05 in the full model, which means that Chinese and DAC aid, democracy, GDP per capita and years of peace only explains 5 percent of the change in equal access to health.

In Table 5 the effect of all Chinese aid, both ODA-like and OOF-like, are presented. The results do not differ from the results when testing the impact of only Chinese projects with development or mixed intent, or from the results of only ODA-like flows. The results for the two other measures of Chinese aid can be found in Appendix E and Appendix F.

¹⁶ Calculated by multiplying SE(within) for Chinese/DAC aid by the Chinese/DAC aid coefficient in the model, and thereafter divide the value by the SE(within) for the dependent variable

4.2 Antenatal care

Table 6 - Regression analysis with Driscoll-Kraay standard errors displaying the effect of Chinese development aid on proportion of women who get four or more antenatal care visits

	(1)	(2)	(3)	(4)	(5)
	Four or more antenatal visits				
Chinese development aid per capita $\log A$	-1.21 (0.73)	-1.26 (0.77)	-1.84* (0.95)	-1.75* (0.93)	-2.44* (1.34)
DAC ODA per capita $\log A$	-2.34 (2.38)	-2.27 (2.88)	1.05 (1.98)	0.87 (1.87)	0.73 (1.91)
Electoral democracy		0.01 (0.01)	0.01 (0.01)	0.01 (0.01)	0.01 (0.01)
GDP per capita \log			0.04*** (0.00)	0.04*** (0.00)	0.04*** (0.00)
Years of peace				-0.00*** (0.00)	-0.00*** (0.00)
Chinese development projects $\log A$					2.67 (2.17)
Constant	0.76*** (0.01)	0.74*** (0.01)	0.47*** (0.03)	0.49*** (0.03)	0.49*** (0.03)
Within R-square	0.41	0.43	0.46	0.46	0.48
Observations	1,783	1,624	1,602	1,602	1,602
Number of groups	151	136	136	136	136

Standard errors in parentheses

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Note: ^A Chinese aid per capita, ODA per capita and Chinese aid projects are all multiplied by 0.001 to illustrate the difference between the coefficients.

^B All variables are lagged by one year compared to the dependent variable

In Table 6 we can see the results from the regression analysis testing Chinese development aid's effect on access to four or more antenatal care visits. In contrast to Chinese aid's effect on equal access to health, the negative effect of Chinese aid on antenatal care is significant at the 0.1-level in model 3-5. In the appendix one can find that these significant results are not robust when using both ODA and OOF-like Chinese aid, and only ODA-like Chinese aid. The positive effects of DAC ODA that is found in the three last models, are not robust for the two first models, when only including DAC ODA, Chinese aid and electoral democracy. Electoral democracy does not have a significant impact on access to antenatal care, but GDP per capita has a constant and significant positive effect in all models included. In contrast to the positive impact of years of peace on access to health in Table 5, the association between of years of peace and access to antenatal care is negative.

The relative effect of Chinese aid on proportion of women who receives four or more antenatal care visits is by one standard deviation increase in Chinese development aid (1.12), proportion of women receiving four antenatal care visits decrease by 4.8 percent. However insignificant, one standard deviation increase in DAC ODA (0.56) increases the proportion of women receiving four or more antenatal care visits increase by 0.7 percent.

The within R-square is in the full model 0.48, which means the full model is explaining 48 % of the change in the proportion of women who have access to four or more antenatal care visits. The explanatory variables included are explaining a much higher percentage of the change in the access to antenatal care than the change in equal access to health.

4.3 Under-5 mortality rate

Table 7 - Regression analysis with Driscoll-Kraay standard errors displaying the effect of ODA-like Chinese aid on under-5 mortality rate

	(1)	(2)	(3)	(4)	(5)
	Under-5 mortality rate				
Chinese ODA-like aid per capita _{logA}	-0.18 (0.18)	-0.44 (0.25)	-0.43 (0.25)	-0.44* (0.24)	0.54 (0.34)
ODA per capita _{logA}	-0.60 (0.63)	-1.00 (0.68)	-1.35 (0.78)	-1.29 (0.79)	-1.10 (0.75)
Electoral democracy		-11.00*** (2.95)	-11.10*** (3.43)	-10.25** (3.66)	-9.57** (3.23)
GDP per capita _{log}			-1.72 (1.23)	-1.64 (1.29)	-1.88 (1.22)
Years of peace				0.18*** (0.03)	0.17*** (0.03)
Chinese ODA-like projects _{log}					-3.50*** (0.89)
Constant	0.00 (0.00)	54.52*** (2.33)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Within R-square	0.47	0.53	0.53	0.53	0.54
Observations	1,808	1,598	1,576	1,576	1,576
Number of groups	153	136	136	136	136

Standard errors in parentheses

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

Note: ^A Chinese aid per capita, ODA per capita and Chinese aid projects are all multiplied by 0.001 to illustrate the difference between the coefficients.

^B All variables are lagged by one year compared to the dependent variable

In Table 7 we see the effect of Chinese ODA-like flows on under-5 mortality rate in the recipient countries. Chinese ODA-like flows seems to have a negative impact on the mortality rate in the first four models, and in the fourth model the coefficient is also significant on the 0.1-level. However, Chinese ODA-like financial flows' negative impact on higher mortality rate disappears in model 5, where the number of projects are included: in this model number of projects have a highly significant negative effect on higher under-5 mortality rate. This might be a consequence of two things: the fact that China often concentrate its flows in a few big projects, as number of projects and the financial value for each country each year has a relatively low correlation, or that the health projects, for example the medical teams China has sent to Africa, lacks a financial value. The negative impact means that an increase in Chinese ODA-like aid projects reduces mortality among children under 5 years old. The relative effect

is 12 percent decrease in mortality rate by one standard deviation increase in Chinese ODA-like aid projects (0.46). The negative effect of DAC ODA is not significant in any of the models. Electoral democracy is just as the amount of Chinese aid projects associated with significantly decreased mortality rates – by one standard deviation change in electoral democracy (0.06), the mortality rates decreases by 4.6 percent.

