# Aid, economic growth and poverty

Analysis of the stimulating and distorting effects of Official Development Assistance on Sub-Saharan African countries

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# Ayuda, crecimiento económico y pobreza

Análisis de los efectos estimulantes y distorsionadores de la Ayuda Oficial al Desarrollo en los países del África Subsahariana

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Escuela de Doctorado

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*In dedication to my late father Gustave Mungongo and mother Béatrice Sebujome, my sister-in-law Fanny Rugwiza and my cousin Dunia Bakarani without whom my dream of becoming doctor would have never come true.*

*Pacifique Mongongo Dosa*

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# List of acronyms

Akaike Information Criterion ...................................... AIC

Co-integrating Equation .......................................... CE

Co-integrating Vector ............................................ CV

Co-integration Analysis .......................................... CA

Co-integration Test .............................................. CT

Development Assistance Committee ............................... DAC

Dynamic Fixed Effect ............................................ DFE

European Union .................................................. EU

External Financial Flows ......................................... EFF

Final Prediction Error ........................................... FPE

Foreign Direct Investment ....................................... FDI

Gross Domestic Product .......................................... GDP

Gross National Income ........................................... GNI

**Hannan-Quinn (information criterion)** ............................. HQ

**Human Development Indicators** .................................... HDI

**Instrumental variable** ............................................ IV

**Latin America and the Caribbean** ................................. LAC

**Millennium Development Goals** ................................... MD

**Non-Governmental Organizations** .................................. NGO

**Official Development Assistance** .................................. ODA

**Organization for Economic Cooperation and Development** ....... OECD

**Pooled Mean Group (estimator)** ................................... PMD

**Randomized Control Trial** ........................................ RCT

**Schwarz Criterion** .............................................. SC

**Self-discovery Approach to Development** .......................... SAD

**Sub-Saharan Africa** ............................................. SSA

**Sustainable Development Goals** ................................... SDG

**United Nations Children's Fund** .................................. UNICEF

**United Nations** ................................................. UN

**Vector Auto Regressive** ......................................... VAR

**Vector Error Correction Model** .................................. VECM

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# Summary—Resumen

## 0.1  Summary

Drawing on the United Nations (UN) *2030 Agenda for Sustainable Development*, "eradicate extreme poverty for all people everywhere" is the first of the 17 *Sustainable Development Goals* (SDG). This was solemnly stated by the world's heads of state in the 2015 UN General Assembly's Declaration:

> *We resolve, between now and 2030, to end poverty and hunger everywhere; to combat inequalities within and among countries; [...]. We resolve also to create conditions for sustainable, inclusive and sustained economic growth, shared prosperity and decent work for all, taking into account different levels of national development and capacities* (United Nations, 2015b, p.3).

Despite being a promising global commitment to promoting development, the question raises: is the goal of eradicating poverty realistic and achievable in a 15-year period?

Among other reports and studies, the UN 'Millennium Development Goals Report' finds that it is not overambitious as it has been proven previously by the Millennium Development Goals (MDG), which successfully contributed to halving the average number of people living in extreme poverty (United Nations, 2015a; Overseas Development Institute, 2015; Sachs, 2015). Consequently, it expected similar development strategies and assistance to accomplish the SDG.

However, given the huge disparities in regional achievements and the differences in poverty levels across developing countries, such a generalization may be misleading. In particular, one could reasonably wonder whether such a positive forecast is valid for a region such as Sub-Saharan Africa (SSA). The answer from aid agencies and practitioners is a conditional 'yes'. They argue that ending poverty in SSA is feasible, provided that developed countries donate more —and more stable— aid (Overseas Development Institute, 2015; Sachs, 2015).

Moreover, a number of investigations have confirmed a fast reduction of poverty and inequality in SSA (Fosu, 2015; Pinkovskiy and Sala-i Martin, 2014). Conversely, from a more 'pessimistic' viewpoint, other authors argue that foreign aid is not part of the solution but the problem itself. They suggest a 'market-based' development funding which, in their view, would not distort recipient countries' economic and political environments (Akonor, 2007; Moyo, 2009; Ogundipe et al., 2014). Those contradictory viewpoints raise a fundamental question: Is aid a way into or a way out of poverty in SSA? No clear answer comes from those two leading streams in aid literature. Since they are mutually exclusive, they do not provide a single, irrefutable, conclusion.

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As SSA is the most critical region for the goal of eradicating extreme poverty by 2030, and it has also become the main recipient of global Official Development Assistance (ODA) since the 1990s, the success of the SDG agenda will clearly depend on the effectiveness of foreign aid in promoting Africa's development. Hence, further investigations into the controversy surrounding the effectiveness of aid in SSA are crucial and timely.

Given that the seemingly never-ending controversy surrounding the macroeconomic effectiveness of aid is rooted in the assumption that ODA distorts SSA's economies, we differentiate two aid modalities —aid grants and aid loans— which may impact the economic growth differently. Indeed, aid loans and grants have different financial natures that should be clearly contemplated when assessing the macro-effectiveness of ODA. Furthermore, we distinguish two types of aid impacts: the 'overall' impact of aid on growth and the 'inequality-adjusted' impact of aid on the poorest citizens.

With that perspective, this PhD Thesis has two core objectives. Firstly, it aims to analyze the relative impact of aid grants and aid loans on the growth rate of SSA countries' per capita income during the period 1991–2014. And secondly, to explore the main 'distorting effects' that ODA has on the recipient economies.

To empirically account for the above-mentioned heterogeneous nature of ODA flows, we examine the relative effects of aid grants and aid loans on economic growth and discuss the strengths and weaknesses of those two aid modalities. We consider the lack of repayment burden on poor countries as the major strength of aid grants but we have also associated it with higher risks of allocating such concessional resources into unproductive activities.

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Conversely, we consider aid loans to exert positive incentives to productively invest the resources in order to meet the future repayment obligations, but we also bear in mind that they generate a debt burden that may be unsustainable for some poor countries. Therefore, we assume for the estimations that the net impact of each aid modality is positive if its strengths compensate for its weaknesses.

As both aid grants and aid loans not only affect economic growth but are also impacted by the latter within a kind of 'loop of causality', we have resorted to Vector Auto Regressive (VAR) models and Co-integration Analysis (CA) respectively for the short and long term estimations. Thus, we have incorporated those inter-dependencies and controlled the effects of other omitted processes that could otherwise bias the estimation results. The econometric estimation points out five relevant results in relation to the aggregate impact of ODA in SSA:

Firstly, although foreign aid exerted both distorting and stimulating effects on SSA's economic growth, its overall net result was significantly positive. This positive net impact underpins the optimistic aid stream [among others: Juselius et al. (2014); Sachs (2015); Tombofa et al. (2013)] and contradicts the aid skeptics [among others: Akonor (2007); Moyo (2009); Ogundipe et al. (2014)]. However, it also confirms the concerns raised by the latter about the existence of aid distorting effects —even though they are assessed to be lower than expected.

Secondly, while both aid components have positive and significant effects on economic growth, aid loans are relatively more effective than aid grants. Subsequently, both an increase of each of these two aid modalities and a reallocation from aid grant to aid loans for a given amount of ODA are expected to induce higher economic growth.

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Thirdly, a reallocation from aid grants to aid loans would provide an adequate incentive to use aid resources in a more productive way, but its complete implementation —100% loans versus 0% grants— is not practical as some strategic targets of ODA are incompatible with aid loans. Nonetheless, donors still have relatively wide room for maneuver since ODA to SSA is largely delivered in terms of grants (91%). Moreover, the success of such reallocation assumes a sustainable debt burden for the recipient country; otherwise, the opposite reallocation —from aid loans to aid grants— would be preferable.

Fourthly, foreign aid does not sufficiently target the poor as it does not significantly boost the income of the poorest citizens. This is an alarming result as ODA is officially intended to reach the neediest people —especially if it is intended to underpin the SDG target of poverty eradication.

Fifthly, as in the short term, both aid grants and aid loans positively affect growth in the long term with a higher relative effectiveness for aid loans. Likewise, these two aid modalities do not have a significant impact on the 'inequality-adjusted' growth in the long term. Consequently, the outcome of the long term analysis meets that of the short term. However, it points out that the difference in effectiveness between aid grant and aid loans is much higher in the long than in the short term as Grants are more short-term oriented projects and programs whereas loans tend to finance longer-term projects and programs.

In sum, these results support both the increase in ODA resources for SSA in the SDG era and the use of both aid grants and loans in this —mainly— low-income region. Furthermore, we cannot infer that concessional loans are completely preferable to grants; on the contrary, grants should still be concentrated in those African countries with lower repayment capacity and more restricted access to credit.

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But the use of concessional loans should be increased in those economies that need resources for financing productive activities, offer guaranties of repayment and are more affected by institutional distortions.

Therefore, this PhD Thesis opens the door for future analysis on the socio-economic, political and institutional conditions that are more appropriate for the —efficient— use of aid loans and grants.

Finally, it should be taken into account that this study mainly assesses the 'macroeconomic effectiveness' of aid in relation to SSA's economic growth, not in relation to the progress in other dimensions of human development. Consequently, it should be interpreted as a 'partial' evaluation of the effectiveness of aid, exclusively referring to the economic dimension of development.

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## 0.2  Resumen

Según la nueva Agenda 2030 para el Desarrollo Sostenible, el primero de los 17 objetivos del Desarrollo Sostenible (ODS) consiste en "poner fin a la pobreza en todas sus formas en todo el mundo". Así fue solemnemente declarado por los jefes de Estado del mundo en la Declaración de la Asamblea General de Naciones Unidas de septiembre de 2015:

> *Estamos resueltos a poner fin a la pobreza y el hambre en todo el mundo de aquí a 2030, a combatir las desigualdades dentro de los países y entre ellos [...]. Estamos resueltos también a crear las condiciones necesarias para un crecimiento económico sostenible, inclusivo y sostenido, una prosperidad compartida y el trabajo decente para todos, teniendo en cuenta los diferentes niveles nacionales de desarrollo y capacidad (UN 2015: 3).*

Aunque es un compromiso global prometedor para la promoción del desarrollo, ¿es realista y alcanzable el objetivo de erradicar la pobreza en un periodo de 15 años? Muchos analistas opinan que no se trata de un objetivo demasiado ambicioso dado que los Objetivos de Desarrollo del Milenio (ODM) han contribuido exitosamente a reducir a la mitad el número de personas viviendo en situación de pobreza extrema (ODI, 2015 y Sachs, 2015). Por lo tanto, es esperable que, de aquí a 2030, se impulsen nuevas estrategias de desarrollo y se financien nuevos recursos de Ayuda Oficial al Desarrollo (AOD) con el ánimo de alcanzar los ODS.

Sin embargo, dadas las grandes disparidades entre los logros regionales y las diferencias en los niveles de pobreza entre los diferentes países en desarrollo, el objetivo de erradicar la pobreza puede generar confusión.

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En particular, uno podría preguntarse si un objetivo tan ambicioso es válido para una región como el África Subsahariana (ASS). La respuesta de los analistas más 'optimistas' es un 'sí' condicional. Estos últimos opinan que acabar con la pobreza en ASS es factible en el caso de que los países desarrollados donen más ayuda —y que ésta sea más estable (ODI, 2015; UN, 2015). Este optimismo se ve respaldado por los resultados de diversas investigaciones que apuntan a una rápida reducción de la pobreza y la desigualdad en ASS (Fosu, 2015; Pinkovskiy y Sala-i-Martin, 2014).

Al contrario, desde un punto de vista más 'pesimista', otros autores opinan que la ayuda internacional no es parte de la solución sino el problema en sí. Estos autores proponen un "modelo de ayuda muerta" (es decir, un modelo de financiación del desarrollo basado en el mercado y no en la ayuda) que no distorsionaría el entorno económico y político de los países receptores (Akonor, 2008; Moyo, 2009; Ogundipe et al., 2014). Estos puntos de vista contradictorios (optimistas y pesimistas) plantean una pregunta fundamental: ¿Es la ayuda internacional un estímulo o una rémora para la promoción del crecimiento y la reducción de la pobreza en ASS?

No existe una respuesta clara por parte de las dos corrientes de pensamiento antes mencionadas, y como son mutualmente exclusivas, no es posible alcanzar una conclusión única e irrefutable. Dado que ASS es una región crítica para el cumplimiento del objetivo de erradicar la pobreza extrema en 2030, y dado que ASS se ha convertido en el mayor receptor de AOD desde los años 90 del siglo pasado, el éxito de los ODS dependerá, claramente, de la eficacia de la ayuda en la promoción del desarrollo de África.

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Por tanto, es pertinente impulsar más investigaciones que permitan clarificar la controversia que rodea la cuestión sobre la eficacia de la ayuda.

Dado que el debate sobre la eficacia macroeconómica de la ayuda está arraigado en la suposición de que la AOD distorsiona las economías de ASS, en la presente Tesis doctoral se diferencian dos modalidades de ayuda —donaciones y créditos— que pueden impactar de manera diferentemente sobre el crecimiento económico de quienes las reciben. Obviamente, las donaciones y los créditos tienen naturalezas financieras diferentes que deben ser consideradas a la hora de evaluar la macro-eficacia de la AOD. Asimismo, en el análisis realizado en esta Tesis se distinguen dos tipos diferentes de impactos de la ayuda: de una parte, el impacto 'agregado' de la ayuda sobre el crecimiento económico; y, de otra parte, el impacto 'ajustado por la desigualdad' (es decir, el impacto sobre la tasa de crecimiento de la renta de los ciudadanos más pobres). Desde esta perspectiva, la Tesis tiene dos objetivos principales: primero, analizar los impactos relativos de las donaciones y los créditos de ayuda en la tasa del crecimiento del PIB per cápita de los países del ASS durante el periodo 1991–2014. Y segundo, explorar los principales efectos distorsionantes que la AOD causa en las economías receptoras.

Para verificar empíricamente esta naturaleza heterogénea de donaciones y créditos de AOD, se examinan los efectos relativos de ambas modalidades de ayuda sobre el crecimiento económico y se discuten sus respectivos puntos fuertes y débiles. Así, el principal punto fuerte de las donaciones es la ausencia de carga financiera de reembolso sobre los países pobres, si bien dichas donaciones presentan un mayor riesgo de inversión en actividades improductivas.

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En cambio, los créditos ejercen incentivos positivos para la inversión productiva de los recursos con el fin de ser capaz de cumplir con las futuras obligaciones de reembolso, pero, a cambio, generan una carga de deuda que puede ser insostenible para algunos países pobres. Así, en la estimación empírica se asume que el impacto neto de cada modalidad de ayuda es positivo si sus puntos fuertes compensan sus puntos débiles.

Dado que donaciones y créditos no sólo afectan al crecimiento económico sino que también se ven afectados por este último, generando un cierto 'círculo de causalidad', la estimación se realiza por medio de un modelo VAR y a un análisis de co-integración (el primero para las estimaciones en el corto plazo y el segundo para las de largo plazo). Dicho enfoque econométrico permite considerar las interdependencias entre las variables analizadas y controlar los efectos de otros procesos omitidos que podrían sesgar los resultados de la estimación. La estimación econométrica destaca cinco resultados relevantes en relación con el impacto total de la AOD en ASS:

Primero, aunque la AOD ejerce tanto efectos distorsionantes como estimulantes sobre el crecimiento económico de ASS, su resultado neto general es significativamente positivo. Este impacto neto positivo apoya la corriente optimista de la ayuda (Fayissa y El-Kaissy, 1999; Juselius et al., 2014; Sachs, 2015; Tombofa et al., 2013, y otros) en contra de los escépticos de la ayuda (como Akankor, 2008; Moyo, 2009; Ogundipe et al., 2014). Sin embargo, esto también confirma las preocupaciones planteadas por estos últimos con respecto a la existencia de efectos distorsionantes —aunque la estimación de dichos efectos revela que son inferiores a lo esperado.

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Segundo, mientras ambas modalidades de la ayuda tienen impactos positivos y significativos sobre el crecimiento económico, los créditos son, relativamente, más eficaces que las donaciones. Consiguientemente, un aumento en ambas modalidades de ayuda y una redistribución de la ayuda a favor de los créditos generarían un mayor crecimiento en ASS.

Tercero, una redistribución de la ayuda a favor de los créditos podría incentivar un uso más productivo de los recursos. Sin embargo, su implementación completa —100% créditos frente a 0% donaciones— no es práctica ni realista, dado que algunos objetivos estratégicos de la AOD no son compatibles con la ayuda crediticia. No obstante, los donantes siguen teniendo un margen de maniobra relativamente amplio dado que la AOD hacia ASS se concede en gran parte a través de donaciones. Además, el éxito de esa redistribución depende de la sostenibilidad de la deuda del país que la recibe; en caso contrario, la redistribución contraria —a favor de donaciones— sería preferible.

Cuarto, la AOD no se dirige adecuadamente a la población más pobres de los países de ASS. Este resultado es alarmante ya que, oficialmente, la AOD debería alcanzar a los más necesitados —sobre todo si se pretende apoyar el objetivo de los ODS de erradicar la pobreza.

Quinto, en el largo plazo tanto los créditos como las donaciones ejercen un efecto positivo sobre la tasa de crecimiento, sin bien dicho efecto es comparativamente mayor en el caso de los créditos. Asimismo, ambas modalidades de ayuda no tienen un impacto significativo sobre la tasa de crecimiento ajustada por la desigualdad. Consiguientemente, los resultados en el largo plazo confirman los resultados antes comentados en el corto plazo.

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No obstante, a medida que se alarga el plazo, las diferencias entre el impacto de las donaciones y de los créditos se ensancha a favor de estos últimos.

En suma, estos resultados respaldan una estrategia internacional de incremento de la AOD dirigida a ASS en la era de los ODS y el uso de ambas modalidades de ayuda (tanto créditos como donaciones) en esta región mayoritariamente compuesta por países de renta baja. Asimismo, del análisis realizado no puede deducirse que los créditos concesionales sean estrictamente preferibles a las donaciones; al contrario, estas últimas deberían seguir concentradas en los países africanos con capacidades de reembolso más limitadas y con accesos más restringidos al crédito. Sin embargo, el uso de créditos concesionales debería aumentar en aquellas economías que necesitan recursos para financiar actividades productivas, que presentan garantías de reembolso y que están más afectadas por distorsiones institucionales. En esta línea, la presente Tesis doctoral abre la puerta a futuros análisis de las condiciones socioeconómicas, políticas e institucionales adecuadas para el uso —eficaz— de la ayuda internacional.

Finalmente, conviene alertar que este estudio evalúa, principalmente, la 'eficacia macroeconómica' de la ayuda en relación con el crecimiento económico de ASS y no en relación con el progreso en otras dimensiones del desarrollo humano sostenible. Por lo tanto, los resultados deben interpretarse como una evaluación 'parcial' de la eficacia de la ayuda, refiriéndose, exclusivamente, a la dimensión económica del desarrollo.

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# Chapter 1

# Introduction

Drawing on the new United Nations (UN) *2030 Agenda for Sustainable Development*, "eradicate extreme poverty for all people everywhere" is the first of the 17 *Sustainable Development Goals* (SDG). This was solemnly stated by the world's heads of state in the 2015 UN General Assembly's Declaration:

> *We resolve, between now and 2030, to end poverty and hunger everywhere; to combat inequalities within and among countries; [...]. We resolve also to create conditions for sustainable, inclusive and sustained economic growth, shared prosperity and decent work for all, taking into account different levels of national development and capacities* (United Nations, 2015b, p.3).

Despite being a promising global commitment to promoting development, the question raises: Is the goal of eradicating poverty realistic and achievable in a 15-year period? Many analysts find that it is not overambitious as it has been proven previously by the Millennium Development Goals (MDG), which successfully contributed to halving the average number of people living in extreme poverty —see among others, Overseas Development Institute (2015) and Sachs (2015).

Consequently, they expect similar development strategies and assistance to accomplish the SDG. However, given the huge disparities in regional achievements and the differences in poverty levels across developing countries, such a generalization may be misleading. In particular, one could reasonably wonder whether such a positive forecast is valid for a region such as Sub-Saharan Africa (SSA).