The main findings in this model – the negative and significant effect of Chinese aid projects and electoral democracy are also present in the models using both OOF- and ODA-like Chinese flows and those only using projects with development intent. DAC ODA are never significant, while the same goes for the Chinese aid flows, in contrast to model 4 in Table 7, where the negative impact of Chinese aid is significant at the 0.1-level. The within R-square indicates that the last model explains 54 % of the change in the under-5 mortality rate.

4.4 Robustness checks

In sum, the results in Table 5-7 suggest that Chinese aid decreases the under-5 mortality rate, while it does not associate with antenatal care or equal access to health. To check whether these results are robust, I have performed a series of robustness checks.

4.4.1 Heckman Selection model

To test for the potential selection effect that might impact the results, I have performed a Heckman selection model in two steps, where the outcome model test the effect of Chinese aid on under-5 mortality rate after taking into account the possible self-selection by the Chinese when distributing aid. The results of this equation show the correlation between the explanatory and dependent variables we would have if all countries received Chinese ODA. The selection model test whether more DAC ODA, GDP per capita and electoral democracy have an impact on the likelihood for countries to receive Chinese ODA.

Table 8 - Heckman Selection model using equal access to health as dependent variable

Number of observations			
	Selected	814	
	Non-selected	849	
Outcome		Receive Chinese ODA	
Chinese ODA per capita (log)	-0.87 (14.31)	DAC ODA per capita (log)	0.16*** (0.02)
DAC ODA per capita (log)	50.85 (43.27)	GDP per capita (log)	-0.34*** (0.03)
Chinese ODA projects (log)	0.01 (0.02)	Regime corruption	0.30* (0.15)
Years of peace	0.01* (0.00)	Oil rents (% of GDP)	0.00 (0.00)
Constant	-.95*** (0.28)		1.85*** (0.31)
lambda	0.56* (0.31)		
Rho	1.00		
sigma	0.56		

Standard errors in parentheses

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

Note: All independent variables are lagged by one year (t-1) compared to the equal access to health variable

This model show that if all country-years received Chinese ODA, the financial value of Chinese ODA per capita would have no significant impact on equal access to health, and the same is true when it comes to the number of projects. This does not differ much from the results from the fixed effects regression with Driscoll-Kraay standard errors in Table 5, where the last model where both financial value and number of projects are included. The second model in the Heckman selection model does however indicate that more ODA from DAC and less GDP per capita makes it more likely to receive Chinese ODA. This might be because countries with less GDP per capita is in need of development assistance, and that DAC has also identified these countries.

There also seems to be a tendency that more corrupt states more often receive Chinese aid, as this coefficient is significant at the 0.1-level. While, even though many fears that China is after natural resources like oil (e.g. Davies 2007; Naím 2007; Norad n.d.) oil rents as a percentage of GDP does not seem to have an impact in Chinas aid distribution. This supports the findings of Bräutigam (2010; 2011) and Dreher and Fuchs (2015). For the purpose of this paper, this means that the negative association between Chinese aid and health access are not driven by the fact that Chinese aid tend to go to countries with large amounts of oil, which might lead to resource curse effects.

The fact that it seems like there is a positive association between the amount of DAC ODA a country receives and the likelihood to receive Chinese aid, might also be an indicator that aid is strategic – China competes for alliances with the West, as has been seen that the World Bank does in countries that have signed on to BRI (Vadlamannati et al. 2019). The fact that the lambda is significant at the 0.1-level indicate that there might be a problem with self-selection. However, there are no big differences other than in the significance levels, compared to the initial models in Table 5.

4.4.2 Instrumental variable test

To test for the potential endogeneity problem I follow Dreher (et al. 2016; 2017) and Brazys and Vadlamannati (2018), in performing an instrumental variable test, using Chinese steel production interacted with probability to receive aid, and number of state visits by Dalai Lama as instruments for Chinese aid. The instruments pass the Stock-Yogo test, testing for weak instruments, with a 10% maximal IV size¹⁷ as 19.93. This value is ideally above 10. The

¹⁷ Should ideally be above 10.

Hansen J F-statistic indicate that the instruments also pass the exclusion test, having p-values above 0.1.

Table 9 - Regression testing the effect of Chinese ODA per capita on under-5 mortality rate using an instrumental variable test

	(1)	(2)	(3)	(4)	(5)
	Under-5 mortality rate				
Chinese ODA per capita (log)	-25.21*** (4.19)	-27.25*** (4.79)	-25.81*** (4.47)	-25.12*** (4.36)	-46.28*** (13.18)
DAC ODA per capita (log)	-0.61 (1.12)	-0.35 (1.27)	-0.57 (1.29)	-0.49 (1.25)	-2.55 (2.08)
Electoral democracy		-26.30** (12.05)	-25.45** (11.60)	-24.12** (11.31)	-39.70** (18.98)
GDP per capita (log)			-5.57 (3.69)	-5.30 (3.60)	-2.64 (5.52)
Years of peace				0.26* (0.15)	0.42* (0.23)
Chinese ODA projects (log)					38.75*** (12.33)
Hansen J-statistics	0.17	0.16	0.18	0.18	0.20
Observations	1,671	1,480	1,460	1,460	1,460
R-squared	-3.629	-2.823	-2.505	-2.335	-7.172
Number of id	153	136	135	135	135

Robust standard errors in parentheses

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

Note: Two-step instrumental variable test, using Chinese steel production multiplied with probability to receive aid (lagged by 2 years), and number of Dalai Lama visits (lagged by 1 year) as instruments for Chinese ODA per capita.

The regression using IVs does differ somewhat from the results in the Driscoll-Kraay regression in Table 7. In this regression the negative association between Chinese ODA and under-5 mortality rate, which is also present in Table 3, is significant at the 0.01-level in all five models. This means, that when controlling for the potential reversed causality, more Chinese ODA are still negatively associated with higher mortality rate among children under 5 years old. Unlike the results in the Driscoll-Kraay regression, it is now the financial value that has significant and negative effect in model 5, rather than the number of projects. By one standard deviation increase in Chinese ODA per capita (0.46), the mortality rate for children under 5 years decreases by 1.7 percent in model 5.

4.4.3 Different samples, different results?

The initial models tested include 138 countries, as listed in Appendix K. This includes oil-rich countries as United Arab Emirates, Qatar, Singapore, Hong Kong, and middle income countries as Turkey and Israel. These countries provide their citizens with relatively equal access to health services, while not receiving much aid from China, and might therefore be the reason behind the negative but insignificant association between Chinese aid per capita and equal access to health. The initial sample also include eastern European countries like Croatia, Ukraine, Serbia and Cyprus, that also rises to be middle income countries in the period between 2000 and 2014, and I therefore test a sample with these countries excluded.

Table 10 - IV regression with equal access to health as dependent variable, with three different samples

	(1)	(2)	(3)
	Equal access to health		
Chinese ODA per capita (log)	-0.11 (0.09)	-0.12 (0.10)	-0.12 (0.10)
DAC ODA per capita (log)	0.01 (0.01)	0.01 (0.01)	0.01 (0.01)
Electoral democracy	-0.07 (0.13)	-0.11 (0.13)	-0.13 (0.14)
GDP per capita (log)	-0.00 (0.04)	-0.00 (0.04)	-0.01 (0.04)
Years of peace	0.01*** (0.00)	0.01*** (0.00)	0.01*** (0.00)
Chinese ODA projects (log)	0.11 (0.08)	0.12 (0.09)	0.12 (0.09)
Hansen J-statistics	0.58	0.56	0.48
Observations	1,469	1,433	1,394
R-squared	-0.108	-0.139	-0.152
Number of id	137	131	127

Robust standard errors in parentheses

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

Note: Two-step instrumental variable test, using Chinese steel production multiplied with probability to receive aid (lagged by 2 years), and number of Dalai Lama visits (lagged by 1 year) as instruments for Chinese ODA per capita.

However, as can be seen in table 6, the results do not differ much between the different samples. The coefficient for the logged Chinese ODA per capita changes from -0.11 in the first

model with all countries included, to -0.12 in model 2 and 3 where oil-rich and eastern European countries are excluded. This indicate that the sample selection do not affect the results in a significant way.

4.4.5 A parsimonious model, only controlling for population

In the models above, the measure of Chinese aid is standardized by population. As this paper aims to investigate aid’s effect on health outcomes and access, the amount of dollar each country receives per capita might be a logical way to estimate their ability to offer each citizen a good access to health. A country that receives many dollars per capita might have to do fewer compromises in their health policies. However, as Annen and Kosempel (2018) points out, donors do not necessarily base their allocation on population size. Dreher (et. al 2016; 2017) therefore propose using population as control. For endogeneity concerns, Dreher (et. al 2016; 2017) exclude all other variables, only including the log-transformed value of Chinese aid in constant US dollar and the log-transformed population size.

To control for the potential effect of the standardization by capita, I follow Annen and Kosempel (2018) and Dreher (et al. 2016; 2017), running a more parsimonious model only controlling for population.

Table 11 - Testing the effect of Chinese aid on the health variables using a non-standardized aid variable

	(1)	(2)	(3)
	Equal access to health	Four or more antenatal care visits	Under-5 mortality rate
Chinese ODA (log) $t-1$	-0.02* (0.01)	0.01*** (0.00)	-6.47*** (1.09)
Population (log) $t-1$	0.34** (0.17)	0.00 (0.02)	-12.72 (9.26)
Hansen J	0.73	0.03	0.03
Observations	1,680	1,923	1,910
R-squared	-0.287	-0.374	-7.886
Number of id	144	163	162

Robust standard errors in parentheses

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

Note: Two-step instrumental variable test, using Chinese steel production multiplied with probability to receive aid (lagged by 2 years), and number of Dalai Lama visits (lagged by 1 year) as instruments for Chinese ODA per capita.

As can be seen in Table 11 above, the negative effect we saw in the initial results on Chinese aid's effect on equal access to health is robust when using Dreher (et. al 2016; 2017), as is the negative association between Chinese ODA and under-5 mortality rate. The same however, is not true for women's access to antenatal care. The initial models indicate that there is a negative association between Chinese development assistance and the proportion of women who receive four or more antenatal care visits, and the effect is significant at the 10 percent-level when using Chinese development assistance with a development intent, as shown in Table 6. Following Dreher (et al. 2016; 2017), the association between Chinese aid and pro-women policies seems to be positive, and is significant at the 1 percent-level.

4.4.4 Corruption

If the politicians in government is misspending money – embezzling or using it on bribes – it is unlikely that all foreign aid is being spent on health services (Schudel 2008). This might especially be true when it comes to Chinese aid, as the Chinese respect state sovereignty, and its aid has no strings attached (Rolland 2020). The Heckman selection model indicates that Chinese aid is more likely to be distributed to more corrupt states, is this the reason behind what seems like a negative, however insignificant, association between Chinese aid and equal access to health?

To test for this, I use the regime corruption variable from V-Dem (Coppedge et al. 2019; Sigman and Lindberg 2017) as dependent variable. I run two models, one following Dreher (et al. 2016; 2017) with the financial value of Chinese aid and population, both variables log-transformed, and one model with Chinese aid per capita, as in the initial models. V-Dem’s regime corruption variable aims to measure to what extent political actors use political office for private or political gain (Coppedge et al. 2019, 262). The variable is put together by four variables, namely executive embezzlement, executive bribes, legislative corruption and judicial corruption (Sigman and Lindberg 2017, 7). Public sector corruption is not included in the variable, as public sector officials in many cases are not directly linked to those elected or appointed to office (Sigman and Lindberg 2017, 7).