The answer from the most 'optimistic' analysts is a conditional 'yes'. They argue that ending poverty in SSA is feasible, provided that developed countries donate more —and more stable— aid [among others, Overseas Development Institute (2015) and United Nations (2015b)]. Moreover, a number of recent investigations have confirmed a fast reduction of poverty and inequality in SSA (Fosu, 2015; Pinkovskiy and Sala-i Martin, 2014).

Conversely, from a more 'pessimistic' viewpoint, other authors argue that foreign aid is not part of the solution but the problem itself. They suggest a 'market-based' development funding which would not distort recipient countries' economic and political environments —see among others, Akonor (2007); Moyo (2009); Ogundipe et al. (2014).

Furthermore, that pessimistic standpoint is underpinned by the fact that part of ODA is allocated in line of some donors' strategical interests which are out of the framework of their commitment to international solidarity —see for instance Dunning (2004); and implemented according to some political and economic interests of receiving countries' leaders which are in conflict with its developmental effectiveness (Alesina and Dollar, 2000; Boone, 1996).

Those contradictory viewpoints raise a fundamental question: Is foreign aid a way into or a way out of economic growth and poverty eradication in SSA? No clear answer comes from those two leading streams in aid literature.

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Since they are mutually exclusive, they do not provide a single, irrefutable, conclusion.

As the evaluation of the MDG's goal of poverty reduction showed that SSA —becoming the main recipient of global ODA since the 1990s— has performed poorly in comparison to other developing regions which received less foreign aid:

> *In 1990, East Asia accounted for half of the global poor, whereas some 15 percent lived in Sub-Saharan Africa; by 2015, this is almost exactly reversed: Sub-Saharan Africa accounts for half of the global poor, with some 12 percent living in East Asia* (World Bank, 2015).

This illustrates how SSA has become a critical region for the goal of eradicating extreme poverty by 2030. As it has also become the main recipient of global ODA since the 1990s[1], the success of the SDG will clearly depend on the effectiveness of foreign aid in promoting SSA development. Hence, further investigations into the controversy surrounding the effectiveness of aid in this region are crucial and timely.

Given that the seemingly never-ending controversy surrounding the macroeconomic effectiveness of aid is rooted in the assumption that ODA distorts SSA's economies, we differentiate two aid modalities —aid grants and aid loans— which may impact the economic growth differently. Indeed, aid loans and grants have different financial natures that should be clearly contemplated when assessing the macro-effectiveness of ODA.

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[1]Between 1990 and 2014, on average, ODA represents 28.39% of SSA Gross Capital Formation and 5.22% of its Gross Domestic Product (GDP) while it only represents 3.60, 2.47, 0.77, 0.23 and 0.00% of GDP respectively for Asia (total), Middle East & North of Sahara, Europe & Central Asia, Latin America & Caribbean and North America (World Bank, 2016b; DAC, 2016).

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Furthermore, we distinguish two types of aid impacts: the 'overall' impact of aid on growth and the 'inequality-adjusted' impact of aid on the poorest citizens. With this perspective, this doctoral Thesis aims at the following research objectives and questions.

## 1.1   Research objectives

This Thesis has two main research objectives: (1) analysing the relative impacts of aid grants and aid loans on the growth rate of SSA countries' per capita income during the period 1991–2014; and (2) exploring the main 'distorting effects' that ODA causes on the recipient economies.

## 1.2   Research questions

To cover those objectives, this PhD Thesis should answer the main question of whether, why and how the resort to foreign aid underpins or undermines the desired growth dynamics in SSA. Answers to this overall question are framed into two angles of consideration, namely (1) the evaluation of the economic performance of aid and (2) the consideration of other targets of aid which may underpin or undermine that economic performance. Therefore, it becomes imperative to specifically answer the following questions.

### 1.2.1   On the economic purpose of aid

(i) Are 'overall' growth's responses to impulses from the 'overall' aid and from its two main delivering modalities (aid-grants and aid-concessional loans) positive and significant?

(ii) Are 'inequality-adjusted' growth's responses to impulses from the 'overall' aid and from those two modalities positive and significant?

(iii) Which modality has a higher relative effectiveness and why?

(iv) Does the outcome of the short term assessment hold in the long term?

### 1.2.2   On other purposes of aid

(i) What have been the main extra sectors (no-economic) targeted by aid in SSA?

(ii) What has been their level of priority in comparison to that of the economic sector?

## 1.3   Methodology and research hypotheses

### 1.3.1   For the assessment of the economic purpose of aid

We resort to econometrics for analyzing the economic purpose of foreign aid. We structure our model in such a way that its estimation captures the stimulating and distorting effects of the delivered aid.

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That makes it able to grasp the transmission channels of both the positive and negative effects on growth and deduct some policies which can improve aid performance. With that end in view, this model exploits the heterogeneous nature of ODA. The analysis is based on an empirical assessment of seven research hypotheses covering all the aspects surrounding the retained research objectives and questions for this Thesis.

### 1.3.2   For feedback-effects of the other purposes of aid

Considering that the results of the economic assessment of aid cannot be understood in isolation, accounting for other relevant sectors and motives of delivering aid would lead to a much more contextualized interpretation of the outcome and the associate policy recommendations. Therefore, we make a descriptive analysis of the sectoral allocation of aid in SSA to grasp which sectors and purposes benefited the most from ODA delivery and resort to the existing literature to understand and consider the impact of such an eclectic distribution of aid on its macroeconomic effectiveness.

## 1.4   Structure and presentation of the Thesis

Apart from the introductory and concluding chapters which outline the issue at hand and the main findings, this Thesis comprises four chapters starting by a descriptive analysis of ODA flows to SSA. The following chapters respectively review the literature, present our methodological framework and provide the results of our empirical estimations.

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Firstly, the descriptive analysis starts off with a comparison of the ODA volume to that of other financial resources directed to SSA. Both domestic and External Financial Flows are considered. Secondly, the chapter describes the participation of SSA in the global ODA system and depicts the geographical allocation of that ODA within this SSA region. Thirdly, it enumerates all donors and provides the sectoral allocation of their contributions. Finally, the chapter outlines the instruments that they have used to deliver those contributions.

The literature review covers theoretical and empirical explanations of figures presented in the descriptive chapter and the subsequent debate on aid effectiveness. Regarding the theoretical literature, we first present the contrast between "poverty trap and big push hypothesis" and "dead aid" arguments underpinned respectively by the aid optimistic and pessimistic streams. We then supplement those two core streams with the "self-discovery" and the Randomized Control Trial (RCT) approaches of development aid. Furthermore, we discuss the eclectic allocation of the aid delivered to SSA. Concerning the empirical literature, we review the existing "four generations" of empirical studies on aid effectiveness and pinpoint the subsequent puzzle for the case of the SSA region.

The methodological chapter spells out our resort to VAR models and Co-integration Analysis (CA) to identify the exogenous impact of aid on per capita economic growth respectively in the short and long term. It also describes the proxies chosen for the estimations and presents the variables used in the analysis and their respective sources.

The estimation chapter presents and discusses the empirical results. First, it focuses on the estimation of the aid's short term impact and then extends the investigation to the long term.

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Direct, feed-back and overall effects are presented and discussed for both the overall and the 'inequality-adjusted' growth.

The concluding chapter recapitulates the Thesis' core research objectives and hypotheses. Then it summarizes the core chapters and pinpoints their respective contributions in the diagnosis of the research hypotheses. Finally, it presents the overall findings and the associated policy recommendations.

# Chapter 2

# Descriptive analysis of aid flows to Sub-Saharan Africa: 1991–2015

This chapter provides the macro-picture of ODA delivered to SSA for the period 1991–2015. Firstly, it examines the weight of ODA in the aggregate 'External Capital Flows' and compares the volume of ODA to that of SSA's domestic savings. Secondly, it depicts SSA's participation in the ODA system and describes the geographical allocation of ODA among SSA countries. Thirdly, it presents donors and provides the sectoral allocation of development aid in SSA. Finally, it describes the instruments used to deliver aid to the SSA region.

According to DAC (2016), ODA is defined as one of the components of 'External Financial Flows'. Those components are grouped in official and private flows. On the one hand, the 'Official Flows' comprises ODA and 'Other Official Flows'. On the other hand, 'Private Flows' includes Foreign Direct Investment (FDI) and 'Other Private Flows', which —like FDI— follow the market terms.

In contrast, ODA consists of all governmental aid, excluding credits and loans for military purposes aiming economic development and the welfare of developing countries. It can take the form of grants, concessional loans (at least 25% of grant element) or technical assistance. 'Other Official Flows' consist of official flows which do not meet the ODA definition. It includes: (1) grants delivered for commercial purposes; (2) flows targeting development, but with less than 25% of grant elements; and (3) other flows intended to promote donors' exports to recipients.

## 2.1 Aid as the major source of 'External Capital Flows' to Sub-Saharan Africa

Figure 2.1 shows that ODA has always been larger than the remaining components of 'External Capital Flows' to SSA. On average, it represents 5.66% of SSA's Gross Domestic Product during the period 1991–2015. This is considerably large in comparison to 'Other Official Flows', FDI, Remittances and 'Other Private Flows', which averages are 0.06%, 0.94%, 0.22% and 1.70% respectively. It is worth noting that ODA's trend has been decreasing since the 1990s. Remittances had a slightly increasing trend between 1991 and 2004. In 2005, they increased shapely and then they have kept a relatively flat trend. FDI and OPF are so volatile that they do not exhibit clear trends.

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Figure 2.1: Components of 'External Capital Flows' to SSA
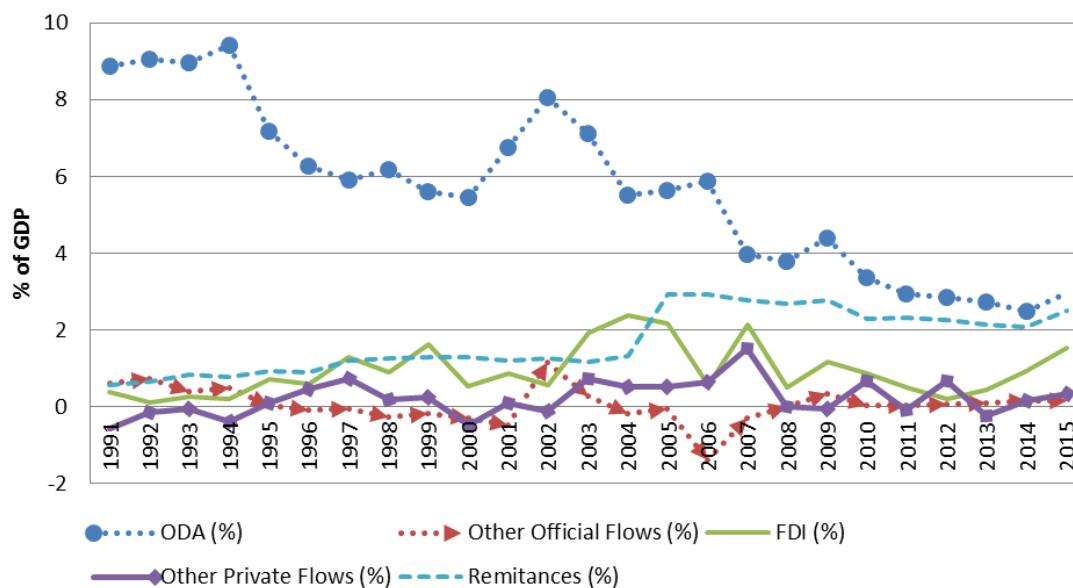


Source: author's elaboration with data from DAC (2016) and World Bank (2016b)

## 2.2  Aid versus domestic savings

Besides 'External Capital Flows', SSA's economic development is likely to be funded by its own savings. As the previous section has already indicated that ODA represents the highest share of those foreign savings, we herewith turn our comparison towards SSA's domestic savings (Figure 2.2).

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Figure 2.2: Gross Capital Formation in SSA: 1990–2012[2]
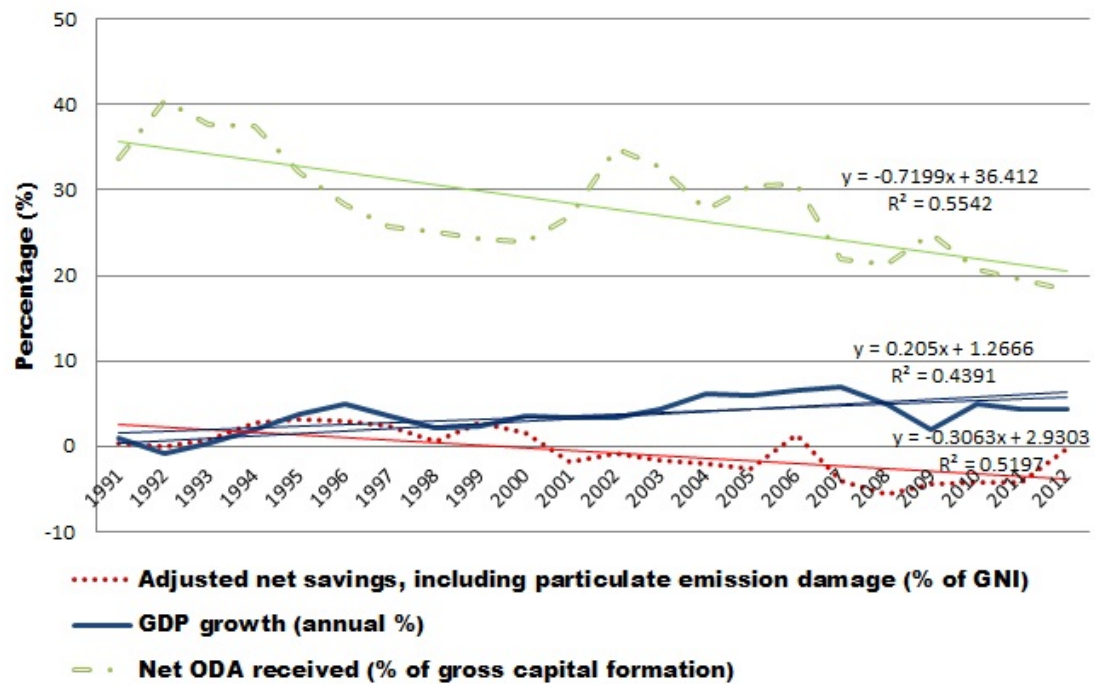


Source: author's elaboration with data from World Bank (2016b)

Figure 2.2 depicts that from 1990 up to 2012 an average negative percentage share of income (-0.58%) was saved in the SSA region. This disinvestment of 0.58% suggests that SSA internal savings was neither able to fund new physical capitals nor to renew existing ones. However, besides that overall negative trend, it worth noting that savings were slightly positive until 2000. They then became and remained negative. One could expect the opposite as the latter period is fully part of the MDG era. However, it is not surprising that a relatively high share of SSA's Gross Capital Formation was funded by foreign aid (28.39%).

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[2]We disregarded years 2013, 2014 and 2015 as they do not have data for 'Adjusted Net Savings'.

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## 2.3 Sub-Saharan Africa's participation in global Official Development Assistance

As described by Figure 2.3, most ODA delivered to Africa goes to its Sub-Saharan region. During the period 1991–2015, SSA received averages of 84.06% and 30.93% of ODA delivered to all Africa and all developing regions, respectively. Moreover, SSA's share of the African quota of ODA increases over time.

Figure 2.3: SSA's quotas of ODA delivered to all Africa and developing countries



Source: author's elaboration with data from DAC (2016)

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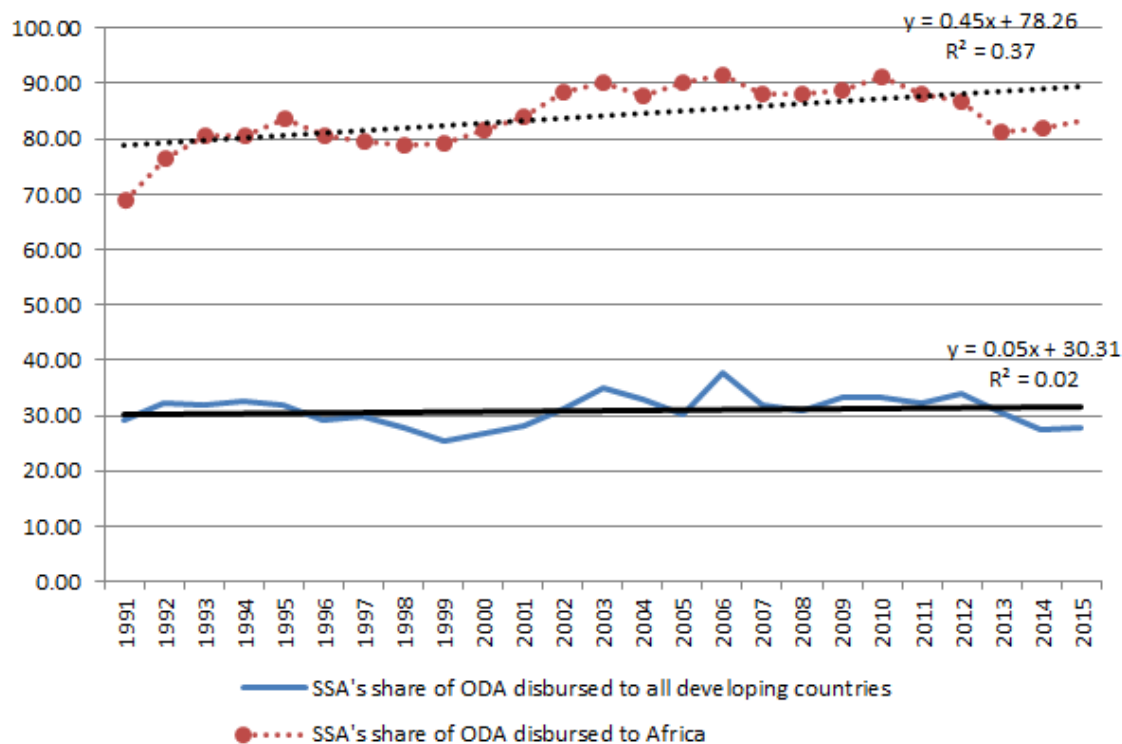
## 2.4    Geographical allocation of Official Development Assistance in Sub-Saharan Africa

The three previous sections lead to the conclusion that ODA is the major funding source of SSA economic development and that SSA is receiving a relatively high share of global ODA. Yet, ODA is not that large when weighted in terms of SSA's population.

As summarized by Table 2.1, SSA received a cumulative net ODA of 838774.38 millions of USD from 1991 to 2015. The per capita annual average is barely 33.66 $. However, this geographical distribution is right-skewed (in fact, the skewness coefficient is equal to 12). Countries that got amounts above the average are fewer than those which got below the average. Nonetheless, as its average (15825.93 $ millions) is considerably larger than its median (10432.53 $ millions), the lags to the average of the former countries are larger than those of the latter countries. Indeed, 20 countries received amounts smaller than the average ODA and 33 larger than it. The relatively large 'negative excess kurtosis' (-2.4) indicates that both country groups received ODA which are closer to the mean than to the minimum (639.60 $ millions: Seychelles) and the maximum (57428.69 $ millions: Ethiopia) allocations.