Table 12 - IV-regression testing the effect of Chinese aid on regime corruption

	(1)	(2)
	Regime corruption	
Chinese aid (log) _{t-1}	-0.01** (0.00)	
Population (log) _{t-1}	0.13* (0.07)	
Chinese aid per capita (log) _{t-1}		-0.02** (0.01)
Hansen J	0.64	0.10
Observations	1,430	1,430
R-squared	-0.899	-0.112
Number of id	137	137

Robust standard errors in parentheses

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

Note: Two-step instrumental variable test, using Chinese steel production multiplied with probability to receive aid (lagged by 2 years), and number of Dalai Lama visits (lagged by 1 year) as instruments for Chinese ODA per capita.

The results show that contrary to many beliefs, Chinese aid seems to be associated with lower levels of corruption. The negative association between Chinese aid and equal access to health could therefore not solely be blamed on corruption.

5. Discussion

5.1 A soft or hard power grab?

As for the hypotheses, neither hypothesis 1 nor hypothesis 2 are uniquely strengthened or weakened. Hypothesis 1 suggest that Chinese aid is negatively associated with health access and outcomes, as China use development assistance as a means for strengthening and creating alliances to secure hard power. If this is the goal, China's primary interest is to seek the support of the government, in order to receive military support and support in international organizations. The results suggest that H1 might be strengthened based on Chinese aid's lack of robust association with pro-poor and pro-women policies. This also supports the argument of Bueno de Mesquita and Smith (2011; 2013), that aid in general is legitimating governments without the people's support. In other words: governments does not have to go through with policies that benefit their citizens to stay in power, because they receive support from the outside. Empirical evidence also suggest that Chinese is disproportionally distributed within countries – governments distribute more Chinese aid to the areas inhabited by people who share their ethnical background, and the same is not found for aid from the World Bank (Dreher et al. 2016; 2019). However, even though the aid is unevenly distributed, they find that it is not less efficient (Dreher et al. 2019). If this is the case, this might be some of the explanation behind the negative and insignificant effect of Chinese aid on equal health access. These findings can also be seen in connection to those of Brazys and Vadlamannati (2018), who find that Chinese aid inhibits economic reform. China's focus on state sovereignty is likely to be a part of its quest for hard power, as governments will be more positively inclined towards China, as they help them stay in power by not undergo economic reform and despite not provide their citizens with equal access to health.

However, H2 suggest that China is using development assistance as a means for securing soft power. China has a spoken goal to strengthening its soft power in the world, and this does not only involve state governments. Soft power is based on making people *want* what you want (Nye 1990), and when your ideas seems legitimate in the eyes of other, they are more likely to adopt your causes and interests, making costly use of force and threats unnecessary.

Health diplomacy has long been used to extend soft power in developing countries (Youde 2010) – citizens will be more positively inclined towards the ones providing them with high quality health services. As mentioned before, this could be seen in Europe after World War II, when the US built considerable amounts of soft power through its Marshall Plan. The results do in fact suggest that China is using development assistance as a means to gain soft power: more Chinese aid is associated with lower under-5 mortality rates, and the results are robust after taking into account endogeneity, different samples, different Chinese aid flows and both aid per capita and aid controlling for population.

It is however not clear if it is the financial value or the number of projects that have impact on the mortality rate. When using the Driscoll-Kraay regression with fixed effects, the number of projects takes away the negative and significant effect from the financial value when included. When doing the IV-regression instrumenting number of projects rather than the financial value, it is still the financial value that is significant and negatively associated with under-5 mortality rate. Nevertheless, based on the fact that the data on Chinese aid has some weaknesses, and that many health projects lack their financial value, it would make sense if it is the number of projects that are negatively associated with higher mortality rate. And, as mentioned earlier, the financial value of Chinese aid and the number of projects only correlates by 0.34, which may indicate that China is more committed to the countries where they have few aid projects, as Grépin and her colleagues (2014, 8-9) points out. It may also indicate that where China has the biggest, but fewest projects, are where they are most interested in making diplomatic ties, and thereby hard power.

In fact, the results seem to support the spoken goals of China, as suggested in hypothesis 3. China values state sovereignty, and promise not to meddle in any country's domestic affairs (Foreign Minister Wang Yi 2013), while also stating that they should work to increase its soft power in the world (Nye 2014; Rolland 2020). By not meddling in countries' inner affairs, one could not expect China to have any impact on the kind of policies the receiving governments pass. At the same time, by building hospitals, roads, irrigation systems, electricity lines and sending medical teams, China is working on building soft power in the recipient countries as the mortality rate declines. In other words, China is getting both hard and soft power as a consequence of its development assistance.

5.1.1 Mechanisms

There is likely to be a handful of mechanisms in play that make Chinese aid positively associated with lower mortality rates for children under 5 years. Most of the Chinese development assistance in the period between 2000 and 2014 is characterized as OOF. This is more commercial oriented projects, focusing on «connectivity», which is an area that has long been ignored by the Western aid donors (Zeng 2019, 369-370), rather than development projects. Some have blamed the Chinese for only building roads from the mines to the harbour, but this is argued not to be true, as Chinese development projects are building roads and irrigation systems in Angola, where the oil is located miles from the coast (Bräutigam 2010). As better health outcomes is not only dependent on the presence of a good health system, it is also dependent of people's ability to reach the hospital when needed. This is supported by the results shown in Appendix M – OOF is also significantly associated with lower mortality rates, but the coefficient is somewhat smaller than for the other variables also containing ODA. This means that the increased focus on infrastructure is in fact bettering health outcomes in recipient countries, and the more vague flows is not fungible to the degree that it is not used for a common good.

As mentioned before, China has for long been sending medical staff to developing countries in Africa, starting with Algeria in 1963 (Bliss 2010; Grépin et al. 2014; Zou, McPake, and Wei 2014). The results show that its effort to train medical personnel in recipient countries, building hospitals and medical centres, and build pharmaceutical factories in fact has contributed to bettering health outcomes and the general health in the recipient countries' population.

5.1.2 Consequences of better health

As earlier mentioned, health is not just a goal in and of itself, but could be a means for enhanced economic growth. The theory of endogenous growth argue that economic growth is not just dependent on external factors, but also internal. Therefore, by investing in human capital, governments can help economic growth. Better health will lead to a population with higher productivity, and longer life expectancy extend the period each individual can be productive (Leung and Wang 2010). China has experienced economic growth parallel to its rise in life expectancy and health in general, which might be the motive behind the focus on health.

And as Dreher (et al. 2017) find, Chinese aid is associated with economic growth in the recipient countries. China has a more commercial aspect to its development assistance than the West (Moyo 2009), building roads and infrastructure often connected to natural resources. However, with the basis in endogenous growth theory, some of the effect might come from the increased health in the recipient nation's population.

5.2 China and DAC compared

Even though the main objective of this paper is to investigate the effect of Chinese development assistance on health access and outcomes, the results are of more interest if compared with another source of aid. I have therefore compared Chinese aid to the aggregated ODA from the countries that are members of DAC. These donors have a much better reputation, as they set conditions of good governance, are more transparent and listen more to the recipients' needs (Dreher and Fuchs 2015). However, the effect of aid is debated, and scholars like former World Bank employee William Easterly, argue that the top down planning by the western donor do more harm than good, or in the best case do nothing (Easterly 2006).

Comparing Chinese and DAC aid it is striking that the effect of DAC aid does seldom significantly affect health outcome and access compared to Chinese aid. The effect of DAC aid is only significantly affecting equal access to health in a positive way, where one standard deviation increase in aid from DAC (0.56) increases the access to health by 5.04 percent., while having no significant effect on antenatal care and the under-5 mortality rate. Chinese aid however, is not overall affecting health access in a positive way – the dollar amount of Chinese aid is in fact significantly associates with lower proportions of women with access to four or more antenatal care visits, while the amount of projects are positively associated, but insignificant. In sum, DAC aid are significantly associated with better access to health equality, while Chinese aid are significantly associated with lower under-5 mortality rates.

Despite Easterly's concerns, DAC ODA per capita does seem to be positively associated with pro-poor policies, securing equal access to health - one standard deviation increase in aid from DAC (0.56) increase the health access by 5.04 percent. This effect is also significant at the 0.05-level. This positive effect might be a consequence of the conditions imposed by the DAC members on the recipient countries, making them change policy in order to receive aid. And, it contradicts the theory of the aid curse, as governments seem to be passing policies that benefit their citizens, even though they have another source of legitimacy in the aid donor.

When looking at under-5 mortality however, the effect of ODA from DAC is negative, just like the effect of Chinese ODA, but never significant. Chinese ODA is significant at 0.1-level in model four, while number of projects in model 5 are significantly associated at the 0.01-level with lower mortality rate. This difference might be the consequence of the fact that the Chinese approach is innovative and differ from the traditional donor approach in the way that they promote the implementation of population- and system-based health strategies (Zou, McPake, and Wei 2014, 1461). Chinese health aid to Africa is also argued to differ from the aid from the DAC donors because of its focus on health system projects and human resources for health, rather than disease-specific programs (Grépin et al. 2014, 8).

However, there are limitations in the ability to compare the two donors. While I have been able to find instruments that pass the weak instrument test, in addition to the exclusion test (Hansen J-statistics) for Chinese aid, the same is not true for aid from DAC. I followed the suggestion made by Dreher (et al. 2017), using total DAC aid budget interacted with probability to receive DAC ODA without managing to pass the exclusion criteria, and further tried including the lagged OECD aggregated growth rate interacted with the probability to receive DAC ODA¹⁸. As including both IVs did not pass the exclusion criteria either, even when expanding the time period from 1970 until 2018, it is hard to interpret anything meaningful when comparing the two donors. I therefore leave this question open for to later studies to investigate.

5.3 Development assistance that works?

Even though it is not possible to conclude on the association between DAC aid and health access and outcomes in the recipient countries, the results suggest against the sceptics of foreign aid like Easterly. Easterly (2006) argue that aid in general is a waste of money, that it is misused by autocrats and that projects are overly planned by «planners» in the donor agencies. Moyo (2009) however, argue that China's approach to development aid is better than that of the West, as China has a more commercial approach, generating business, which the African continent is in great need of. The results indicate that both Chinese ODA and OOF is associated with lower under-5 mortality rates, and thereby better general health in the population. If the positive effect is a result of mechanisms also present in Western development

¹⁸ See results in

Appendix L - IV test for the effect of DAC aid per capita on under-5 mortality rate

projects, or whether it is characteristics unique for Chinese activity, is not to be concluded on. However, the positive effect on mortality rates is also found when using OOF, which is projects targeting infrastructure projects, as roads, electricity grid and water supply. As infrastructure is a field ignored by most Western donors, it is reasonable to believe that China contributes with an extra element in the work to improve health, compared to the West.

5.4 Problems with the data

There are limitations to the Chinese aid data used in this study. While the DAC countries report their donations to the OECD Creditor Reporting System, China does not (Strange, et al. 2017, 1). AidData has therefore developed a methodology called Tracking Underreported Financial Flows (TUFF), to collect project-level data from suppliers of official finance who does not participate in global financing systems (Strange, et al. 2017, 1). The researchers behind the dataset follow a standardized set of procedures at each step of the data collection process, and continuously look for improvements and inputs on how to improve (Strange, et al. 2017, 1). One can therefore argue that the reliability of the data is sufficiently high, although there may occur some minor differences between the data collectors. However, this is the best data on Chinese aid available, and numbers reported by the Chinese government would not necessarily be of better quality.