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Table 2.1: Participation of SSA countries in ODA system: 1991–2015

| Recipients | Total ODA (USD millions) | ODA quota (%) | Total ODA per capita (USD) | Ranking |
|---|---|---|---|---|
| **South of Sahara, Total** | **838774.38** | **100.00** | **841.59** | |
| Angola | 11966.58 | 1.43 | 478.24 | Q3 |
| Benin | 11826.62 | 1.41 | 1087.01 | Q3 |
| Botswana | 3578.16 | 0.43 | 1581.86 | Q1 |
| Burkina Faso | 20468.37 | 2.44 | 1130.47 | Q3 |
| Burundi | 9733.52 | 1.16 | 870.70 | Q2 |
| Cabo Verde | 4858.85 | 0.58 | 9326.01 | Q2 |
| Cameroon | 21537.67 | 2.57 | 922.62 | Q1 |
| Central African Republic | 5489.86 | 0.65 | 1120.38 | Q2 |
| Chad | 9832.21 | 1.17 | 700.45 | Q2 |
| Comoros | 1380.01 | 0.16 | 1751.28 | Q1 |
| Congo | 8123.40 | 0.97 | 1758.31 | Q2 |
| Côte d'Ivoire | 26206.98 | 3.12 | 1154.39 | Q4 |
| Democratic Republic of the Congo | 45476.14 | 5.42 | 588.56 | Q4 |
| Djibouti | 3366.89 | 0.40 | 3791.54 | Q1 |
| Equatorial Guinea | 979.82 | 0.12 | 1159.55 | Q1 |
| Eritrea | 5114.12 | 0.61 | | Q2 |
| Ethiopia | 57428.69 | 6.85 | 577.81 | Q4 |
| Gabon | 2344.41 | 0.28 | 1359.08 | Q1 |
| Gambia | 2441.20 | 0.29 | 1226.12 | Q1 |
| Ghana | 30864.70 | 3.68 | 1126.04 | Q4 |
| Guinea | 10312.98 | 1.23 | 817.91 | Q2 |
| Guinea-Bissau | 3475.55 | 0.41 | 1884.79 | Q1 |
| Kenya | 34045.68 | 4.06 | 739.32 | Q4 |
| Lesotho | 3759.15 | 0.45 | 1760.73 | Q1 |
| Liberia | 10521.25 | 1.25 | 2336.50 | Q3 |
| Madagascar | 16838.37 | 2.01 | 694.80 | Q3 |
| Malawi | 19715.49 | 2.35 | 1145.25 | Q3 |
| Mali | 21220.73 | 2.53 | 1205.72 | Q3 |
| Mauritania | 8767.75 | 1.05 | 2155.30 | Q2 |
| Mauritius | 1800.35 | 0.21 | 1425.46 | Q1 |
| Mayotte | 5075.20 | 0.61 | ... | Q2 |
| Mozambique | 46769.49 | 5.58 | 1671.65 | Q4 |
| Namibia | 5936.99 | 0.71 | 2414.39 | Q2 |
| Niger | 14556.32 | 1.74 | 731.51 | Q3 |
| Nigeria | 44052.58 | 5.25 | 241.78 | Q4 |
| Rwanda | 19088.28 | 2.28 | 1644.12 | Q3 |
| Saint Helena | 1240.64 | 0.15 | 155080.00 | Q1 |
| Sao Tome and Principe | 1420.98 | 0.17 | 7478.84 | Q1 |
| Senegal | 22339.47 | 2.66 | 1476.60 | Q4 |
| Seychelles | 639.60 | 0.08 | 6877.42 | Q1 |
| Sierra Leone | 10432.53 | 1.24 | 1616.69 | Q2 |
| Somalia | 14398.21 | 1.72 | 1334.77 | Q3 |
| South Africa | 20817.90 | 2.48 | 378.80 | Q3 |
| South Sudan | 6812.37 | 0.81 | 552.06 | Q2 |
| Sudan | 28926.81 | 3.45 | 718.95 | Q4 |
| Swaziland | 1632.31 | 0.19 | 1268.31 | Q1 |
| Tanzania | 53461.41 | 6.37 | 999.84 | Q4 |
| Togo | 5314.41 | 0.63 | 727.50 | Q2 |
| Uganda | 34968.51 | 4.17 | 895.89 | Q4 |
| Zambia | 29595.24 | 3.53 | 1825.51 | Q4 |
| Zimbabwe | 14832.35 | 1.77 | 950.61 | Q3 |

Source: author's elaboration with data from DAC (2016)

By choosing three thresholds, these SSA countries can be classified in three groups. Firstly, the "aid darlings" —such as Ethiopia (6.85%) and Tanzania (6.37%), which ODA shares are largely above the average quota (1.89%). Secondly, the "aid orphans" —such as Seychelles (0.08%) and Equatorial Guinea (0.12%), which quotas are largely below the average. Finally, the remaining countries, which quotas are either equal to, slightly above or below the average.

In that vein, the last column of table 2.1 provides the quartile based ranking for each country. Q1, Q2, Q3 and Q4 indicate that the corresponding countries got ODA quotas respectively between the minimum (0.08%) and the first quartile (0.51%), the first and the second quartile (1.24%), the second and the third quartile (2.55%) and the third quartile and the maximum (6.85%). Based on this ranking, I would consider as relatively "aid darlings" the 12 'Q4 countries' and as relatively "aid orphans" the 14 'Q1 countries'. Consequently, I would put the 13 'Q2 countries' and the 12 'Q3 countries' in the third class (remaining countries).

## 2.5  Sub-Saharan Africa's donors

According to table 2.2, ODA has mostly been delivered in bilateral framework. Multilateral ODA represents only 37.51% and were mostly delivered by the World Bank (12.33%) and EU Institutions (10.81%). Bilateral aid is largely spread. Some countries such as the United States (13.84%) and France (9.87%) have been more generous with quotas largely above the per country average (2.21%). Others such as Slovenia (roughly 0.00%), Slovak Republic (0.01%), Czech Republic (0.01%), Greece (0.02%) and Iceland (0.01%) have barely symbolically assisted SSA. The remaining countries are dispersed between these two extremes.

Table 2.2: Donors of SSA region: 1991–2015

| Donors | Total ODA (USD millions) | ODA Quota (%) |
|---|---|---|
| **All Donors, Total** | **838774.38** | **100.00** |
| DAC Countries, Total | 518211.62 | 61.78 |
| Australia | 3109.10 | 0.37 |
| Austria | 4095.84 | 0.49 |
| Belgium | 14560.63 | 1.74 |
| Canada | 20958.85 | 2.50 |
| Czech Republic | 91.21 | 0.01 |
| Denmark | 17476.55 | 2.08 |
| Finland | 5004.48 | 0.60 |
| France | 82793.70 | 9.87 |
| Germany | 46574.29 | 5.55 |
| Greece | 159.84 | 0.02 |
| Iceland | 182.60 | 0.02 |
| Ireland | 6366.58 | 0.76 |
| Italy | 15029.21 | 1.79 |
| Japan | 28009.00 | 3.34 |
| Korea | 2004.90 | 0.24 |
| Luxembourg | 2244.47 | 0.27 |
| Netherlands | 27579.48 | 3.29 |
| New Zealand | 296.55 | 0.04 |
| Norway | 21777.53 | 2.60 |
| Poland | 304.97 | 0.04 |
| Portugal | 6677.18 | 0.80 |
| Slovak Republic | 114.88 | 0.01 |
| Slovenia | 5.18 | 0.00 |
| Spain | 8252.83 | 0.98 |
| Sweden | 20399.74 | 2.43 |
| Switzerland | 9581.71 | 1.14 |
| United Kingdom | 58458.87 | 6.97 |
| United States | 116101.47 | 13.84 |
| **Multilaterals, Total** | **314639.03** | **37.51** |
| EU Institutions | 90670.04 | 10.81 |
| International Monetary Fund, Total | 13387.03 | 1.60 |
| Regional Development Banks, Total | 34381.05 | 4.10 |
| United Nations, Total | 42147.03 | 5.02 |
| World Bank Group | 103433.67 | 12.33 |
| Other Multilateral | 30667.48 | 3.66 |
| Non-DAC Countries, Total | 5923.74 | 0.71 |
| Memo: Private Donors, Total | 5163.03 | 0.62 |
| G7 Countries, Total | 367925.37 | 43.86 |
| DAC EU Members, Total | 316189.91 | 37.70 |
| DAC EU Members + EC, Total | 406859.96 | 48.51 |

Source: author's elaboration with data from DAC (2016)

## 2.6  Sectoral allocation of aid in Sub-Saharan Africa

ODA disbursed to SSA has prioritized social, commodity and humanitarian assistance more than economic and productive activities (Table 2.3).

Table 2.3: Sectoral distribution of ODA in SSA

| Sectors | ODA (USD millions) | ODA quota (%) |
|---|---|---|
| Total Gross ODA | 654184.42 | 100.00 |
| Total Sector Allocable (I+II+III+IV) | 376012.66 | 57.48 |
| **I Social Infrastructure & Services, Total** | **238399.70** | **36.44** |
| I1 Education | 39870.56 | 6.09 |
| I2 Health | 50426.56 | 7.71 |
| I3 Population Policies/Programmes & Reproductive Health | 54571.92 | 8.34 |
| I4 Water Supply & Sanitation | 22824.19 | 3.49 |
| I5 Government & Civil Society | 54094.26 | 8.27 |
| I6 Other Social Infrastructure & Services | 16612.20 | 2.54 |
| **II Economic Infrastructure & Services, Total** | **66549.29** | **10.17** |
| II1 Transport & Storage | 35528.62 | 5.43 |
| II2 Communications | 1760.80 | 0.27 |
| II3 Energy | 18587.97 | 2.84 |
| II4 Banking & Financial Services | 6567.45 | 1.00 |
| II5 Business & Other Services | 4104.45 | 0.63 |
| **III Production Sectors, Total** | **40631.79** | **6.21** |
| III1 Agriculture, Forestry, Fishing, Total | 30846.13 | 4.72 |
| III2 Industry, Mining, Construction, Total | 6338.56 | 0.97 |
| III3a Trade Policies & Regulations, Total | 3122.45 | 0.48 |
| III3b Tourism, Total | 324.64 | 0.05 |
| **IV Multi-Sector / Cross-Cutting, Total** | **30431.88** | **4.65** |
| IV1 General Environment Protection, Total | 8799.14 | 1.35 |
| IV2 Other Multisector, Total | 21632.74 | 3.31 |
| **Commodity Aid / General Programme Assistance, Total** | **56224.78** | **8.59** |
| General Budget Support, Total | 43310.17 | 6.62 |
| Developmental Food Aid/Food Security Assistance, Total | 11595.28 | 1.77 |
| Other Commodity Assistance,Total | 1319.32 | 0.20 |
| **Action Relating to Debt, Total** | **142725.33** | **21.82** |
| **Humanitarian Aid, Total** | **64929.81** | **9.93** |
| **Administrative Costs of Donors, Total** | **1749.37** | **0.27** |
| **Refugees in Donor Countries, Total** | **2554.65** | **0.39** |
| **Refugees in donor countries (non-sector allocable)** | **2554.65** | **0.39** |
| **Unallocated / Unspecified, Total** | **9987.82** | **1.53** |

Source: author's elaboration with data from DAC (2016)

According to Table 2.3, roughly half of the total amount of ODA disbursed to SSA has funded infrastructures and services. However, allocations to social sector's infrastructures and services are 3.6 times larger than those of the economic sector. Productive sector were less funded than the commodity, general program assistance and humanitarian sectors.

Within the 'social infrastructures and services', 'population policies & Reproductive Health and Government & Civil Society' are the sub-sectors mostly funded. 'Health' sector received less than the two but higher than 'education'. Concerning the 'economic infrastructure and services', 'transport & storage and communications' sectors has been prioritized. The ODA disbursed to the SSA production sector has mostly targeted agriculture, forestry and fishing.

## 2.7 Instruments of Official Development Assistance in Sub-Saharan Africa

According to Table 2.4, ODA to SSA has mostly been delivered in terms of grants (91.46%). It is worth noting the relatively large difference between net and gross loans. The former represents 8.67% of net ODA and the latter 24.74%. As received interest represents only 2.44% of Net ODA and loans repayments 6.57%, extra cost related to debt are relatively high (7.06%). This would be one of the elements making SSA's debt burden unsustainable and debt forgiveness unavoidable in the long term. Indeed, Table 2.4 indicates that 'net debt relief' is one of the largest shares of aid grants. It represents 10.07% of Net ODA.

Table 2.4: Instruments of ODA disbursed to SSA

| Instruments | ODA (USD millions) | ODA quota (%) |
|---|---|---|
| **ODA: Total Net** | **838774.38** | **100** |
| **Grants, Total** | **767127.98** | **91.46** |
| Grants: Debt Forgiveness | 154128.97 | 18.38 |
| ODA Gross Loans | 207539.18 | 24.74 |
| Rescheduled debt | 6286.94 | 0.75 |
| ODA Loan Repayments | -55138.12 | -6.57 |
| Offsetting entries for debt relief | -79709.92 | -9.50 |
| **ODA Loans: Total Net** | **72691.14** | **8.67** |
| Technical Cooperation | 127983.93 | 15.26 |
| Development Food Aid | 21084.56 | 2.51 |
| Humanitarian Aid | 81231.23 | 9.68 |
| Interest received | -20486.06 | -2.44 |
| **Memo: ODA Total. excl. Debt** | **754280.78** | **89.93** |
| Memo: Net debt relief | 84493.6 | 10.07 |

Source: author's elaboration with data from DAC (2016)

# Chapter 3

# Review of aid effectiveness literature

This chapter reviews the aid effectiveness literature and pinpoints its theoretical and empirical limitations at the current state of the issue. The first section analyzes the theoretical limitations by confronting the four main streams of aid effectiveness literature: (1) the aid optimistic stream, (2) the aid skeptic stream, (3) the Randomized Control Trial (RCT) and (4) the Self-discovery Approach to Development (SAD). The second section elaborates on the existing four generations of empirical studies dedicated to the assessment of the macroeconomic effectiveness of aid. It pays specific attention to contributions from each generation of investigation and highlights its limitations in dealing with the endogeneity issue for detecting the exogenous impact of aid on economic growth. The last section presents the ongoing efforts to overcome the last generation's limitations by pinpointing those improvements which have not yet been applied to the SSA case.

## 3.1   Main streams of aid effectiveness literature

### 3.1.1   Aid-optimistic stream: "poverty trap" and "big push" hypothesis" in Sub-Saharan Africa

The "poverty trap hypothesis" is rooted in the capital accumulation approach of growth theory. Since the consideration of the level of savings in the Harrod-Domar model (Harrod, 1939; Domar, 1946), the level of savings has become a core part of most growth models. As with Harrod-Domar, most of those models consider savings as the main trigger of the capital accumulation process and, therefore, of the economic growth (Hagemann, 2009; Solow, 1956, 2007). Assuming that all savings are invested, these models expect higher savings rates to yield higher economic growth and the opposite in case of lower savings rates. Drawing on this, some development economists associate persistent underdevelopment with little or no savings. In Sachs' words:

> *The poor start with a very low level of capital per person, and then find themselves trapped in poverty because the ratio of capital per person actually falls from generation to generation. The amount of capital per person declines when the population is growing faster than capital is being accumulated [...]. The question for growth in per capita income is whether the net capital accumulation is large enough to keep up with population growth* (Sachs 2005a, p. 245).

In line with the "big push" theory pioneered by Rosenstein-Rodan (1961c, 1943), among many others, Sachs and Warner (1997) suggest a "big push" in terms of foreign aid to overcome that trap, especially for SSA.

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In aid they saw the ability of substituting savings and pushing growth up to a threshold from which developing countries can afford saving and hence catch up with the self-sustaining capital accumulation process.

Most descriptive statistics seem to underpin that without foreign aid, SSA would be trapped in such a vicious cycle of poverty. For instance, in the previous chapter, Figure 2.2 depicted that from 1990 to 2012, an average negative percentage share of income (-0.58%) was saved in the SSA region. This disinvestment of 0.58% of GNI suggests that SSA economic growth was neither able to fund new physical capitals nor to renew the pre-existing ones. It is therefore not surprising that during the same period, a relatively high share of its Gross Capital Formation was funded by foreign aid (28.39%). From this, one could reasonably argue that the level of income was too low to cover a decent consumption and generate the net savings necessary to boost the capital accumulation process. Consequently, most SSA economies needed foreign aid to acquire or renew some vital physical capitals.

When we wanted to check whether SSA falls in the description of the poverty trap made by Sachs (2005a), we could only find the 'Gross Physical Capital Formation' data. Consequently, we had to approximate the 'Net Physical Capital Formation' by the 'Adjusted Net Savings'.[1] As in most growth models, this approximation assumes that all savings are invested. This assumption is quite realistic, considering the insufficiency (or lack) of savings in SSA to fund its huge needs for investment.

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[1]We were able to compute the 'Adjusted Net Savings' thanks to the 'Adjusted Net Savings, including particulate emission damage (constant 2005 US$)' and the 'GNI (constant 2005 US$)' published in the World Bank's World Development Indicators 2016.

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Figure 3.1 compares this approximation of net physical capital formation to population growth. It depicts that SSA population is growing faster than its physical capital. Subsequently, the ratio of capital per person is declining and hence —as it is described by Sachs (2005a, p. 245)— SSA still faces a severe poverty trap.

Figure 3.1: Dynamics of net savings and population growth in SSA: 1990–2014[3]
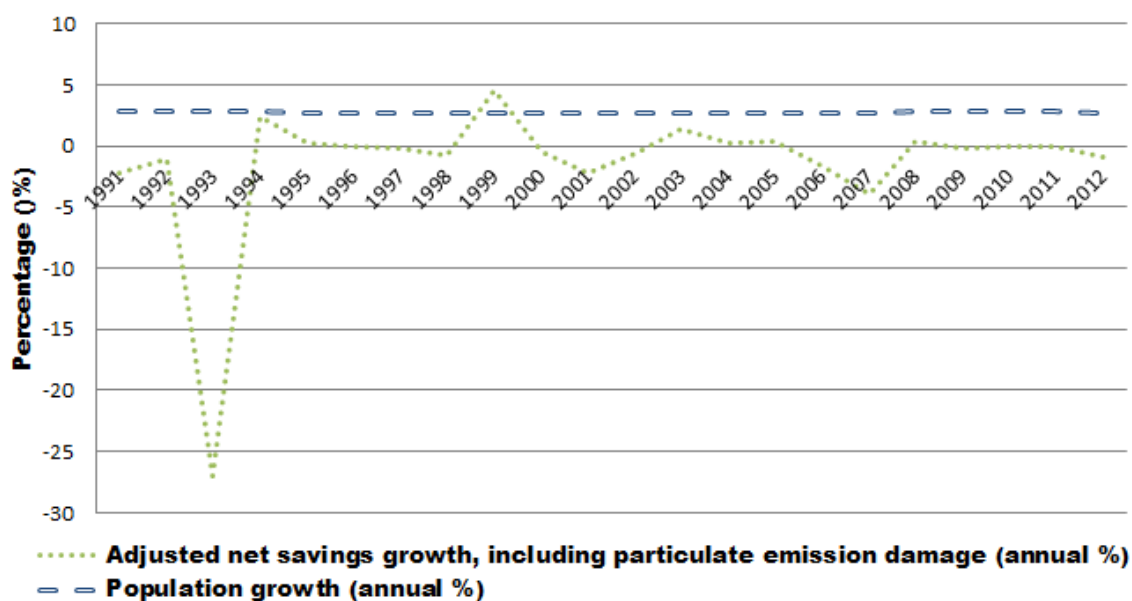


Source: author's elaboration with data from DAC (2016)

Drawing on growth theories, the classic ways out of that trap are either (1) more savings to relaunch the capital accumulation process, (2) more investments in education and health to boost the human capital, (3) more investments in research and development (or in technology adoption) or (4) a combination of some or all of them (Solow, 1956).

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[3]We disregarded year 2015 as it misses data for 'Adjusted Net Savings'.

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However, one could reasonably question the feasibility of those classic options in an economy of subsistence that is poorly managed. Indeed, Ramsey (1928) indicated that in such a survival situation the preference for present consumption tends to infinity and the global optimal level of savings is expected to be negative. Furthermore, Sachs (2005a) questions the "*public institutional capital*" in SSA. In such a situation, relying on savings to invert the poverty trap does not seem parsimonious. Among others, Sachs (2005b) further suggests that the practical way out of poverty for SSA is a "big push" in terms of allocating more and stable aid.

That policy recommendation was adopted at the UN Millennium Development Summit in 2000 and implemented within the framework of the MDG. Drawing on earlier estimations such as that of Rosenstein-Rodan (1961a) proposing a push of 1% of GNI of OECD countries, the agreed contribution of 0.7% of developed countries' GNI would be a big enough push. Such an assistance should allow African economies to cross the threshold beyond which they can afford saving and investing. According to Sachs (2005a), this aid should sequentially increase marginal productivity, income, savings, investments and consequently sustain economic growth. It should, therefore, break down the self-reinforcing mechanism which makes poverty persistent in SSA.