As I aim to investigate the effect of aid on health quality and access, by using the financial values of the aid projects, the validity is somewhat reduced due to 1409 of 3944 projects missing their financial value. However, even though the health projects are those most likely to directly affect health outcomes, the reason behind a populations health is complex, depending on governments prioritizing infrastructure, like roads, water supply and electricity as well. By using the financial value while also controlling for number of projects, the results should paint a sufficient picture of the association between aid and health in the recipient countries.

It is also worth noting that 120 000 US\$ China used on animals donated to Kabul Zoo in Afghanistan in 2002 is marked as both ODA-like and with a development intent – which is the same labels AidData gave the \$3.6 million grant China provided Afghanistan to renovate Kabul hospital the same year (AidData 2017). The 120 000 dollars spent on zoo animals is very unlikely to have an impact on the health quality and access in Afghanistan, at best, we can hope

that some of the money initially meant to be spent on the animals, is used to better living conditions for the Afghan population.

The relatively short time period covered by the Chinese Official Flows dataset may also be limiting. Much has happened since 2014, and China's Belt and Road Initiative first started in 2013. This means that the competition on the «aid market» has been incentivised after the period tested in this paper, which can lead to different results, as it is found that the conditions imposed by the West is less effective if the donor has large strategic goals by supplying aid (Bearce and Tirone 2010).

6. Conclusion

Chinese aid seems to be bettering health outcomes that is not necessarily dependent on a policy change from the government, like the under-5 mortality rate. Mortality rate is more dependent on access to vaccines, access to hospitals, functioning hospitals and health personnel, than of a policy change. Antenatal care and equal access to health services are dependent on governments prioritizing the health sector: standardizing the number of visits women should receive during pregnancy and secure education of skilled health personnel, while equal access might be dependent on lower deductibles for doctor visits and operations. This is in line with the pattern that can be seen in previous work – Chinese aid seems to be positively associated with economic growth (Dreher et al. 2017), while inhibiting economic reform (Brazys and Vadlamannati 2018) and increasing government repression and increased acceptance of authoritarian (Gehring, Kaplan and Wong's 2019).

Further work should be focused on finding a better instrument for Western aid, making it possible to do a better comparison of the two aid donors. Dreher (et al. 2017) suggest interacting Chinese aid and a Western aid donor, provided one find an instrument for DAC or World Bank aid passing the exclusion criteria.

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Appendices

Appendix A - Testing for autocorrelation in the data

```
. xtserial HAQI lnRFRpop lnDACpop
```

Wooldridge test for autocorrelation in panel data

H0: no first order autocorrelation

F(1, 153) = 54870.514

Prob > F = 0.0000

Appendix B - Testing for heteroscedasticity in the full model with under 5 mortality rate as dependent variable

```
. hettest
```

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity

Ho: Constant variance

Variables: fitted values of under5mort

chi2(1) = 131.16

Prob > chi2 = 0.0000

.

Appendix C - Descriptive statistics instrumental variables

	Mean	St.Dev	Min	Max	Units
IV_Chinese steel (all aid)	7.70	4.25	0	13.62	136
IV_Chinese steel (MD)	7.37	4.34	0	13.62	136
IV_Chinese steel (OOF)	4.15	2.85	0	11.80	136
IV_Chinese steel (ODA)	5.45	4.14	0	13.62	136
Dalai Lama visits	.084	.848	0	16	137
Dalai Lama visits (log)	5.45	4.14	0	13.62	137

Appendix D - Skewness and kurtosis (N=138)

	Not log transformed		Log-transformed	
	Kurtosis	Skewness	Kurtosis	Skewness
Chinese ODA per capita	657.39	22.88	9.62	2.50
Chinese aid per capita (mixed + development)	231.52	13.32	4.98	1.64
Chinese aid per capita (all RFR)	188.78	11.96	4.66	1.55
DAC aid per capita	23.86	4.05	2.73	-0.26
Chinese projects (all RFR)	20.22	3.11	2.26	0.54
Chinese projects (mixed + development)	21.80	3.21	2.33	0.62
GDP per capita	15.21	2.90	2.22	0.03

Appendix E - Regression analysis with Driscoll-Kraay standard errors displaying the effect of Chinese development aid on equal access to health services

VARIABLES	(1)	(2)	(3)	(4)	(5)
	Equal access to health				
Chinese development aid per capita _{logA}	-0.67 (3.86)	-0.83 (3.60)	-2.12 (3.80)	-3.36 (3.74)	-4.76 (3.34)
ODA per capita _{logA}	13.86 (18.80)	14.61 (15.85)	14.40** (6.33)	16.88** (5.62)	16.61*** (5.51)
Electoral democracy		-0.01 (0.20)	-0.11 (0.19)	-0.08 (0.16)	-0.08 (0.16)
GDP per capita _{log}			0.01 (0.03)	0.02 (0.03)	0.02 (0.03)
Years of peace				0.01** (0.00)	0.01** (0.00)
Chinese development projects _{log}					5.37 (7.19)
Constant	0.04 (0.06)	-0.06 (0.14)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Within R-square	0.03	0.03	0.03	0.05	0.05
Observations	1,637	1,634	1,612	1,612	1,612
Number of groups	138	138	138	138	138

Standard errors in parentheses

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

Note: ^A Chinese aid per capita and ODA per capita are both multiplied by 0.001 to illustrate the difference between the coefficients.