At the eve of the MDG' expiry, researchers and aid practitioners paid a special attention to the assessment of the 15 years of such a policy orientation. On the one hand, most development agencies positively assessed the MDG era. On the other hand, they recognized the necessity of extra efforts to eradicate poverty by 2030 —among many others, Overseas Development Institute (2013) and United Nations (2013).

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Nonetheless, macroeconomic indicators still question this optimistic viewpoint on aid effectiveness in terms of alleviating poverty and stabilizing the SSA macroeconomic framework. Indeed, Figure 3.2 confirms that ODA represents a relatively high share of SSA's GNI (an average of 5% from 1990 to 2013). However, SSA's available income is still too low to generate a significant level of savings (see Figure 2.2 in chapter 2). This situation of a durable coexistence of aid and poverty is observable in many other SSA macroeconomic aggregates. As illustration, Figure 3.2 provides an insight into such a coexistence for external debt, inflation and employment indicators.

Figure 3.2: ODA and some macroeconomic aggregates in SSA: 1960–2014
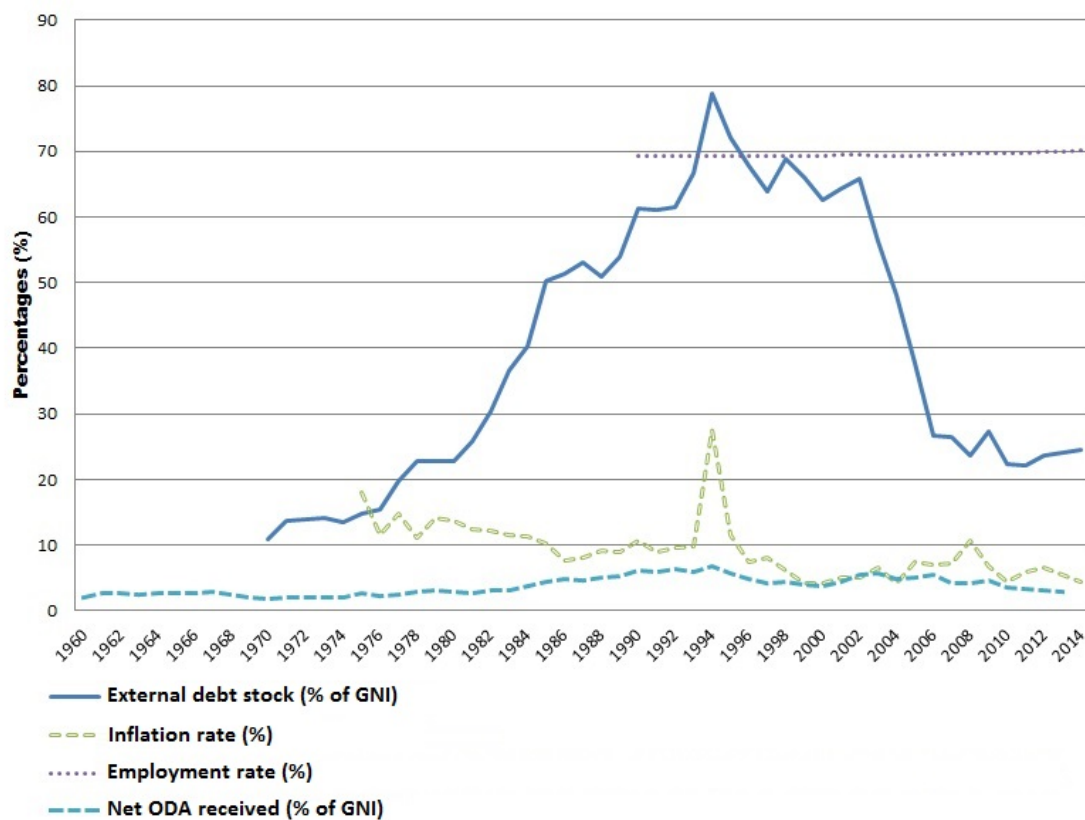


Source: author's elaboration with data from World Bank (2016b)

Let us point out the decline in ODA both as percentage share of donor countries' GNI and volume in 2008 (DAC, 2016), which could be explained by the economic depression that western economies were suffering from. That decline in ODA coincides with declines in most macroeconomic indicators in SSA. Thus, Figure 3.2 depicted the increases of inflation, external debt stock and a contraction of GDP per capita in 2008. Similarly, Figure 2.2 revealed a fall of savings in 2008 and hence a more severe poverty trap.

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However, other aspects such as the difficult economic or business climate observed along that year would have contributed —at least in part— in causing that nonperformance. Therefore, a causal conclusion questioning the aid-optimistic researchers' claim that aid is a way out of poverty in SSA needs further empirical investigation[4]. Moreover, these negative co-movements between aid and most indicators of macroeconomic performance would not validly question the aid-optimistic researchers' viewpoint, as the "big push"pioneering work already questioned the effectiveness of low ODA:

> *There is a critical ground speed which must be passed before the craft can become airborne. proceeding 'bit by bit' will not add up in its effects to sum total of the single bits. A minimum quantum of investment is necessary, though not sufficient, condition of success* (Rosenstein-Rodan, 1961c, p. 57).

DAC's (2016) statistics confirm how on average, from 1960 up to date, donors have never complied with their commitment to delivering the 0.7% of GNI which were estimated enough to overcome the poverty trap. However, it is worth noting that a few complies but the majority of donors does not. For instance, in 2015 only 6 donors out of 28 DAC countries complied: Sweden, Norway, Luxembourg, Denmark, Netherlands and United Kingdom (DAC, 2016).

Drawing on this statistical fact, aid optimistic analysts remain convinced that aid is working and therefore keep advocating that more delivery of foreign aid would make a much bigger and more observable impact on both the poverty alleviation target and other indicators of macroeconomic performance.

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[4]The causal analysis of the impact of aid on both the per capita economic growth and poverty reduction is covered by chapters 4 and 5.

From that perspective, one could conclude that if donors would have provided more aid, we would be facing a lower level of poverty today and, at best, poverty would have already been eradicated. However, aid skeptic researchers think otherwise.

## 3.1.2 Skeptical theories: "dead aid" arguments for Sub-Saharan Africa

In contrast to the previously described aid-optimists' viewpoint, other researchers think that the problem is aid itself. As we have already mentioned, they mostly argue that aid distorts economic and political institutions, which are necessary to consolidate economic growth. From their viewpoint, aid should leave place for non-distorting market based development funding (Moyo, 2009). However, Moyo's (2009) influential analysis is mainly too descriptive to underpin her claims against aid. Indeed, even if her analysis would hold true, with a simultaneous increase of development assistance on the one hand, a decline of growth and an increase of poverty on the other hand, it is neither enough to blame the former for the latter nor to consider that aid did not boost economic growth and reduce poverty.

One could expect Moyo (2009) to draw such inferential conclusions from a specific identification method considering the counter-factual hypothesis. For instance, Rajan and Subramanian's (2008) identification procedure indicated that the observed co-movement between aid and growth was merely a correlation as, after correcting the simultaneous bias, they could not detect neither a positive nor a negative causal impact of aid on growth. Nonetheless, this does not question Moyo's (2009) valuable contribution to aid effectiveness literature.

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Hence, it will remain one of the works which hihly stimulated fruitful policy debates and more pieces of research on the macroeconomic effectiveness of aid in SSA.

Some researchers —such as Angeles and Neanidis (2009); Collier (2006); Muhammed (2005); Burnside and Dollar (2000)— conditioned aid effectiveness to recipient countries' good governance and political stability. Donor countries have already tried to condition aid delivery on the observation of some measures against those distortions. As the implementation of those conditionalities are often dependent to their compatibility with some strategic interests, they are revealing their limits.

Indeed, strategic benefits lead donor countries to provide for aid even when they know beforehand that aid is more likely to be diverted (Svensson, 2000) or to induce politic and economic distortions in recipient countries (Alesina and Dollar, 2000; Hansen and Tarp, 2000; Lancaster, 2007). Therefore, Bearce and Tirone (2010) condition the macroeconomic effectiveness of aid on the smallness of donors' strategic benefits behind aid delivery. From their perspective, boosting economic reform is the channel through which aid impacts growth. They subsequently argue further that when donors' strategic benefits are large in a receiving country or region, that channel becomes dysfunctional since it is not anymore practical for the donors to credibly enforce conditions for economic reform. In fact, in the last decade most SSA countries have poorly implemented the 'democratization' condition (Figure 3.3). And yet SSA received the highest share of total ODA since 1988, surpassing other regions' shares (Figure 3.4). Among other examples, this illustrate the relative failure of the implementation of such conditionalities.

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Figure 3.3: Sub-Saharan Africa: regimes by type



Source: Polity IV (2016)

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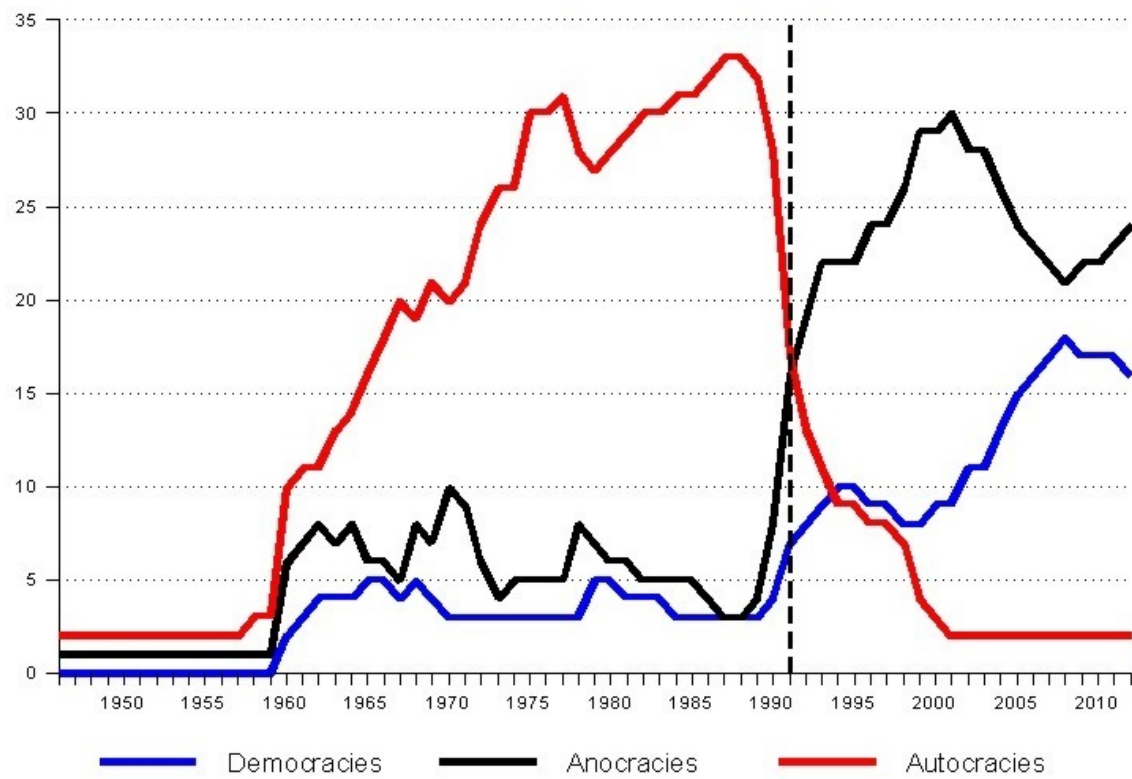
Figure 3.4: Regional ODA as a percentage share of total net disbursements: 1960–2014
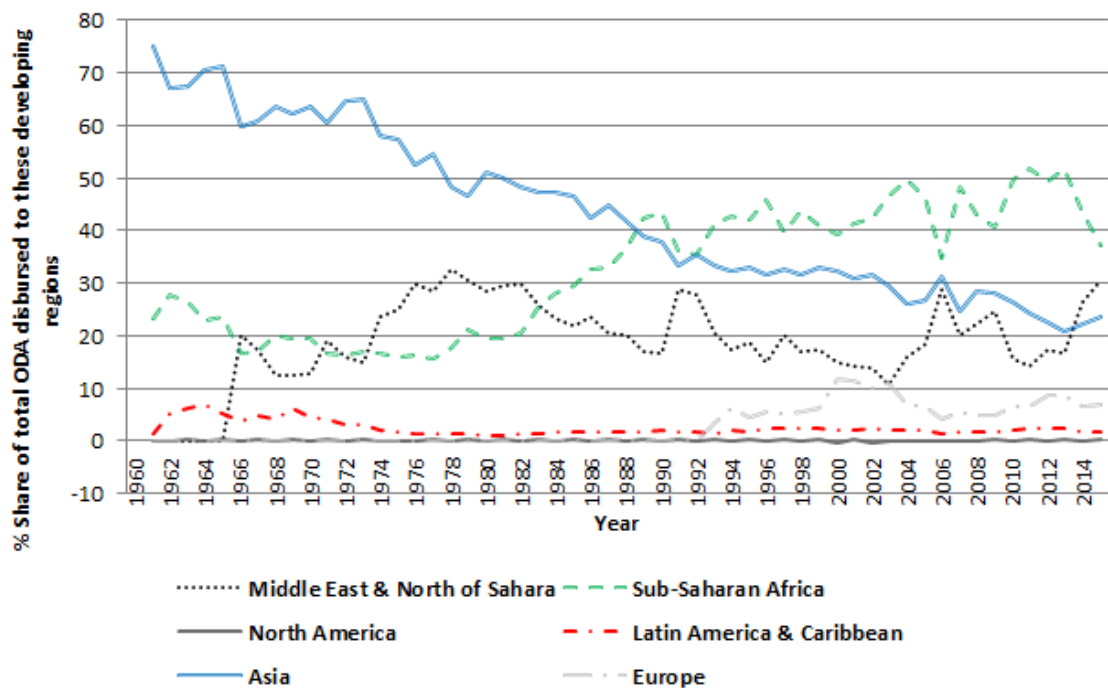


Source: author's elaboration with data from DAC (2016) and World Bank (2016b)

Indeed, while such a high level of aid delivery is compatible with the drastic fall of autocracies during the 1990s, aid delivered under the 'democratization' condition seems to tolerate the increasing number of anocraties (semi-democracies) depicted on Figure 3.3. This meets the Knack (2004) multivariate analysis showing that aid does not promote democracy. In such regimes, incumbents use State institutions and resources to make sure that democratic rules do not undermine their power and interests (Acemoglu et al., 2004; Padro, 2007). As rulers' time horizons and number of challengers are higher in autocracies than in anocracies, this misuse of economic and political institutions is logically higher in the latter regime.

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As Wright (2008) spells out:

> *First, dictators have a greater incentive to invest in public goods when they have a long time horizon. Second, dictators with short time horizons often face the threat of challengers to the regime; this leads them to forgo investment and instead consume state resources in two forms that harm growth: repression and private pay-offs to political opponents. Third, dictators with short time horizons have a strong incentive to secure personal wealth as a form of insurance in case the regime falls* (Wright, 2008, p. 971).

It is mostly in such an anocratic context that aid operates in SSA. However, is it enough to underpin a global denial of aid as an effective development policy in this SSA region? While '**yes**' is the answer of Self-discovery Approach to Development's tenants, '**no**' is that of those who advocate for the recourse to Randomized Control Trial and '**it depends** is the outcome of the analysis of the multipurpose nature of ODA.

### 3.1.3 Randomized Control Trial and Self-discovery Approach to Development

Apart from those two main streams, the aid effectiveness literature has been influenced by two development approaches known as Randomized Control Trial (Banerjee and Duflo, 2009) and Self-discovery Approach to Development (White, 1992; Narayan et al., 2009; Easterly, 2006). The first approach is close to the aid optimistic stream and the second to the skeptic stream.

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As it is the case for effectiveness tests for new treatments in medicine, Randomized Control Trial (RCT) tries to establish the impact of a development policy, program or intervention by applying it to a group of people (treatment group). RCT then follows up and compares subsequent changes of situations to that of a similar group on which the development policy, program or intervention was not applied (control group). The improvement of the control group's situation provides for 'the counter-factual' or 'the endogenous variation'. Consequently, the difference between the observed improvement on the treated group and that counter-factual results in the actual impact. This make RCT the best existing strategy to identify exogenous (causal) effects.

However, RCT is not applicable to cross-country or region analysis, as they are not randomisable. Drawing on Pritchett and Sandefur (2014, 2015) who question the effectiveness of RCT regarding most complicated issues that developing countries are facing —among many other examples (1) corruption (2) low entrepreneurship (3) lack of institutions pulling up productivity (4) misuse of public funds and goods— I would describe RCT as a 'micro-level assessment tool' working for some development interventions rather than a 'special way' to solve key development issues.

In the same vein, Cohen and Easterly (2009) saw in RCT a shift of focus from 'thinking big' on what we have failed to know to 'thinking small' on what we can accurately know. However, unlike in macro-econometric estimations, RCT provides a way of accurately establishing the counter-factual. Hence determine whether, when, where, how and under which conditions some development interventions are susceptible to work.

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Indeed, RCT carries out case by case investigations to overcome what is usually labeled as the 'last mile problem'. This is the paradox of the coexistence of cheap development means such as fertilizers, vaccines, technology in developing regions and issues such as nutrition, preventable diseases they can address. For instance, immunization has been known since many years, but many children cannot get basic vaccinations. Malaria bed nets are not expensive, and for many years we have known that they work, yet many children were died from malaria.

Thanks to RCT studies, appropriate programs —such as increasing vaccines delivery and malaria bed nets— have been suggested and implemented. Those interventions have considerably saved the lives of millions of people in SSA and elsewhere (Banerjee and Duflo, 2009). Indeed, net ODA is positively correlated to SSA's human development. As illustrated by Table 3.1, these correlations are particularly higher in health and education sectors which benefit from many projects implemented by Non-Governmental Organizations (NGO) and different specialized UN agencies such as World Health Organization (WHO) and United Nations Children's Fund (UNICEF).

Table 3.1: ODA and some HDI: 1960–2015

| Correlation | ODA |
|---|---|
| Immunization, DPT (% of children ages 12–23 months) | 0.83 |
| Improved sanitation facilities, rural (% of rural population with access) | 0.89 |
| Improved water source, rural (% of rural population with access) | 0.82 |
| Life expectancy at birth, total (years) | 0.95 |
| Lifetime risk of maternal death (%) | -0.82 |
| Maternal mortality ratio (modeled estimate, per 100,000 live births) | -0.86 |
| Mortality rate, infant (per 1,000 live births) | -0.94 |
| Enrolment in primary education, both sexes (number) | 0.93 |
| Enrolment in secondary education, both sexes (number) | 0.93 |

Source: author's computation with data from World Bank (2016b)

According to Duflo (2009), RCT is behind most of such successful projects. Furthermore, in her viewpoint, development policies that RCT studies have found effective or unsuccessful in a region can be respectively replicated elsewhere or abandoned. Based on those assumptions, she considers RCT an international public good which should be funded by international agencies in order to optimize its potential of making development assistance more efficient.

Nevertheless, some researchers such as Ravallion (2012) do not agree with such an external validity of RCT studies. In their viewpoint, if a development policy works in a country at a given period of time, it is not evident that it would work in another country or even in the same country at a different time.

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Hence, they recognize the positive contributions of RCT studies and related policy recommendations in fighting specific cases of poverty trap, but disagree with their ability to fight global poverty which —in their viewpoint— remains a macroeconomic issue.

On the other hand, Self-discovery Approach to Development (SAD)'s tenants argue that each country has to design and/or discover its own solution. They insist that imported development policies never give adequate incentives to beneficiaries. In that, Easterly (2002) saw the reason why aid inflows to SSA and elsewhere were not sufficiently transformed into productive activities by recipient countries, while donors thought that aid would be a realistic substitute of savings to launch the capital accumulation process. Easterly (2002) further argues that whatever the good intentions and promising economic intuitions behind most externally designed development policies, their distorting effects on incentives make them counterproductive.

For instance, in Easterly's viewpoint, a seemingly good policy such as funding the 'education for all program'[5] does not systematically induce economic growth and better life as expected. On the contrary, it may distort the good incentives and encourage people to acquire the wrong set of skills or use the acquired knowledge in rent-seeking rather than in productive activities.

Despite the critics of Self-discovery Approach to Development's tenants, RCT studies are increasingly considered to be appropriate for specific development issues. Subsequently, they are getting more and more practical recognition and support from development agencies and practitioners.

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[5]It is a program aiming to make basic education available for everybody. It is specially promoted by UNESCO, UNDP, UNICEF and the World Bank (UNICEF, 2016).

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Their success stems from beforehand micro-level impact evaluations. Those evaluations provide ways of implementing development interventions minimizing strategic, managerial and logistic inefficiencies. Such a strategy matches with micro-aid. From that, they would at best be a way out of failure of the latter. Nevertheless, at the macro level the question remains debatable and leaves room to further empirical testing. Indeed, while it seems evident that RCT-based projects implemented by NGO and UN agencies mostly target developmental (economic and social) issues, there is no consensus on the actual purposes of macro-aid.

### 3.1.4   Multipurpose nature of macro-aid

On the one hand, Figure 3.5 shows that higher ODA delivery since the 1990s coincides with higher economic growth in the SSA region.

Figure 3.5: Growth dynamics in SSA: 1961–2014



Source: author's elaboration with data from DAC (2016)

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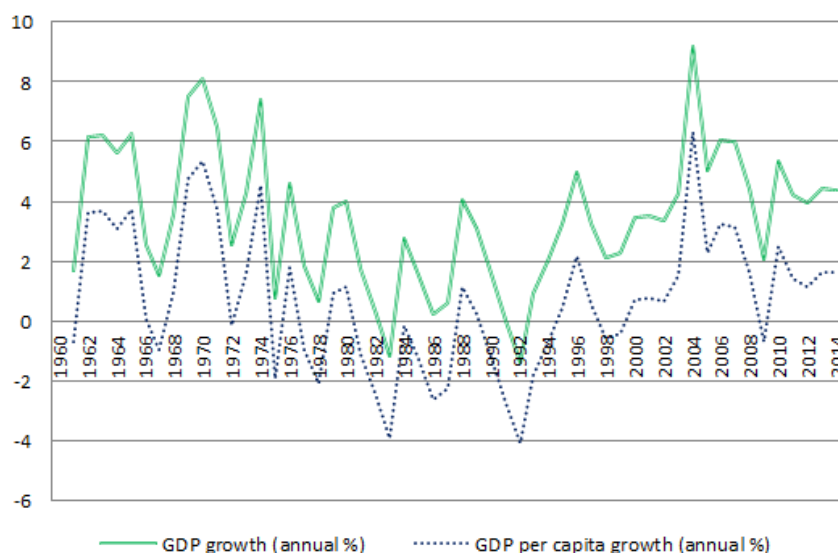
On the other hand, Figure 3.4 pinpointed that donors have prioritized SSA since the 1990s. Is this positive co-movement between aid and economic growth a simple correlation or an actual causality? To prepare the more elaborated empirical investigations on this causality question, this section checks the extent to which this higher ODA has underpinned economic and social needs in SSA.

Although by definition ODA is intended to serve, first and foremost, receiving countries' developmental needs, it has been shown that it is also used to pursue political, strategic and commercial objectives of donor countries. Therefore, before analyzing the aid macro-effectiveness, we need to understand the donors' decisions that determine the geographical allocation of aid.

In his recent review of the aid allocation literature, Tezanos (2015) summarizes those multiple purposes surrounding the allocation of aid with the economic model formalized in Equation 3.1.

$$A_t = f(N_{jt}, I_{jt}, G_{jt}); j = 1, ..., J \tag{3.1}$$

Where $A_t$ is the donor's aid budget in period t; $N_j$ is a vector of variables that explains the level of necessity of the recipient country j; $I_j$ is a vector of variables that explains the donor's interests on the recipient country j; and $G_j$ is a vector of determining variables of aid effectiveness. In other words, Equation 3.1 suggests that aid allocation is driven by three groups of reasons:

- Developmental aid $(N_j)$ which describes the share of aid delivered for the international solidarity against poverty

- Instrumental aid $(I_j)$ which consists of the share of aid used by donors to promote their strategic interests and values in receiving countries

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- Aid promoting good governance and policies ($G_j$) which captures the fact that higher amounts may be delivered where aid works or is expected to work better.

Tezanos (2015, p.104)'s review of the empirical estimations of various specifications of Equation 3.1 indicates that:

> in reality, aid is allocated in an 'eclectic' way, so that developing countries with greater political, historical and cultural affinities with donors, as well as countries with greater economic and geo-strategic importance, tend to receive more aid than other countries with similar —or greater— levels of need.

That, therefore, assigns a higher weight to instrumental aid. The latter aid ($I_j$) can be segmented in terms of aid (1) promoting democracy, (2) maintaining political stability, building voice and empowerment of civil society, (4) making more effective the war against terrorism, (5)containing refugees inflows and so on.

For example, as pinpointed by the European Commission for the case of European foreign aid, aid is used to export and serve some donors' interests and values in recipient countries:

> EU development policy has helped larger numbers of people live less poor, longer and freer lives. Policies, and the monies put behind them, have helped to demonstrate the European Union commitment to the core European values (European Commission, 2016, p. 2).

However, as it is the case for helping "*larger numbers of people live less poor and longer*", serving donors' values does not necessarily imply that these values and interests are against those of receiving countries. Nevertheless, as it is often the case for helping "*larger numbers of people live freer*", it neither implies an enthusiastic adhesion of leaders of receiving countries to all of them.

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Nonetheless, though more and more negotiable since the 2000s, it is worth noting that the alignment to the latter values and interests still weight considerably in the process of allocating aid (Alesina and Dollar, 2000; Tezanos, 2015). In that way, leaders of sending countries make sure that they keep an acceptable support of their constituencies whose opinion, as taxpayers and subsequently primary donors of most 'traditional' aid which is funded by developed countries' budgets, matters in the context of a democratic governance.

The 2016 Eurobarometer dedicated to *donor citizens' views on development, cooperation and aid* shows that an overwhelming majority of European citizens (89% in 2015 and higher than 80% since 2013) perceives necessary to help people in developing countries (European Commission, 2016). Elsewhere, most of them seem convinced that developing countries are trapped in poverty and need an external assistance to overcome it.

Indeed, the number of those who think that tackling poverty in developing countries should be one of the main priorities of developed countries is much higher than that of those who think that it should be one of the main priorities of recipient countries' governments (69% against 50%). Regarding the reason why they are so concerned about poverty and express such an agreement for helping developing countries: a large majority (80%) claims that helping poor countries also serves their own interests as it creates trade opportunities and a better access to energy and raw materials. Thus, they agree that it has an actual positive impact on themselves (72%).

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Similarly, the majority of the Europeans (76%) thinks that delivering aid is good since it makes the world more peaceful and equal on the one hand and; that it is an effective way of tackling illegal migration (73%) on the other hand. Furthermore, they also think that it is the moral responsibility of developed countries to assist developing countries (74%).

In sum, a large variety of the motives —both altruistic (international solidarity) and strategic (donors' interests)— are supported by the majority of European citizens. However, some of them are complementary and others are not.

For instance, while promoting democracy reduces the likelihood of violent conflict in countries with a relatively high income, Collier and Rohner (2008) empirically show that it drives violent conflict in countries with a relatively low income. Thus, aid promoting democracy and aid supporting voice and empowerment of civil society may seem undeniably complementary but, may jointly undermine political stability in relatively low-income recipient countries. This instability would then complicate both the war against terrorism and the control of refugee inflows. These negative feed-backs among these goals make the aid allocation process very delicate for donors and a full cut of support almost impossible, since aid delivered to a given country may miss most of those targets by keeping performing well for few but crucial ones.

Molenaers et al. (2015) empirically assessed the way donors adjust their budget supports to discourage recipient counties' misconducts regarding some of these targets. Their results underpin that donors tend to be quite sensitive to political regress and that economic regress is more tolerated than democratic regress. They further pinpoint that donors mostly do not cut aid (fully stop), but rather reduce, delay or re-channel it.

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## 3.2 Empirical studies on the macroeconomic effectiveness of Official Development Assistance in Sub-Saharan Africa

### 3.2.1 The four generations of aid macroeconomic effectiveness

Since the 1960s, the aid effectiveness literature has been covered by a considerable number of empirical studies. While pioneering investigations have the merit of shading light on following studies, the gradual improvements of estimation methods and the quality and availability of data have always made the findings of posterior researchers better and more clarifying than that of their prior peers. That is, they help detect the exogenous impact of foreign aid on economic growth and guide policy makers, aid agencies and practitioners.

Drawing on earlier literature reviews[6], we group those sequential improvements into four generations. Tezanos (2010) distinguished them in terms of studies which investigated the impact of aid on growth through savings and then through investment, those which considered other relevant aspects such as the effects of recipient countries' institutions and finally the more promising ones which tried to overcome the limits of the third generation by using new methodological advances and the availability of quality data.

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[6]See, among others, McGillivray et al. (2006), Dalgaard and Hansern (2010), Hansen and Tarp (2000), Doucouliagos and Paldam (2008) and Tezanos (2010)

Indeed, the first generation investigated the growth stimulating effects of aid through savings. Drawing on growth theories and considering incomes of poor countries too low to generate domestic savings, the early studies saw in aid a substitute of domestic savings to stimulate the capital accumulation of countries with too low income to generate savings. Rosenstein-Rodan (1961b), among others, claimed that foreign aid proportionally increases domestic savings and, provided that savings are finally invested, eventually leads to growth.

Nevertheless, such a one-to-one relationship was quickly rejected by empirical exercises. Moreover, some studies suggested that the higher the foreign aid was, the lower the economic growth became (Griffin and Enos, 1970). It was quite naïve to assume that aid could be fully transformed in investment. The lack of awareness on the fungible nature of aid is today recognized as the main limit of those early studies. For instance, it is more logical to expect a highly aid dependent and poor country to allocate aid in final consumption rather than in investment. On the other hand, for strategic reasons, donors may deliver aid for unproductive activities or simply let a predatory regime divert it. Confirming that, some researchers argue that such a non-proportional (or even negative) co-movement between aid and growth was due to the fact that aid may demotivate both public and private domestic savings and hence reduce domestic investment (Weisskopf, 1972).

The second generation of studies shifted the focus from savings to investment. The rationale was that proving that aid positively impacts investment would be enough to conclude that it positively affects growth. In this line, some researchers found that aid had a positive impact on investment (Hansen and Tarp, 2000). However, others, such as Massell et al. (1972), found the opposite.

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It is worth noting that Griffin and Enos (1970) already questioned their own estimation of a negative aid-growth elasticity. Even though they concluded that it is aid which decreased growth according to what they considered as the intuitively valid direction of the causality, they acknowledge that such a negative sign would capture the reversal causality. That is, the lower the economic growth, the higher the foreign aid is expected to be.

In their meta-analysis, Doucouliagos and Paldam (2006) reviewed all papers of the first and second generations published till first January 2005. They found that the impact of aid on 'accumulation' (savings or investment) was much lower than expected. They pointed out that an average of 25% of disbursed aid would have contributed to physical capital accumulation while the remaining 75% were 'crowded out by a fall in savings'.

To deal with the endogeneity issue, the third generation took advantage of the availability of higher quality data and resorted to advances in growth theories to make more elaborated estimation models. Those estimation models try to disentangle the exogenous from the endogenous effects of aid on growth. McGillivray et al.'s (2006) literature review of those studies displayed that up to the 1990s they came up with either 'contradictory or inconclusive results'. Doucouliagos and Paldam's (2008) meta-study analyzed whether those contradictions and that inconclusiveness were disappearing over time. They found that "*the results do have a positive average, but it is small, insignificant and falling; [and that] variation between studies can be attributed to publication outlet, institutional affiliation, data and specification differences*" (Doucouliagos and Paldam, 2008, p. 27).

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Elsewhere, the Doucouliagos and Paldam (2010) meta-study exclusively reviewed papers dedicated to the 'conditional aid effectiveness' which empirically assess the assumption that aid has a positive impact on growth in a country with 'good policy' and the opposite otherwise. They found that 'good policies' stimulate economic growth in general, but they could not find evidence supporting that those policies increase ODA's ability to promote growth.

Doucouliagos and Paldam (2011) updated their previous meta-analyses and found that, though the contradictions and inconclusiveness of the impact of 'overall' aid on growth still persist, "*new evidence suggests that some aid components may have a positive effect on growth*" (Doucouliagos and Paldam, 2011, p.399). In the same vein, Mavrotas and Nunnenkamp (2007) convincingly argued in favor of considering aid heterogeneity in the assessment of the macroeconomic effectiveness of aid. Otherwise, the assessment is more likely to be biased or misunderstood.

Therefore, studies of the fourth generation have considered the aid heterogeneity by distinguishing aid types according to either their targets and objectives or their delivery modalities. Even though this has not yet been done for the case of SSA, it has proved to be useful in giving deeper insights into the effectiveness of aid. For instance, by considering sectoral allocation, Thiele et al. (2007) revealed that aid was less likely to contribute significantly to the MDG because donors claimed to fund the latter while they were practically funding unrelated sectors. To assess aid effectiveness according to incentives behind modality choices, Jain (2007) applied the 'principal-agent' framework to 'donor country voters and their aid agency administrators'. Jain's (2007) finding questioned donors' prioritization of project-based aid while general budget support seemed more efficient.

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His theoretical model indicated that information asymmetry allows donors to impose such an inefficient preference without objection of voters who are poorly informed about the effectiveness of alternative development funding modalities.

Furthermore, Mavrotas and Ouattar (2007) distinguished between ODA projects and financial programs in their General Method of Moments (GMM) estimation, which they applied to a panel of data covering 106 aid-recipient countries from 1970 to 2001. The estimations revealed that financial programs induce higher government final consumption while ODA projects increase capital expenditure. The Asiedu and Nandwa (2007) analysis of the impact of foreign aid in education on growth considered the aid's heterogeneous nature in disentangling 'overall' aid in the share, respectively funding primary, secondary, and higher education. They run separate regressions for 29 low and middle income countries between 1990 and 2004. They also found that those different aid modalities affected growth differently. While aid promoting primary education positively affected growth in low income countries, aid targeting post-primary education had no significant effect. For middle income countries, only the share of aid promoting higher education positively affected growth. Those targeting primary and secondary education seemed to have negative effects. Elsewhere, Dovern and Nunnenkamp (2007) disentangled aid in grants and concessional loans in their cross-regional analysis of the impact of ODA on "growth acceleration"[7] of 124 developing countries from 1960 to 1994. They found that aid loans perform better than aid grants.

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[7]Variation in annual average economic growth within a chosen time interval and exceed a chosen threshold (Dovern and Nunnenkamp, 2007, p. 363).

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In the same vein,Tezanos et al. (2013) distinguished between two other aid modalities (aid loans and aid grants) in their empirical investigation of ODA macroeconomic effectiveness in Latin America and the Caribbean (LAC) countries from 1992 to 2007, and concluded that the impact of loans was greater than that of grants. That result —according to the authors— supports the use of both aid modalities in a middle-income region such as LAC, despite its long record of debt sustainability problems.

As a matter of fact, none of these studies have specifically analyzed the case of SSA. To date the potential of considering different aid modalities have not yet been explored in examining extensively the aid-growth nexus for the specific case of the SSA region.

### 3.2.2   Aid effectiveness puzzle in Sub-Saharan Africa

Since 1995, SSA's growth has shown a positive trend with relatively high growth rates fluctuating between 4 and 8 % (See Figure 3.5 in the previous section). If SSA keeps growing at this pace, it will double its annual GDP per capita in 9 to 18 years. If that growth also benefits the poor, it will help the region to advance towards the goal of eradicating income poverty as the SDG claim. More importantly, it has been recently shown that this remarkable growth is accompanied by significant increases in the income of the poorest citizens (Fosu, 2015; Pinkovskiy and Sala-i Martin, 2014). Moreover, according to Solow's (2007) self-sustaining feature of growth, an economy that has reached such a performance is more likely to keep enjoying it for several years.

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Nevertheless, similar optimistic forecasts about SSA's growth were made in the 1960s and they were eventually proven to be wrong, as the economic performance was poor from 1972 to 1994 (Maddison, 2006). What ensures that the ongoing forecasts in terms of economic growth and poverty reduction are more accurate than those made 50 years ago? To shed light on this question, development researchers have investigated both the causes of the poor performance observed during the 'lost development decades' and the key determinants of the current performance.

In this context, Collier and Gunning (1999) pointed out the low level of domestic investments. Given that the average income in SSA was (and still is) below the subsistence level needed to generate significant savings, some economists saw in foreign aid a realistic alternative to savings in order to boost and maintain the capital accumulation process and the subsequent growth (Sachs, 2005a,b). Even though it may have been partly or fully motivated by other factors which have nothing to do with this argument, the prioritization of SSA by donors with an average share of between 40 and 50 percent of global ODA since 1992 (Figure 3.4) meets the policy recommendation that one could draw from it. Subsequently, most policy makers, aid agencies and some researchers claim that higher aid causes and sustains the ongoing economic growth, and by also keeping its delivery that would ensure against re-experiencing the 'lost development decades' in SSA (United Nations, 2013; Overseas Development Institute, 2015; Sachs, 2015; United Nations, 2015b).

However, is that positive co-movement between 'more aid' and 'higher economic growth' observed since the mid 1990s a simple correlation or an actual causality? And if yes, is the previously described push against poverty trap its performing channel? There is not yet consensus on that question.

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Indeed, some investigations —such as that of Kraay and Raddatz (2007)— contradict the existence of that poverty trap in SSA.

Other development researchers —as previously explained— believe that ODA distorts the economic and political institutions that SSA needs to consolidate in order to accelerate the pace of economic growth and (income) poverty reduction (Easterly, 2002, 2006; Moyo, 2009).

Given that most SSA leaders have under control both the economic and the political power, this pessimism meets Angeles and Neanidis' (2009) analysis. This analysis shows that in a case where elites are more concerned by their own well-being than that of the worst-off, the likelihood of misusing aid is very high. Pedersen (2001) spells out such perverse effects —the so-called 'institutional distortions— within the framework of the Buchanan (1975) Samaritan's dilemma. In order to get more aid, he argues, recipient governments cut down poverty-reducing efforts as more misery is expected to make donors more altruistic. Similarly, the existence of budget support undermines the effort of enhancing tax revenues through pro-growth policies. Pedersen (2001) further argues that even if donors combine aid with 'good policy' conditions, inconsistency and credibility problems would not allow them to significantly change the outcome.

Even the most aid-optimistic researchers acknowledge that inadequate policies are as important as the lack of savings in explaining the poor performance of SSA economies (Sachs and Warner, 1997). Therefore, the 'overall' impact of aid inflows would crucially depend on their effects on the quality of macroeconomic policies and institutions. For instance, if aid disbursed to SSA induces worse macroeconomic policies, it is no longer obvious that it would lead to higher economic growth and less poverty.

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That uncertainty has raised a hot debate on the macroeconomic effectiveness of aid in this region. As illustrated in Table 3.2, a number of empirical studies on the macroeconomic impact of aid have been exclusively conducted for SSA. Some found that aid positively impacts growth (Ekanayake and Chatrna, 2010; Houdou and Njoupouognigni, 2010; Tombofa et al., 2013). Others found the opposite (Girijasankar, 2008; Ogundipe et al., 2014).