^B All variables are lagged by one year compared to the dependent variable

Appendix F - Regression analysis with Driscoll-Kraay standard errors displaying the effect of ODA-like Chinese aid on equal access to health services

VARIABLES	(1)	(2)	(3)	(4)	(5)
	Equal access to health				
Chinese ODA-like aid per capita _{logA}	-0.60 (4.39)	-0.75 (4.30)	-1.76 (4.24)	-2.19 (3.76)	-4.57 (4.44)
ODA per capita _{logA}	14.13 (18.47)	15.32 (15.55)	14.30** (5.98)	16.83** (5.83)	16.36** (5.84)
Electoral democracy		-0.04 (0.21)	-0.14 (0.19)	-0.10 (0.16)	-0.11 (0.16)
GDP per capita _{log}			0.00 (0.03)	0.01 (0.02)	0.01 (0.02)
Years of peace				0.01** (0.00)	0.01** (0.00)
Chinese ODA-like projects _{log}					8.56 (8.74)
Constant	0.04 (0.06)	-0.04 (0.15)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Within R-square	0.03	0.03	0.02	0.05	0.05
Observations	1,611	1,608	1,586	1,586	1,586
Number of groups	138	138	138	138	138

Standard errors in parentheses

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

Note: A Chinese aid per capita, ODA per capita and Chinese aid projects are all multiplied by 0.001 to illustrate the difference between the coefficients.

B All variables are lagged by one year compared to the dependent variable

Appendix G - Regression analysis with Driscoll-Kraay standard errors displaying the effect of all Chinese aid on proportion of women who get four or more antenatal care visits

	(1)	(2)	(3)	(4)	(5)
	Four or more antenatal visits				
Chinese aid per capita (all) _{logA}	-0.88 (0.64)	-0.93 (0.72)	-1.62 (0.93)	-1.54 (0.92)	-2.16 (1.29)
ODA per capita _{logA}	-2.62 (2.53)	-2.66 (3.10)	0.84 (2.23)	0.65 (2.12)	0.54 (2.14)
Electoral democracy		0.01** (0.00)	0.02 (0.01)	0.01 (0.01)	0.01 (0.01)
GDP per capita _{log}			0.04*** (0.00)	0.04*** (0.00)	0.04*** (0.00)
Years of peace				-0.00*** (0.00)	-0.00*** (0.00)
Chinese aid projects (all)					2.42 (1.98)
Constant	0.76*** (0.01)	0.77*** (0.01)	0.47*** (0.03)	0.48*** (0.03)	0.48*** (0.03)
Within R-square	0.41	0.43	0.45	0.46	0.46
Observations	1,760	1,601	1,579	1,579	1,579
Number of groups	151	136	136	136	136

Standard errors in parentheses

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

Note: ^A Chinese aid per capita, ODA per capita and Chinese aid projects are all multiplied by 0.001 to illustrate the difference between the coefficients.

^B All variables are lagged by one year compared to the dependent variable

Appendix H - Regression analysis with Driscoll-Kraay standard errors displaying the effect of ODA-like Chinese aid on proportion of women who get four or more antenatal care visits

	(1)	(2)	(3)	(4)	(5)
	Four or more antenatal visits				
Chinese ODA-like aid per capita _{logA}	-1.15 (0.92)	-0.74 (1.02)	-0.76 (0.99)	-0.72 (1.01)	-1.57 (1.45)
ODA per capita _{logA}	-2.78 (2.21)	-2.77 (2.71)	0.33 (1.78)	0.14 (1.68)	-0.02 (1.73)
Electoral democracy		0.00 (0.01)	0.01 (0.01)	0.01 (0.01)	0.01 (0.01)
GDP per capita _{log}			0.03*** (0.00)	0.03*** (0.00)	0.03*** (0.00)
Years of peace				-0.00*** (0.00)	-0.00*** (0.00)
Chinese ODA-like projects _{log}					3.02 (2.94)
Constant	0.76*** (0.01)	0.75*** (0.01)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Observations	0.41 1,758	0.43 1,598	0.45 1,576	0.46 1,576	0.46 1,576
Number of groups	151	136	136	136	136

Standard errors in parentheses

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

Note: ^A Chinese aid per capita, ODA per capita and Chinese aid projects are all multiplied by 0.001 to illustrate the difference between the coefficients.

^B All variables are lagged by one year compared to the dependent variable

Appendix I - Regression analysis with Driscoll-Kraay standard errors displaying the effect of all Chinese aid on under-5 mortality rate

VARIABLES	(1)	(2)	(3)	(4)	(5)
	Under-5 mortality rate				
Chinese aid per capita (all) _{logA}	-0.22 (0.16)	-0.25 (0.17)	-0.19 (0.18)	-0.23 (0.18)	0.43 (0.27)
ODA per capita _{logA}	-0.61 (0.69)	-1.03 (0.73)	-1.41 (0.87)	-1.33 (0.87)	-1.21 (0.84)
Electoral democracy		-11.22*** (3.02)	-11.18*** (3.43)	-10.29** (3.68)	-9.84** (3.34)
GDP per capita _{log}			-2.09 (1.29)	-2.03 (1.36)	-2.22 (1.32)
Years of peace				0.19*** (0.03)	0.19*** (0.03)
Chinese aid projects (all)					-2.53*** (0.75)
Constant	0.00 (0.00)	55.55*** (2.59)	66.43*** (12.34)	60.41*** (13.23)	62.90*** (13.05)
Within R-square	0.48	0.53	0.53	0.53	0.54
Observations	1,810	1,601	1,579	1,579	1,579
Number of groups	153	136	136	136	136

Standard errors in parentheses

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

Note: A Chinese aid per capita, ODA per capita and Chinese aid projects are all multiplied by 0.001 to illustrate the difference between the coefficients.

B All variables are lagged by one year compared to the dependent variable

Appendix J - Regression analysis with Driscoll-Kraay standard errors displaying the effect of Chinese development aid on under-5 mortality rate

VARIABLES	(1)	(2)	(3)	(4)	(5)
	Under-5 mortality rate				
Chinese development aid per capita _{logA}	-0.20 (0.19)	-0.26 (0.21)	-0.22 (0.21)	-0.25 (0.21)	0.48 (0.30)
ODA per capita _{logA}	-0.57 (0.66)	-0.96 (0.69)	-1.33 (0.81)	-1.26 (0.81)	-1.12 (0.78)
Electoral democracy		-11.14*** (2.79)	-11.11*** (3.21)	-10.20** (3.45)	-9.80*** (3.09)
GDP per capita _{log}			-2.07 (1.23)	-2.02 (1.30)	-2.29* (1.28)
Years of peace				0.20*** (0.03)	0.19*** (0.03)
Chinese development projects _{logA}					-2.83*** (0.82)
Constant	0.00 (0.00)	0.00 (0.00)	66.12*** (11.74)	59.97*** (12.61)	63.09*** (12.59)
Within R-square	0.47	0.53	0.53	0.53	0.54
Observations	1,833	1,624	1,602	1,602	1,602
Number of groups	153	136	136	136	136

Standard errors in parentheses

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

Note: ^A Chinese aid per capita, ODA per capita and Chinese aid projects are all multiplied by 0.001 to illustrate the difference between the coefficients.