Table 3.2: Empirical studies of the macroeconomic effectiveness of aid in SSA

| Significant positive impact of aid on per capita income growth | | | | |
|---|---|---|---|---|
| Study | Period | Estimator | Aid Proxy | Results |
| Ekanayake and Chatrna (2010) | 1980–2007 | Panel Least Squares | ODA | 0.03% [71] |
| Houdou and Njoupouognigni (2010) | 1980–2007 | Pooled Mean Group Dynamic Fixed Effect | ODA | 0.05% [72] 0.13% [73] |
| Tombofa et al. (2013) | 1981–2010 | Co-integration Analysis | ODA | 0.79% [74] |
| Juselius et al. (2014) | 1965–2007 | Co-integration Aanalysis | ODA | In 27 out of 36 countries |
| **Significant negative impact of aid on per capita income growth** | | | | |
| Study | Period | Estimator | ODA | Results |
| Girijasankar (2008) | 1965–2005 | Co-integration Analysis | ODA | Negative |
| Juselius et al. (2014) | 1965–2007 | Co-integration Analysis | ODA | Only Comoros in 36 countries |
| **Positive or negative insignificant impact of aid on per capita income growth** | | | | |
| Study | Period | Estimator | ODA | Results |
| Ogundipe et al. (2014) | 1996–2010 | System GMM | ODA | -0.01% [75] |
| Juselius et al. (2014) | 1965–2007 | Co-integration Analysis | ODA | Positive in 7 out of 36 countries |
| Juselius et al. (2014) | 1965–2007 | Co-integration Analysis | ODA | Only Ghana in 36 countries (-) |

Source: author's elaboration

41. growth response from a 1% ODA impulse

42. growth response from a 1% ODA impulse for the Pooled Mean Grouped estimator

43. growth response from a 1% ODA impulse for the Dynamic Fixed Effect estimator

44. (long term) growth response from a 1% ODA impulse

44. growth response from a 1% ODA impulse

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Even though Table 3.2 merely provides a sample of empirical studies on aid effectiveness in SSA, it is worth noting that it is fully representative of the whole population of those studies; given that all of them came up with either 'significant positive', 'significant negative', 'insignificant positive' or 'insignificant negative' impacts of aid on per capita GDP growth. Differences in outcomes are mostly due to differences in estimation methodologies. As illustrated by Houdou and Njoupouognigni (2010), who used both Pooled Mean Group (PMG) and Dynamic Fixed Effect Estimators (DFE), applying two different estimators on the same SSA growth and aid data may bring very different regression results. In Houdou and Njoupouognigni (2010), PMG brought an aid-growth elasticity of 0.05 while DFE came up with 0.13.

Let us exemplify this inconclusive empirical debate by revising in more detail five of these studies. Houdou and Njoupouognigni (2010), investigated the long-term effect of foreign direct investments and foreign aid on growth in 36 African countries from 1980 to 2007. They found a positive but low impact of aid: a 1% increase in foreign aid resulted 'only' in a 0.05% increase in growth. In contrast, Girijasankar (2008), in a Co-integration Analysis of the six poorest and most aid-dependent African countries —Central African Republic, Malawi, Mali, Niger, Sierra Leone and Togo— found that the long-term effect of aid on growth was negative and statistically significant. Nevertheless, Denkabe (2004) reconciled these two opposite outcomes by arguing the existence of decreasing marginal returns to aid and, thus, the existence of a threshold volume (i.e. a turning point) below which aid stimulates growth and above which it undermines it.

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Moreover, Feeny and McGillivray (2009) underpinned that threshold hypothesis with their analysis, which showed that some countries can efficiently absorb more aid than they have received while others receive far more aid than they can efficiently absorb. Finally, Kathavate (2013) spelled out the negative aid-growth elasticity with a quantitative political economy model for SSA. His empirical findings showed that the aid-growth nexus significantly fluctuates with the quality of institutions in which aid operates.

Put together, these five papers show that there is no 'yes or no' answer for whether aid is effective in SSA. Aid performance in this region depends on several factors and, given the inconclusiveness of the debate, further investigations are still necessary for a better understanding of whether, when and how foreign aid stimulates economic growth and poverty reduction.

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# Chapter 4

# Methodological framework

This chapter presents the methods that we use to address the research questions of this Thesis. Section 1 provides our analytical model. It is specified to capture both the stimulating and distorting effects of ODA on SSA per capita income growth. Sections 2 and 3 elaborate on the econometric procedures retained for the estimation of that model respectively in the short and long term. Section 4 describes the selected proxies and section 5 details the variables and their respective sources.

## 4.1   Analytical model

We developed a model accounting for two aid modalities: grants and loans. As previously shown by Chang et al. (2002) and Tezanos et al. (2013), such a model —that disentangles ODA in these two components— should give deeper insight into (1) the existence of aid perverse effects and (2) the extent to which they undermine the potential of aid to boost and sustain growth.

Hence, following the Barro (1991) methodology, we assume that GDP per capita growth $y_{i,t}$ of a country $i$ between years $t_0$ and $t_1$ is an increasing function of the initial GDP per capita $y_{i,to}$ and a linear combination of the explanatory variables $\sum_{i=1}^{n} \beta_i X_{i,t}$:

$$y_{i,t} = k_1 + \delta_1 y_{i,t0} + \sum_{i=1}^{n} \beta_i X_{i,t} + \mu_{i,t}^1 \tag{4.1}$$

As we are interested in the specific effects of the two aid modalities, we disentangle $\sum_{i=1}^{n} \beta_i X_{i,t}$ in aid-grants (G), aid-concessional loans (L) and a linear combination of other explanatory variables disregarded in the model $\sum_{i=1}^{m} \Omega_i Z_{i,t}$:

$$y_{i,t} = k_4 + \delta_4 y_{i,t0} + \beta_G G_{i,t} + \beta_L L_{i,t} + \sum_{i=1}^{m} \Omega_i Z_{i,t} + \mu_{i,t}^2 \tag{4.2}$$

As our second aim is to estimate the effects of these aid modalities on the 'inequality-adjusted' growth, we then shift our focus from the 'overall' income to the mean income corrected from inequality. We use the superscript 'ia' to mean 'inequality-adjusted'. $y_{i,t}$ is corrected from inequality ($y_{i,t}^{ia}$) using the complement to one of the Gini coefficients[1]:

$$y_{i,t}^{ia} = (1 - \text{GINI}_{i,t}) y_{i,t} \tag{4.3}$$

By substituting $y_{i,t}$ by $y_{i,t}^{ia}$ in Equation 4.2, we have:

$$y_{i,t}^{ia} = k_2 + \delta_2 y_{i,to}^{ia} + \beta_G^{ia} G_{i,t} + \beta_L^{ia} L_{i,t} + \sum_{i=1}^{m} \Omega_i Z_{i,t} + \mu_{i,t}^3 \tag{4.4}$$

Equation 4.4 enables us to assess the effectiveness of the aid share that is delivered to the poorest citizens.

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[1]The first part of the following section (Variables and sources) extensively elaborates on this adjustment method.

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That is worthwhile since aid is expected to prioritize disadvantaged people —
especially within the SDG agendas, provided that the latter pledges that *"no one
will be left behind"* (United Nations, 2015b, p.3).

All in all, we retain Equations 4.2 and 4.4 make up our analytical model. They
do not assume equal growth impact coefficients of aid grants and aid loans (i.e.
$\beta_G \neq \beta_L$ and $\beta_G^{ia} \neq \beta_L^{ia}$). Indeed, aid loans and grants have very different financial
natures.

On the one hand, aid loans are refundable and exert a positive incentive to
productively invest the resources in order to meet the future repayment obligations,
as they cannot be diverted without default risk. This would significantly reduce
the perverse effects of aid loans in comparison to those of aid grants. On the other
hand, aid loans generate external debt, which may compromise the future financial
capacity of recipient countries and hence undermine their 'overall' effectiveness.

Specifically, the impact of aid grants will be positive ($\beta_G \geq 0$) if their stimulus
on growth compensates for the negative effect on productive incentives. Similarly,
the impact of aid loans will be positive ($\beta_L \geq 0$) if their stimulus on growth
compensates for the debt burden's negative effect. In this setting, we check the
following seven disputed assumptions regarding the effectiveness of aid in SSA.

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- **Assumptions of 'overall' effectiveness**

    $H_1 : \beta_A > 0$:     Aid as a whole exerts a positive impact on the 'overall'
    economic growth (where $\beta_A$ combines $\beta_G$ and $\beta_L$).

    $H_2 : \beta_A^{ia} > 0$:     Aid as a whole exerts a positive impact on the 'inequality-
    adjusted' growth (where $\beta_A^{ia}$ combines $\beta_G^{ia}$ and $\beta_L^{ia}$).

- **Assumptions of different impacts of aid grants and loans**

    $H_3 : \beta_G > \beta_L$:     The impact of aid grants on the 'overall' economic growth
    is higher than that of aid loans.

    $H_4 : \beta_G^{ia} > \beta_L^{ia}$:     The impact of aid grants on the 'inequality-adjusted'
    growth is higher than that of aid loans.

- **Assumptions of inclusiveness**

    $H_5 : \beta_G^{ia} > \beta_G$:     The impact of aid grants is higher on the 'inequality-
    adjusted' growth than on the 'overall' growth.

    $H_6 : \beta_L^{ia} > \beta_L$:     The impact of aid loans is higher on the 'inequality-
    adjusted' growth than on the 'overall' growth.

    $H_7 : \beta_A^{ia} > \beta_A$:     In aggregated terms, the impact of aid is higher on the
    'inequality-adjusted' growth than on the 'overall' growth
    (where $\beta_A^{ia}$ combines $\beta_G^{ia}$ and $\beta_L^{ia}$).

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While $H_1$ and $H_2$ evaluate the 'overall' effectiveness, $H_3$ and $H_4$ assess the existence of distorting effects on recipient economies. When there is a lack of distortions, the estimation is expected to confirm those two hypotheses. It is possible to compute the related magnitude without and with inequality adjustment by using the following Equations:

$$\mathrm{M}_{g,l} = \frac{|\beta_G - \beta_L|}{|\beta_L|} \quad (4.5)$$

$$\mathrm{M}_{g,l}^{ia} = \frac{|\beta_G^{ia} - \beta_L^{ia}|}{|\beta_L^{ia}|} \quad (4.6)$$

$\mathrm{M}_{g,l}$ and $\mathrm{M}_{g,l}^{ia}$ capture the expected extra effectiveness associated with aid grants, which is considered as the most favorable loan. In line with Sachs (2005a), this would be the adequate "big push" to overcome the poverty trap in SSA.

In contrast, if $H_3$ and $H_4$ are empirically rejected, then the higher vulnerability of aid grants to distortions outweighs the above-mentioned advantage. In this case, as claimed by Moyo (2009), grants distort economies more than they stimulate them. To evaluate the 'overall' effectiveness, $H_1$ and $H_2$ merge the effects of aid grants and aid loans with and without inequality adjustment. If empirically confirmed, in aggregated terms the stimulating effects of aid are higher than their distorting effects.

$H_5$, $H_6$ and $H_7$ jointly assess inclusiveness by respectively assuming that the impacts of grants, concessional loans and total aid are higher on the 'inequality-adjusted' economic growth than on the unadjusted economic growth.

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## 4.2   Econometric procedure

### 4.2.1   Short term analysis

For econometric accuracy, we are aware that in the retained analytical models (Equations 4.2 and 4.4) both $G_{i,t}$ and $L_{i,t}$ are endogenous variables. One explanation is that both the eligibility criteria to aid grants and to aid loans as well as their respective volume partly depend on the income levels of the recipient countries. This would introduce the reversal —or double— causality bias in the estimation. Furthermore, several phenomena —such as armed conflicts, governance quality and natural resources endowment— affect both economic growth and aid inflows, thus causing the omitted variable bias. Subsequently, we need an appropriate estimation method that enables us to estimate the unbiased causal effects of each $\beta$ from Equations 4.2 and 4.4.

To do so, most of the previous empirical studies resorted to Instrumental Variables (IV)[2]. However, in order to take into account the interdependency between aid and growth, we use a VAR model which has a comparative advantage in the assessment for the estimates of each $\beta$ of Equations 4.2 and 4.4.

For the VAR framework, the coefficients $\beta_G$, $\beta_L$, $\beta_G^{ia}$ and $\beta_L^{ia}$ are portions of the responses from impulses in the aid equations of two three-series VAR models with GDP per capita (1) without inequality adjustment ($y_{i,t}$) and (2) with inequality adjustment ($y_{i,t}^{ia}$).

---

[2]For instance, Hansen and Tarp (2000), Dalgaard and Hansern (2010), Chauvet and Guillaumont (2004), Rajan and Subramanian (2008), Roodman (2006), Djankov et al. (2009) and Tezanos et al. (2013) carried out IV estimations within the Arellano-Bond GMM estimator's framework.

That is due to the feedback effects that these models incorporate into the direct impacts captured by the $\beta$ coefficients of isolated equations such as Equations 4.2 and 4.4.

In other words, by using a VAR model, we do not assume that aid grants and aid loans are exogenous as in Equations 4.2 and 4.4; on the contrary, we assume them to be endogenous. That means that the VAR model considers not only the 'direct effects' that they exert on economic growth, but also the impacts ('feedback effects') that growth exerts on aid grants and aid loans. As income levels of recipient countries are one of the main eligibility criteria to both aid grant and aid loans, the existence of feedback effects are intuitively irrefutable. Hence considering them should lead to better estimates of both effects. The two VAR models that we need are derivable from the general equation of a VAR model. Hence, a 'n' dimensional VAR process ($X_t$) can be written as:

$$\overrightarrow{X}_t = C + A_1 \overrightarrow{X}_{t-1} + ... + A_p \overrightarrow{y}_{t-p} + \overrightarrow{\epsilon}_t \tag{4.7}$$

Where $X_t$ is a multivariate vector including all the time series considered as part of the VAR model.

We derive Equation 4.8 corresponding to the VAR process assessing the first and third hypotheses:

$$\overrightarrow{\text{var}}_1 = \begin{pmatrix} y_{1,t} \\ G_t \\ L_t \end{pmatrix} = \begin{pmatrix} C_1 \\ C_2 \\ C_3 \end{pmatrix} + \begin{pmatrix} \Phi_{11} & \ldots & \Phi_{1n} & \ldots \\ \Phi_{21} & \ldots & \Phi_{2n} & \ldots \\ \Phi_{31} & \ldots & \Phi_{3n} & \ldots \end{pmatrix} \begin{pmatrix} y_{1,t-1} \\ \vdots \\ y_{1,t-n} \\ G_{t-1} \\ \vdots \\ G_{t-n} \\ L_{t-1} \\ \vdots \\ L_{t-n} \end{pmatrix} + \begin{pmatrix} \varepsilon_{Y1,t} \\ \varepsilon_{G,t} \\ \varepsilon_{L,t} \end{pmatrix} \qquad (4.8)$$

Equation 4.9 takes into account the inequality adjustment and hence assesses the second and the fourth hypotheses:

$$\overrightarrow{\text{var}}_2 = \begin{pmatrix} y_{2,t} \\ G_t \\ L_t \end{pmatrix} = \begin{pmatrix} c_1 \\ c_2 \\ c_3 \end{pmatrix} + \begin{pmatrix} \phi_{11} & \ldots & \phi_{1n} & \ldots \\ \phi_{21} & \ldots & \phi_{2n} & \ldots \\ \phi_{31} & \ldots & \phi_{3n} & \ldots \end{pmatrix} \begin{pmatrix} y_{2,t-1} \\ \vdots \\ y_{2,t-n} \\ G_{t-1} \\ \vdots \\ G_{t-n} \\ L_{t-1} \\ \vdots \\ L_{t-n} \end{pmatrix} + \begin{pmatrix} \varepsilon_{y2,t} \\ \varepsilon_{g,t} \\ \varepsilon_{l,t} \end{pmatrix} \qquad (4.9)$$

For simplifying the notation, $y_{i,t}^{ia}$ of Equation 4.4 is replaced by $y_{2,t}$ in Equation 4.9. Besides that, it is worth noting that the assessments of the remaining 3 hypotheses combine information from both the VAR models 4.8 and 4.9.

As VAR models are made for stationary processes, we need first to carry out a stationarity analysis on the variables in order to select and estimate the valid VAR models, including their respective stationary forms[3]. On the one hand, the plots, the auto and partial correlation functions together with the Dickey-Fuller unit root tests prove that GDP and 'inequality-adjusted' GDP are stationary after being log-differenced once (Appendix A. 1). Such a transformation is quite interesting since it leads to their respective growth rates. On the other hand, grants and loans are stationary without any additional transformation (Appendix A.1). As we have considered their respective percentage share of GDP, they are also expressed in percentage as GDP growth itself. Subsequently, our estimates will be interpreted as elasticities. Therefore, the percentage change in economic growth induced by a one percentage change in grants or loans.

Concerning the model selection, we selected the appropriate order, minimizing the Akaike information criterion (AIC), the Schwarz-Beysian Information Criterion (SBIC or SC), the Hannan-Quinn information criterion (HQ) and the Akaike's Final Prediction Error Criterion (FPE). For the unlimited maximal lag, FPE suggests VAR (3) while the others suggest VAR (4). As in this case both VAR (3) and VAR (4) are valid.

---

[3]Even though they may temporarily deviate, stationary processes fluctuate around their means (or trends) over time. In case of deviation, they will definitely revert back to the latter. Therefore, resorting to the stationary forms of GDP, aid grant and aid loans ensures that our estimations do not provide spurious relationships.

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Therefore, we have selected VAR (3) in order to gain one additional degree of freedom. Table 4.1 provides the values of these information criteria for a maximal lag of 3.

Table 4.1: Valid VAR's selection parameters

| Criteria | VAR (1) | VAR (2) | VAR (3) |
|----------|---------|---------|---------|
| AIC(n) | 0.7706621 | 0.1472333 | -0.26292832 |
| HQ(n) | 0.8716115 | 0.3238948 | -0.01055474 |
| SC(n) | 1.3671499 | 1.1910869 | 1.22829112 |
| FPE(n) | 2.2030356 | 1.2921101 | 1.09350781 |

Source: author's computation with 'R' software

Similar to the FPE selection criterion, AIC and SBIC strongly prefer VAR (3) to VAR (1) and VAR (2). SC strongly rejects VAR (1) and slightly prefers VAR (2) to VAR (3). As for the SC criterion the difference of the minimal values for VAR (2) and VAR (3) is negligible and the other criteria strongly suggest VAR (3), we definitely choose the latter as the most appropriate to the statistical structure of our dataset.

Nonetheless, the statistical validity of the estimates of this VAR (3) lies in the assumption that the residuals from the estimation are drawn from a multivariate white noise error term. This means that, on average, its univariate components should be zero ($E(\varepsilon_t) = 0$); the correlations among them should not exist at lead nor at lag ($\text{cov}(\varepsilon_t, \varepsilon_{t-k}) = 0 \; \forall k > 0$); and that the co-variances should be constant ($\text{cov}(\varepsilon_t) = \Sigma$). Tables 4.2 and 4.3 and Figure 4.1 provide the test's output of this set of assumptions.

Table 4.2: Residuals' descriptive statistics

| Res. Stat. | From $Y_t$ eq. 1 ($\varepsilon_{y,t}$) | From $G_t$ eq. 2 ($\varepsilon_{G,t}$) | From $L_t$ eq. 3 ($\varepsilon_{L,t}$) |
|---|---|---|---|
| Min. | -1.24942 | -1.5664 | -2.3084 |
| 1st. Qu. | -0.50148 | -0.8573 | -0.3989 |
| Median | 0.03491 | -0.2039 | 0.1620 |
| Mean | 0.00000 | 0.00000 | 0.00000 |
| 3rd. Qu. | 0.45376 | 0.4304 | 0.6805 |
| Max. | 1.66794 | 2.9834 | 1.2354 |

Source: author's computation with 'R' software

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Table 4.3: Residuals' covariance and correlation matrices

| Covariance | $\varepsilon_{y,t}$ | $\varepsilon_{G,t}$ | $\varepsilon_{L,t}$ |
|---|---|---|---|
| $\varepsilon_{y,t}$ | 1.2047 | 0.1508 | -0.1493 |
| $\varepsilon_{G,t}$ | 0.1508 | 2.7665 | -2.0647 |
| $\varepsilon_{L,t}$ | -0.1493 | -2.0647 | 1.6350 |
| Correlation | $\varepsilon_{y,t}$ | $\varepsilon_{G,t}$ | $\varepsilon_{L,t}$ |
| $\varepsilon_{y,t}$ | 1.00000 | 0.08262 | -0.1064 |
| $\varepsilon_{G,t}$ | 0.08262 | 1.0000 | -0.9708 |
| $\varepsilon_{L,t}$ | -0.10642 | -0.97082 | 1.0000 |

Source: author's computations with 'R' software

Figure 4.1: Dependency structure of residuals from of the retained VAR (3)
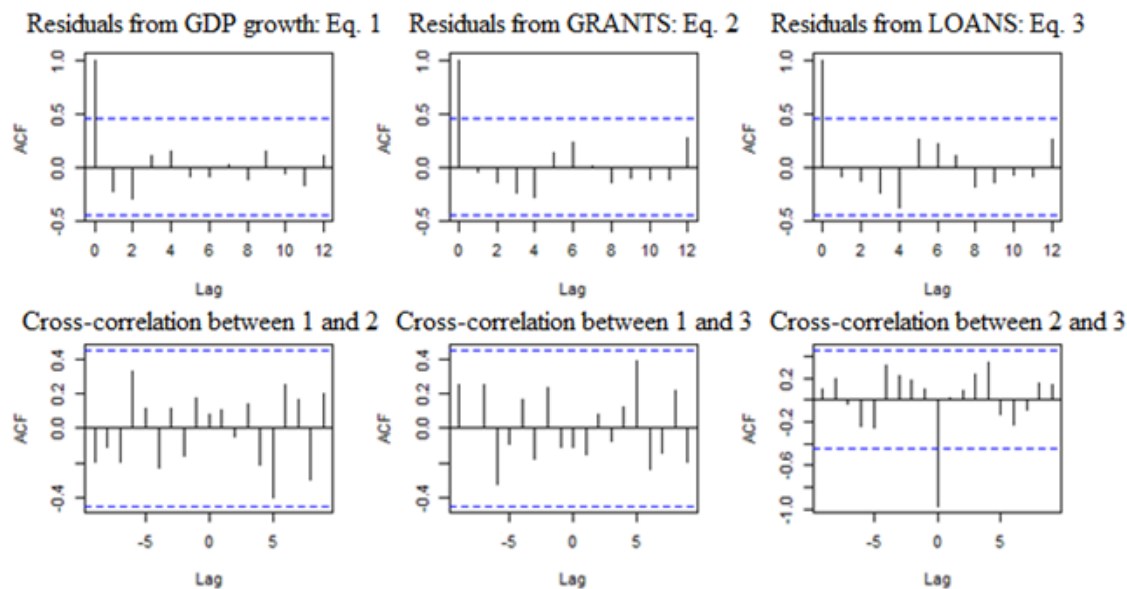


Source: author's computation with 'R' software

As already observable at lag zero of the cross-correlation function between aid grants and aid loans on Figure 4.1, the contemporaneous correlation between the residuals from their respective equations is considerable and statistically significant. This does not question the validity of the selected VAR model, since VAR models do not assume zero contemporaneous correlations among residuals (only zero cross-correlations in lead and in lag). All in all, this pre-estimation diagnostics confirms that this multivariate residual is a sample of a white noise and consequently confirms the validity of this VAR (3) model.

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## 4.2.2   Long term analysis

As VAR models, Co-integrating Equations (CE) consider the endogeniety issue by including feedback effects and neutralizing the omitted variables' bias. Therefore, they fit the extension of our analysis in the long term. Furthermore, it has been argued and shown that a long run framework cancels out endogenous effects of received aid from observations of growth and its expectations and is therefore an adequate estimation procedure (Collier and Rohner, 2008). Consequently, this analytical setting is expected to yield adequate estimates. Nonetheless, we can resort to such a co-integration setting only if per capita GDP ($y_t$) or 'inequality-adjusted' per capita GDP ($y_t^{ia}$), aid grants ($G_t$) and aid loans ($L_t$) exhibit at least one common long run equilibrium. In case of existence, such an equilibrium has the Algebraic form of Equation 4.10.

$$\beta_{11}log(y_t) + \beta_{12}log(G_t) + \beta_{13}log(L_t) + \alpha_1 = \delta_{1t} \tag{4.10}$$

If the left hand-side of the CE 4.10 yields a stationary vector $\delta_{1t}$, then the logarithmic values of GDP, grant and concessional loans have a common long run equilibrium with Equation 4.11 as a Co-integrating Vector (CV).

$$\beta_1 = \begin{pmatrix} \beta_{11} \\ \beta_{12} \\ \beta_{13} \end{pmatrix} \tag{4.11}$$

It is worth noting that there are '$\kappa - 1$' possible CEs and CVs describing long run relationships among '$\kappa$' processes. Thus, it is likely to have another CE and CV which respectively have the forms of Equations 4.12 and 4.13.

$$\beta_{21}log(y_t) + \beta_{22}log(G_t) + \beta_{23}log(L_t) + \alpha_2 = \delta_{2t} \tag{4.12}$$

$$\beta_2 = \begin{pmatrix} \beta_{21} \\ \beta_{22} \\ \beta_{23} \end{pmatrix} \tag{4.13}$$

$\beta_1$ and $\beta_2$ should be linearly independent and make the co-integrating matrix 4.14.

$$\beta = \begin{pmatrix} \beta_{11} & \beta_{21} \\ \beta_{12} & \beta_{22} \\ \beta_{13} & \beta_{23} \end{pmatrix} \tag{4.14}$$

The Equations 4.10 and 4.12, made explicit in terms of $log(y_t)$, result in Equations 4.15 and 4.16. The latter equations give long term elasticities of grants and concessional loans to GDP and hence enable a long term assessment of their relative effectiveness.

$$log(y_t) = \frac{\beta_{12}}{\beta_{11}} log(G_t) + \frac{\beta_{13}}{\beta_{11}} log(L_t) + \frac{1}{\beta_{11}}\alpha_1 + \frac{1}{\beta_{11}}\delta_{1t} \tag{4.15}$$

$$log(y_t) = \frac{\beta_{22}}{\beta_{21}} log(G_t) + \frac{\beta_{23}}{\beta_{21}} log(L_t) + \frac{1}{\beta_{21}}\alpha_2 + \frac{1}{\beta_{21}}\delta_{2t} \tag{4.16}$$

As short run data exhibit deviations from long run equilibria, we evaluate the speed of adjustment using the Vector Error Correction Model formalized by Equation System 4.17.

$$
\begin{cases}
\Delta log(y_t) = C_1 + \gamma_{11}\delta_{1,t-1} + \gamma_{21}\delta_{2,t-1} \\[1mm]
+a_{11}\Delta log(y_{t-1}) + a_{12}\Delta log(G_{t-1}) + a_{13}\Delta log(L_{t-1}) + \epsilon_{log(y),t} \\[1mm]
\Delta log(G_t) = C_2 + \gamma_{12}\delta_{1,t-1} + \gamma_{22}\delta_{2,t-1} \\[1mm]
+a_{21}\Delta log(y_{t-1}) + a_{22}\Delta log(G_{t-1}) + a_{23}\Delta log(L_{t-1}) + \epsilon_{log(G),t} \\[1mm]
\Delta log(L_t) = C_3 + \gamma_{13}\delta_{1,t-1} + \gamma_{23}\delta_{2,t-1} \\[1mm]
+a_{31}\Delta log(y_{t-1}) + a_{32}\Delta log(G_{t-1}) + a_{33}\Delta log(L_{t-1}) + \epsilon_{log(L),t}
\end{cases}
\tag{4.17}
$$

In the Equation System 4.17, $\delta_{1,t-1}$ and $\delta_{2,t-1}$ are the residuals of the two CEs. Their respective coefficients determine the speed of adjustment. The higher their absolute values are, the faster the adjustment to the long run equilibria is. In case of one valid CE and CV, Equation 4.17 is reduced to Equation 4.18.

$$
\begin{cases}
\Delta log(y_t) = C_1 + \gamma_{11}\delta_{1,t-1} \\[1mm]
+a_{11}\Delta log(y_{t-1}) + a_{12}\Delta log(G_{t-1}) + a_{13}\Delta log(L_{t-1}) + \epsilon_{log(y),t} \\[1mm]
\Delta log(G_t) = C_2 + \gamma_{12}\delta_{1,t-1} \\[1mm]
+a_{21}\Delta log(y_{t-1}) + a_{22}\Delta log(G_{t-1}) + a_{23}\Delta log(L_{t-1}) + \epsilon_{log(G),t} \\[1mm]
\Delta log(L_t) = C_3 + \gamma_{13}\delta_{1,t-1} \\[1mm]
+a_{31}\Delta log(y_{t-1}) + a_{32}\Delta log(G_{t-1}) + a_{33}\Delta log(L_{t-1}) + \epsilon_{log(L),t}
\end{cases}
\tag{4.18}
$$

As pre-estimation investigation, we have carried out the stationarity analysis to check whether the considered processes are stationary or, at least, equally integrated. As an outcome, at a five or one percent significance level, per capita GDP growth, aid grants and aid loans become stationary after being differentiated once (for more details, look at appendix A.1). In other words, they are all integrated of order one. Consequently, they are appropriate for further investigations within a co-integration setting. We resort to Johansen's (1991) procedure to (1) determine the number of the co-integrating equations compatible with the data structure and then (2) estimate the corresponding CV. To get the adjustment speed, we estimate the associate Vector Error Correction Model.

## 4.3 Selection of proxies

The retained analytical framework considers the aid effects on the GDP and the 'inequality-adjusted' GDP growth as indicators of the aid performance. Adjusting GDP from inequality is fundamental, as we are analyzing a region with high income inequality. Between 1991 and 2014, SSA's average GINI coefficient is 0.45 —author's computation with data from (World Bank, 2016b). In the following pages we first discuss the strengths and weaknesses of using 'overall' GDP and GDP growth as an indicator of socio-economic performance. We then detail the adjustment methodology that we apply on GDP to reinforce its expressiveness of the socio-economic prosperity. Thirdly, we illustrate the descriptive power of that adjustment using SSA data. Finally, we check its external validity.

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## 4.3.1    Growth dynamics as an indicator of socio-economic performance: strengths and weaknesses

Policy makers, aid practitioners and researchers expect high rates of economic growth to eradicate extreme poverty (White, 1992; Acemoglu et al., 2004; Arellano and Bond, 1991; Collier, 2007; Hansen and Tarp, 2000). This is underpinned by an economic and a statistical argument, namely the capital accumulation process (Alesina and Dollar, 2000; Sachs, 2005a; Tezanos et al., 2013) and the exponential feature of growth.

Considering the levels of capital in developing countries as relatively low, the law of diminishing marginal returns is expected to keep the rates of economic growth high for a considerable period of time (Mongongo, 2016). In addition to that, we know that growth is self-reinforcing and therefore —once reached— difficult to leave (Solow, 2007). On this basis, one would reasonably expect the high growth rates of developing economies to last over time. More importantly, as it is the case with any incrementally growing process, such rates have exponential effects.

For instance, an economy with $\mathbf{y_t}$ as initial per capita GDP, growing at a rate $\mathbf{g}$ between eight to four percent (as is the case of SSA average growth since mid-1990s), doubles its income after a period of time $\mathbf{n}$ lying between $\mathbf{9}$ and $\mathbf{18}$ years:

$y_{t+1} = y_t * (1 + g)$

$y_{t+2} = y_{t+1} * (1 + g) = y_t * (1 + g)^2$

$y_{t+3} = y_{t+2} * (1 + g) = y_t * (1 + g)^3$

$y_{t+n} = y_{t+n-1} * (1 + g) = y_t * (1 + g)^n$

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The doubling time is:

$y_{t+n} = y_t * (1+g)^n = 2 * y_t \Leftrightarrow ln(1+g)^n = ln(2) \Rightarrow n = \frac{ln(2)}{ln(1+g)}$

Consequently, **n** = 9 if **g** = 8% and **n** = 18 if **g** = 4%.

Does this predict the end of poverty with our generation? It depends on how that prosperity is shared. Growth and income per capita give no information about wealth distribution. Given high inequalities within developing countries, it is possible that, in stead of predicting the end of poverty, such a growth pace and the subsequent excess of income per capita on poverty threshold indicate more of absolute or/and relative poverty. That would be the case if income of the poorest is not growing or/and is growing at a slower pace than the income of the richest. To overcome that weakness of the growth-based assessment, development analyses and policies should incorporate the dynamics of inequality to pinpoint actual impacts of growth on poverty reduction.

## 4.3.2 Measuring 'inequality-adjusted' GDP

A considerable number of inequality measures exists, although the most frequently used are the following seven: range, range ratio, Mcloon index, coefficient of variation, Theil's T Statistic, income percentiles and GINI Coefficient. Although each of them has its strengths and weaknesses, the GINI coefficient has more potential in decomposing GDP with respect to inequality. Unlike others, it includes the whole income data and allows direct comparison among economies with different population sizes (Kakwani, 1977). These advantages makes the GINI ratio a benchmark of this piece of research.

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We introduce the retained GINI-based adjustment by the percentiles procedure. As they both adjust GDP for inequality, introducing the latter by the former provides us not only with a methodological guideline but also a comparison mean given that we should come up with an adjustment with equivalent effects on GDP (increasing with GDP and decreasing with inequality).

More in detail, the percentiles procedure adjusts both GDP and GDP growth by excluding the income above a given threshold. For instance, to account for high income inequalities within LAC countries, Tezanos et al. (2013) excludes the income beyond the ninetieth percentile as described below:

$$y_{i,t}^{ia} = \sum_{k=1}^{9} d_{i,t}^{k} \frac{y_{i,t}}{0.9 N_{i,t}} \tag{4.19}$$

Where $d_{i,t}$ is the income share of the $k^{th}$ deciles of the population of country $i$ in year $t$; $y_{i,t}$ is the 'overall' GDP; and $N_{i,t}$ is the population of country $i$ in year $t$. Finally, levels of 'inequality-adjusted' GDP ($y_{i,t}^{ia}$) are used to compute average growth rates. Even though the authors found a large enough sample of income percentiles for LAC countries, this is not the case in other developing economies, especially in SSA, where there is a shortage of data ( Table 4.4).

Table 4.4: SSA income distribution availability in PovCalnet database: 1991–2014

| | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Angola | | | | | | | | | | | | | | | | | | | ✔ | | | | | |
| Benin | | | | | | | | | | | | ✔ | | | | | | | | | ✔ | | | |
| Botswana | | | ✔ | | | | | | | | | ✔ | | | | | | ✔ | | | | | | |
| Bourkina Faso | | | | ✔ | | | | ✔ | | | | ✔ | | | | | | ✔ | | | | | | ✔ |
| Burundi | | ✔ | | | | | | ✔ | | | | | | | ✔ | | | | | | | | | |
| Cabo Verde | | | | | | | | | | ✔ | | | | | ✔ | | | | | | | | | |
| Cameroon | | | | | | ✔ | | | | ✔ | | | | | ✔ | | | | | | | | | ✔ |
| Central African Republic | | ✔ | | | | | | | | | | ✔ | | | | | ✔ | | | | | | | |
| Chad | | | | | | | | | | | | ✔ | | | | | | | | | ✔ | | | |
| Comoros | | | | | | | | | | | | | | ✔ | | | | | | | | | | |
| Congo, DR | | | | | | | | | | | | ✔ | | | | | | | | | | ✔ | | |
| Congo, Republic of | | | | | | | | | | | | | | | ✔ | | | | | | ✔ | | | |
| Cote d'ivoire | | ✔ | | | ✔ | | | ✔ | | | ✔ | | | | | | ✔ | | | | | | | |
| Ethiopia | | | | | ✔ | | | | ✔ | | | | ✔ | | | | | | | ✔ | | | | |
| Gabon | | | | | | | | | | | | | | | ✔ | | | | | | | | | |
| Gambia, The | | | | | | | | ✔ | | | | ✔ | | | | | | | | | | | | |
| Guinea-Bissau | ✔ | | ✔ | | | | | | | | ✔ | | | | | | | | | ✔ | | | | |
| Guinea | ✔ | | | ✔ | | | | | | | ✔ | | | | | ✔ | | | | | | ✔ | | |
| Kenya | | ✔ | | ✔ | | | ✔ | | | | | | | | ✔ | | | | | | | | | |
| Lesotho | | | | ✔ | | | | | | | | ✔ | | | | | | | | ✔ | | | | |
| Liberia | | | | | | | | | | | | | | | ✔ | | | | | | | | | |
| Madagascar | | | ✔ | | | | | ✔ | | ✔ | ✔ | | | | ✔ | | | | | ✔ | | ✔ | | |
| Malawi | | | | | | | ✔ | | | | | | | ✔ | | | | ✔ | | | | | | |
| Mali | | | | ✔ | | | | | | | ✔ | | | | | ✔ | | ✔ | | | | | | |
| Mauritania | | | ✔ | | ✔ | | | | | ✔ | | | | ✔ | | | | | ✔ | | | | | ✔ |
| Mauritius | | | | | | | | | | | | | | | | ✔ | | | | | | ✔ | | |
| Mozambique | | | | | | ✔ | | | | | | ✔ | | | | | | ✔ | | | | | | |
| Namibia | | | ✔ | | | | | | | | | | ✔ | | | | | | ✔ | | | | | |
| Niger | | ✔ | | ✔ | | | | | | | | | | | ✔ | | ✔ | | | | ✔ | | | ✔ |
| Nigeria | | ✔ | | | | | | | | | | | ✔ | | | | | | ✔ | | | | | |
| Rwanda | | | | | | | | | | ✔ | | | | | ✔ | | | | | ✔ | | | ✔ | |
| Sao Tome and Principe | | | | | | | | | | ✔ | | | | | | | | | ✔ | | | | | |
| Senegal | | | | | | | | | | | | | | | | | | | | | | | | |
| Seychelles | ✔ | | | ✔ | | | | | | | ✔ | | | | ✔ | | | | | | ✔ | | | |
| Sierra Leone | | | | | | | | | | | | | ✔ | | | | | | | | ✔ | | | |
| South Africa | | | ✔ | | | ✔ | | | | ✔ | | | | | | ✔ | | | ✔ | | ✔ | | | |
| South Sudan | | | | | | | | | | | | | | | | | | | ✔ | | | | | |
| Sudan | | | | | | | | | | | | | | | | | | | ✔ | | | | | |
| Swaziland | | | | ✔ | | | | | | ✔ | | | | | | | | | ✔ | | | | | |
| Tanzania | ✔ | | | | | | | | | ✔ | | | | | | | ✔ | | | | ✔ | | | |
| Togo | | | | | | | | | | | | | | | | ✔ | | | | | ✔ | | | |
| Uganda | | ✔ | | | | ✔ | | | ✔ | | | ✔ | | | ✔ | | | | ✔ | | | ✔ | | |
| Zambia | ✔ | | ✔ | | | ✔ | | ✔ | | | | ✔ | | ✔ | | ✔ | | | | ✔ | | | | |
| Zimbabwe | | | | | | | | | | | | | | | | | | | ✔ | | | | | |

Source: author's elaboration with data from World Bank (2016a)

Table 4.4 illustrates that the Word Bank's PovcalNet dataset, one of the most comprehensive databases of percentiles distribution of income, still misses data from many years for a considerable number of SSA countries. Indeed, most databases summarize income distribution with the GINI coefficient. In the following section, we show that a derivative of the latter is a good alternative of $d_{i,t}^k$. Not only is there more data available, there are also better analytical and intuitive features when the focus is on using it to adjust economic growth by inequality (and not merely on having an inequality index).

Note that if the focus of this Thesis was only tracking inequality and not the aggregation of equality and growth, the choice between Palma index and GINI coefficient would be less obvious. It would have been rather an empirical issue than a theoretical choice. To make such a choice, one should make sure that 'the middle of income distribution' stability assumption holds for the sample. Otherwise, Palma index $(\frac{d_{i,t}^{10}}{d_{i,t}^{40}})$ would be misleading as it merely compares the richest 10% to the poorest 40% and assumes that the rest is stable (Cobham and Summer, 2013).