^B All variables are lagged by one year compared to the dependent variable

Appendix K - List of countries

Afghanistan	Croatia	Kazakhstan	North Macedonia	Tunisia
Albania	Cuba	Kenya	Oman	Turkey
Algeria	Cyprus	Kosovo	Pakistan	Turkmenistan
Angola	Djibouti	Kuwait	Panama	Uganda
Argentina	Dominican Republic	Kyrgyz Republic	Papua New Guinea	Ukraine
Armenia	Equator	Lao PDR	Paraguay	United Arab Emirates
Azerbaijan	Egypt	Lebanon	Peru	Uruguay
Bahrain	El Salvador	Lesotho	Philippines	Uzbekistan
Bangladesh	Equatorial Guinea	Liberia	Qatar	Vanuatu
Barbados	Eritrea	Libya	Rwanda	Venezuela
Belarus	Eswatini	Madagascar	Sao Tome and Principe	Vietnam
Benin	Ethiopia	Malawi	Saudi Arabia	West bank and Gaza
Bhutan	Fiji	Malaysia	Senegal	Yemen
Bolivia	Gabon	Maldives	Serbia	Zambia
Bosnia and Herzegovina	Gambia	Mali	Seychelles	Zimbabwe
Botswana	Georgia	Malta	Sierra Leone	
Brazil	Ghana	Mauritania	Singapore	
Burkina Faso	Guatemala	Mauritius	Solomon Islands	
Burundi	Guinea	Mexico	Somalia	
Cabo Verde	Guinea-Bissau	Moldova	South Africa	
Cambodia	Guyana	Moldova	South Sudan	
Cameroon	Haiti	Mongolia	Sri Lanka	
Central African Republic	Honduras	Montenegro	Sudan	
Chad	Hong Kong SAR	Morocco	Suriname	
Chile	India	Mozambique	Syrian Arab Republic	
Colombia	Indonesia	Myanmar	Tajikistan	
Comoros	Iran	Namibia	Tanzania	
Congo, DR.	Iraq	Nepal	Thailand	
Congo, Rep.	Israel	Nicaragua	Timor-Leste	
Costa Rica	Jamaica	Niger	Togo	
Cote d'Ivoire	Jordan	Nigeria	Trinidad and Tobago	

Appendix L - IV test for the effect of DAC aid per capita on under-5 mortality rate

VARIABLES	(1) Under-5 mortality rate
DAC ODA per capita (log) _{t-1}	-70.51** (29.66)
Hansen J	0.000
Observations	6,423
Number of id	167
R-squared	-1.151
Robust standard errors in parentheses	
*** p<0.01, ** p<0.05, * p<0.1	
Note: A DAC aid budget interacted with probability to receive aid (t-2) and OECD growth rate interacted with probability to receive aid (t-3) are used as IVs	
B Stock-Yogo weak variable test: 19.93	
C Time period: 49 years from 1970 until 2018	

Appendix M - Comparing the effect of the different Chinese aid flows using an IV-test

VARIABLES	(1)	(2)	(3)	(4)
	Under-5 mortality rate			
Chinese ODA per capita (log) _{t-1}	-25.69*** (3.50)			
Chinese development projects per capita (log) _{t-1}		-17.54*** (2.04)		
Total Chinese aid per capita (log) _{t-1}			-16.45*** (1.94)	
Chinese OOF per capita (log) _{t-1}				-10.94*** (1.45)
Hansen J	0.13	0.42	0.4	0.30
Observations	1,910	1,919	1,889	1,846
R-squared	-3.681	-2.458	-2.211	-0.342
Number of id	162	162	162	162
Robust standard errors in parentheses				
*** p<0.01, ** p<0.05, * p<0.1				

Note: A Two-step instrumental variable test, using Chinese steel production multiplied with probability to receive the different types of aid (lagged by 2 years), and number of Dalai Lama visits (lagged by 1 year) as instruments for Chinese aid per capita.

B Chinese aid per capita is lagged by one year compared to under-5 mortality rate

Appendix N - IV regression testing different samples

VARIABLES	(1)	(2)	(3)
	Under-5 mortality rate		
Chinese ODA per capita (log) _{t-1}	-25.12*** (4.36)	-25.34*** (4.46)	-25.08*** (4.44)
DAC ODA per capita (log) _{t-1}	-0.49 (1.25)	-0.39 (1.31)	-0.12 (1.36)
Electoral democracy _{t-1}	-24.12** (11.31)	-25.18** (11.78)	-24.63** (11.93)
GDP per capita (log) _{t-1}	-5.30 (3.60)	-5.31 (3.65)	-5.48 (3.67)
Years of peace _{t-1}	0.26* (0.15)	0.26* (0.15)	0.23 (0.15)
Observations	1,460	1,428	1,389
R-squared	-2.335	-2.393	-2.251
Number of id	135	130	126

Robust standard errors in parentheses

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

Note: ^A Two-step instrumental variable test, using Chinese steel production multiplied with probability to receive the different types of aid (lagged by 2 years), and number of Dalai Lama visits (lagged by 1 year) as instruments for Chinese aid per capita.

^B Chinese aid per capita is lagged by one year compared to under-5 mortality rate