In contrast, a GINI based adjustment is a good alternative of percentile distribution of income $(d_{i,t}^k)$ to adjust GDP (or GDP growth) by inequality. It can even be preferred to $d_{i,t}^k$. That is, it is available as well gives a more intuitive indicator, which keeps the properties of percentiles based adjustments. It provides a more meaningful measurement of relative poverty hidden in the 'overall' growth of most economies. This is understandable in light of the GINI coefficient construction. In reference to Figure 4.2, $\text{GINI}_{i,t} = \frac{A}{A+B}$.

The larger 'A' is, the farther the Lorenz curve is from the perfect equality line and hence the higher is the $\text{GINI}_{i,t}$ index (hence the level of inequality).

Figure 4.2: Components of GINI coefficient
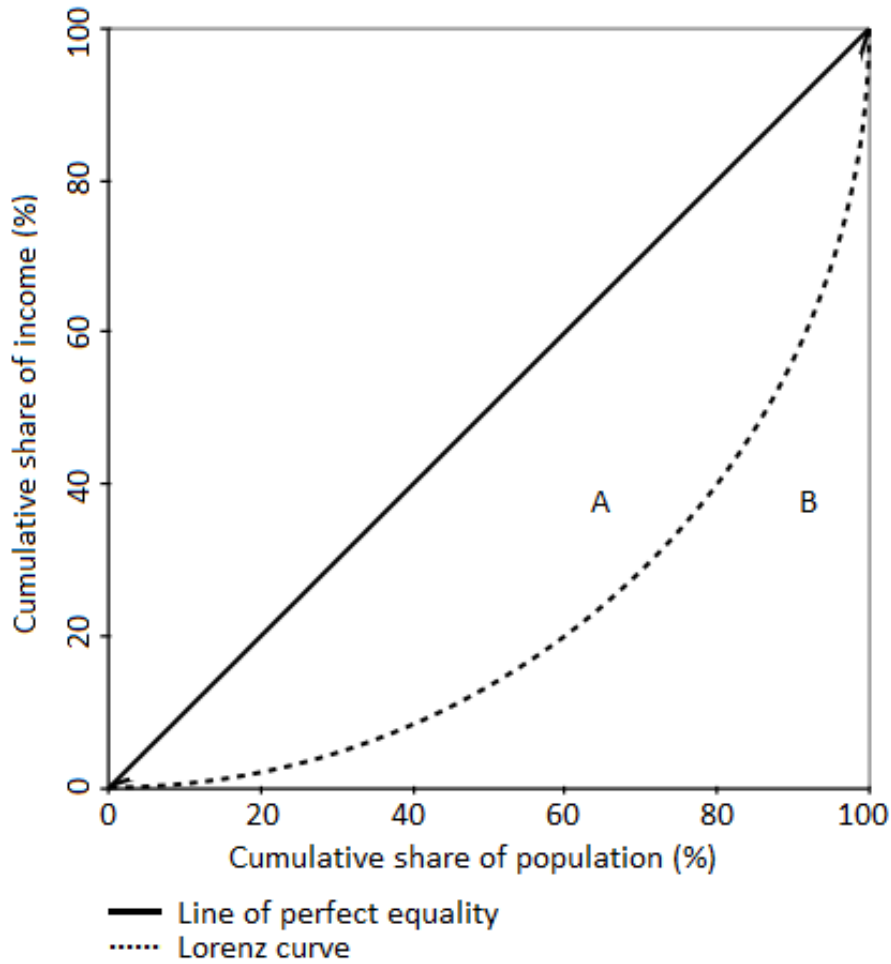


Source: author's illustration

To get a $\text{GINI}_{i,t}$-based indicator increasing with 'overall' GDP ($y_{i,t}$) and decreasing with inequality as in Equation 4.19, we have two options. Either we divide $y_{i,t}$ by $\text{GINI}_{i,t}$ or we multiply it by $(1 - \text{GINI}_{i,t})$ in Equation 4.19.

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As detailed in the following analysis, the second option is more intuitive and has better features in terms of considering inequality in growth diagnosis. It gives the following Equation of 'inequality-adjusted' GDP:

$$y_{i,t}^{ia} = (1 - \text{GINI}_{i,t}) y_{i,t} \tag{4.20}$$

Drawing on Figure 4.2, the following aspects are noteworthy:

1. The Lorenz curve gives the actual distribution of income among the population and $\int_{0\%}^{100\%} (\text{Lorenz Curve}) \, dp = 100\%$ of the population $= 1 = \frac{A}{A+B} + \frac{B}{A+B}$

2. The A and B areas considered in $\text{GINI}_{i,t}$ computation measure income lags with respect to perfect equality and inequality. They capture the share of income held by those earning below the average income from two opposite perspectives. While 'A' captures inequality, 'B' captures equality.

3. $\frac{A}{A+B} + \frac{B}{A+B} = 1 \Leftrightarrow \frac{B}{A+B} = 1 - \frac{A}{A+B} = (1 - \text{GINI}_{i,t})$
   Subsequently, $y_{i,t}^{ia} = (1 - \text{GINI}_{i,t}) y_{i,t} \Rightarrow y_{i,t}^{ia} = \frac{B}{A+B} y_{i,t}$. $\frac{B}{A+B}$ is an inequality deflector that corrects mean income for inequality.

4. Finally, $y_{i,t}^{ia}$ is in intuition and effect close to Sen (1976)'s income gap correcting term $(P_1(1 - G^p))$ of his poverty index which can be re-written as $P_s = P_o G^p + P_1(1 - G^p)$ (Punam et al., 1991). That validates $y_{i,t}^{ia}$ ability of accounting for GDP dynamics and inequality using the GINI coefficient and considering average income as benchmark.

On the left extreme $\text{GINI}_{i,t} = 1$, $y_{i,t}^{ia} = 0$. This means that $y_{i,t}$ is disregarded in the poverty reduction analysis since it fully belongs to the most favored population.

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On the right extreme $\text{GINI}_{i,t} = 0$, $y_{i,t}^{ia} = y_{i,t}$. In this case $y_{i,t}$ is entirely considered, since there is no relative poverty. The remaining cases lie between these. For instance, at the median case where $\text{GINI}_{i,t} = 0.5$, half $y_{i,t}$ is taken into account and hence: $y_{i,t}^{ia} = \frac{1}{2}y_{i,t}$.

### 4.3.3 Dynamics of GDP and 'inequality-adjusted' GDP in Sub-Saharan Africa

The blue and green plots on Figure 4.3 display the GDP and the 'inequality-adjusted' GDP between 1991 and 2015. The left hand side (Figure 4.3-A) depicts their values and the right hand side (Figure 4.3-B) compares the corresponding growth. Both the GDP and the 'inequality-adjusted' GDP are increasing but at different paces. While such a co-movement is due to the positive impact of the first on the second, differences in pace are attributable to the inequality adjustment. Effects of the latter become clearer in their respective growth on Figure 4.3-B. This figure describes three critical periods.

Figure 4.3: GDP and 'inequality-adjusted' GDP



Source: author's computation with data from World Bank (2016b)

From 1991 up to 2000, the increasing pace of 'inequality-adjusted' GDP growth was slower than the one of 'overall' GDP growth. This means that the effects of growth were not primarily on the advantage of the poor. From 2000 to 2007, the opposite is observed. The increasing pace of 'inequality-adjusted' GDP growth became faster than the one of 'overall' GDP growth. In other words, growth was more on the side of the poor. As 2000 was the launching year of stronger commitments for international solidarity in favor of the poor, such as the MDG, one would associate this improvement to foreign aid. However, we cannot yet infer such a causal link from this descriptive analysis.

Since 2007, the trend of those two growth dimensions has shifted so SSA growth has become less pro-poor. This would be one of the consequences of the last global economic crisis. Hence, it seems that people with lower incomes bear most of the burdens of the economic recession.

Even though Figure 4.3-B shows that in both the pre-2000 period and the post-2007 era 'inequality-adjusted' GDP grew slower than 'overall' GDP, the situation of the first era is worse than that of the second. One would expect the latter growth pattern to revert to the pro-poor of the 2000–2007 period with the recovery from the 2 global crisis. Figures 4.3 A and B shed light on that matter by comparing the forecast values for the 2030 horizon.

GDP growth and 'inequality-adjusted' GDP growth are stationary and match with AR (1) and MA (1) features. The corresponding ARIMA Forecasts give similar results in both cases. On average, point forecasts for 'inequality-adjusted' GDP growth are roughly 1% higher than those of 'overall' growth. While predictions of the first are slightly higher than 5% of annual growth, the ones of the second are spread between 4 and 4.5 %.

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That shows that the post-2007 situation is disappearing with the ongoing economic recovery and is making way for a pro-poor growth dynamic, as previously observed in the period 2000–2006.

However, it is noteworthy that the post-2007 temporary shift of growth pattern against the poor suggests that the latter carry bigger burdens of poor economic conditions. This is confirmed by the lower bounds ARIMA forecasts, which predict roughly a 1% difference in favor of 'overall' growth. Considering the initial 1% difference in favor of 'inequality-adjusted' growth, this corresponds to 2% growth redistribution from the poor to the rich.

### 4.3.4   Validity check

The application of the adjustment procedure we propose to SSA shows that the average poverty is diminishing as the 'overall' GDP is increasing. Furthermore, it shows that inequality is diminishing, since the 'inequality-adjusted' GDP is growing faster than the 'overall' GDP. Thus, both the absolute and the relative poverty are diminishing. Before empirically assessing the contribution of foreign aid to this promising trend, we resort to the conclusion of existing studies that analyze the dynamics of growth and inequality in SSA to check the validity of our adjustment procedure.

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Drawing on descriptive statistics and economic theories, some development economists claim that the situation in SSA is worsening. For instance, Moyo (2009) claimed that both poverty and inequality are growing and argued that foreign aid is one of the major causal channels of the mentioned negative dynamics. Her conclusion meets that of most authors from the aid-skeptic stream; for instance, Narayan et al. (2009) and partly those who, do not believe in 'traditional' aid but, unlike her, believe in aid supporting entrepreneurship and innovation (Easterly, 2002, 2006). Conversely, other authoritative economists claimed that the dynamics of both poverty and inequality exhibit positive trends especially along the MDG era and they expect a very significant inequality reduction together with the eradication of poverty by 2030 (Sachs, 2005a,b; United Nations, 2006, 2015b).

Like the outcome of our analysis, Sachs (2015) points out that poverty eradication needs a significant inequality reduction. Similarly, Sachs (2015) and the United Nations (2015b) found that SSA income has been increasing and inequality has been diminishing during the MDG era. While this would validate the potential of our procedure to come up with accurate results, the first wave of authors denying such positive trends of income and inequality would invalidate it. However, let us recall that the conclusions of both streams are drawn from mostly theoretical studies. Consequently, it is worth checking how well our results meet the outcome of empirical investigations.

A number of empirical studies paid special attention to the dynamics of growth and inequality in SSA (although using different methods). Let us start with Fosu (2009), who compared SSA to other developing regions. Fosu (2009) found that a higher level of inequality not only worsens poverty but also undermines the effectiveness of economic growth in fighting poverty.

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That supports our recourse to a proxy aggregating both growth and inequality dynamics. In the same vein, Pinkovskiy and Sala-i Martin (2014) have drawn our special attention, since they (although separately) assessed the dynamics of both GDP and inequality in SSA. As they used another methodological approach, their results are valuable to check the analytical performance of the proxy that we retained for the empirical estimations in the following chapter. Pinkovskiy and Sala-i Martin (2014) found that income is not only rising in SSA but also reaching poorer citizens. We have found similar results by constructing and examining 'inequality-adjusted' growth'.

Similarly, Fosu (2015) has come up with the same results by decomposing SSA poverty dynamics in that of income and inequality. He has shown that, in contrast to the 1980s and 1990s, the SSA region has made considerable progress in terms of poverty reduction. This underpins the higher growth pace of 'inequality-adjusted' growth in comparison to that of the 'overall' growth. This also supports that the MDG era has performed well on both growth and poverty reduction dimensions, as estimated and shown in the description and application of the retained proxy on SSA.

Likewise, Fosu (2013) found that this performance has not been robust to the recent global crisis. Once again, as predicted by the retained proxy description, he predicted that good performance will resume at the end of the global crisis.

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## 4.4   Variables and sources

Table 4.5 summarizes the selected variables used for the estimations[4]. The database includes all the SSA countries which are listed as developing countries in the World Bank's *World Development Indicators* and listed as ODA recipients by DAC between 1991 and 2014.

Table 4.5: Variables' description and information sources

| Variable | Description | Source |
|---|---|---|
| GDP | Contant ($: Y2005) | World Bank (2016b) |
| GDP per capita | Contant ($: Y2005) | World Bank (2016b) |
| GINI coefficient | In percentage | World Bank (2016b) |
| Ineq. Adj. GDP | Inequality-corrected | World Bank (2016b) |
| Ineq. Adj. GDP per capita | Inequality-corrected | World Bank (2016b) |
| Grants | Net and % of GDP | DAC & World Bank (2016) |
| Loans | Net and % of GDP | DAC & World Bank (2016) |

According to DAC (2016), disbursed grants and loans refer to the actual international transfer of financial resources from donor to recipient countries. They are recorded as net when repaid principals of earlier loans are already deducted from the current gross values. As grants have no repayment components, their net values are equivalent to their respective gross values. However, the net and gross values are different for concessional loans.

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[4]Appendix B.1 provides their corresponding descriptive statistics

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As special attention is paid to the comparison of the relative effectiveness of those two aid components and the associated policy implication. From that, net loans are deemed to be more appropriate, since they account for the repayment burden. To consider the relative weights, we resort to aid grants and loans as percentage share of the annual GDP. Unlike their absolute values, the relative values in terms of the recipients' GDP give a more realistic insight into how important each aid provision is in comparison to the size of the recipient's economy. Likewise, we use GDP and 'inequality-adjusted' GDP in per capita terms instead of total values in order to neutralize the 'population size effects' and hence end up with the actual impacts on the people's well-being.

# Chapter 5

# Results: aid effectiveness in Sub-Saharan Africa

This chapter presents and discusses our empirical findings. It provides the estimation results of the stimulating and distorting effects of foreign aid on SSA per capita economic growth. The analysis considers both the short and the long term analytical frameworks.

## 5.1  Aid distorting and stimulating effects

The estimations (Table 5.1) show that (1) a 1% increase in aid grants has raised SSA growth rate by around 2.46%, and (2) an equivalent increase in aid loans had a greater impact on growth (with an average coefficient of 3.05). Figure 5.1 depicts the subsequent grants and loans elasticities of per capita GDP growth.

Like Table 5.1, Figure 5.1 describes that growth is elastic with respect to both, but with a higher elasticity associated to the loans' impulses.

Table 5.1: Direct effects of grants and concessional loans on economic growth

| Variable | Lag 1 | P-Value | Lag 2 | P-Value | Lag 3 | P-Value |
|---|---|---|---|---|---|---|
| Aid grants | 2.45982 | 0.00984 | -1.05074 | 0.44085 | -1.13834 | 0.24913 |
| Aid loans | 3.04601 | 0.00655 | -0.96044 | 0.56019 | -1.31964 | 0.24137 |

Source: author's estimations with 'R' software

Figure 5.1: Grants and Loans elasticities of Growth



Source: author's estimations with 'R' software

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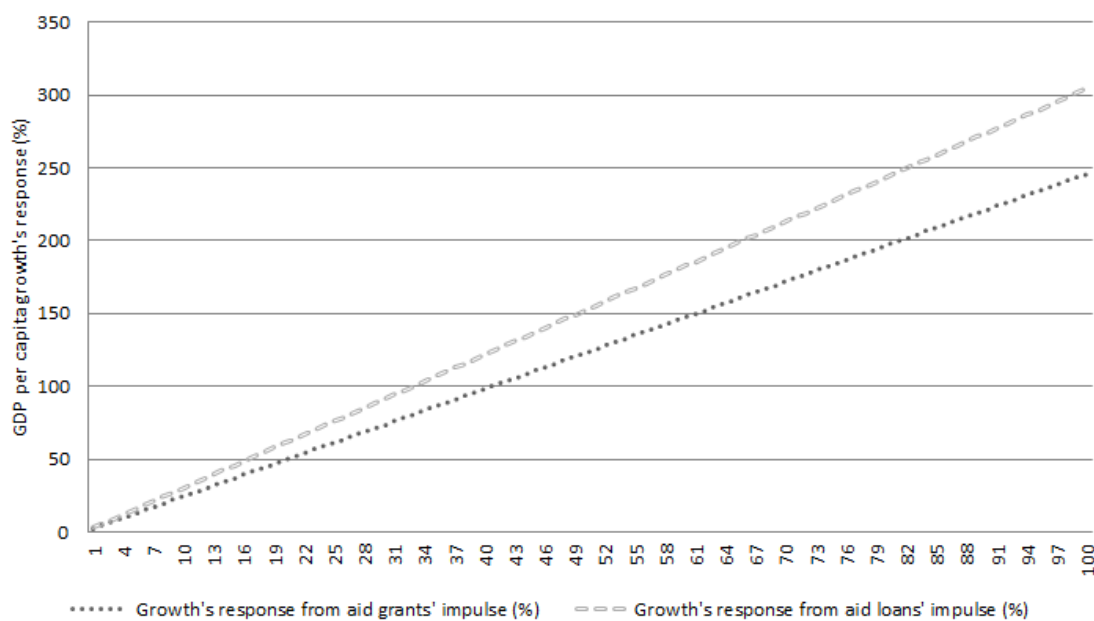
These results suggest that, on the one hand, the positive impact of aid loans compensates for the inconvenient repayment burdens attached to them. On the other hand, although aid grants are relatively less effective than aid loans in promoting growth, they still exert a positive and significant impact.

It is worth recalling that net loans disbursed to SSA are relatively low in comparison with grants (they represent 0.51% and 4.65% of GDP, respectively). However, according to our estimations, loans exert a relatively higher effect on growth than grants. That in turn suggests that a reallocation of ODA from grants to loans would provide an extra stimulus to economic growth. The latter policy is especially more promising for those countries which debts are still sustainable. Apart from those direct effects, both grants and loans may be affected by feedback effects from growth on them, or by their mutual interactions.

Part 1 of Table 5.2 shows that an increase of economic growth does not affect aid grants and aid loans. Relatively low levels of GDP per capita is the major ODA eligibility criterion. Consequently, one would expect higher growth to reduce the amount of disbursed grants and concessional loans. That is not the case, however, because the level of SSA per capita GDP is still relatively low (in comparison to other developing regions) to consider that its growth is a sign that the region has become rich enough to handle its development path with less —or no— foreign assistance. Figure 5.2 shows that aid grants are elastic to aid loans. In the same vein, part 2 of Table 5.2 shows that an increase of aid loans has a positive and significant impact on aid grants.

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Table 5.2: GDP growth feedback effects and Grants-Loans interactions

| 1. Feedback effect of 1% of increase of GDP growth on aid grants and aid loans | | | | | | |
|---|---|---|---|---|---|---|
| Variable | Lag 1 | P-Value | Lag 2 | P-Value | Lag 3 | P-Value |
| Aid grants | 0.008 | 0.985 | 0.163 | 0.634 | 0.554 | 0.184 |
| Aid loans | -0.173 | 0.617 | 0.014 | 0.956 | -0.512 | 0.118 |
| **2. Direct effects of 1% of increase of aid loans on aid grants** | | | | | | |
| Variable | Lag 1 | P-Value | Lag 2 | P-Value | Lag 3 | P-Value |
| Aid loans | 2.631 | 0.076 | -1.561 | 0.533 | 0.698 | 0.672 |
| **3. Direct effects of 1% of increase of aid grants on aid loans** | | | | | | |
| Variable | Lag 1 | P-Value | Lag 2 | P-Value | Lag 3 | P-Value |
| Aid grants | -0.803 | 0.385 | 1.116 | 0.481 | -0.629 | 0.573 |

Source: author's estimations with 'R' software

Figure 5.2: Loans elasticity of Grants
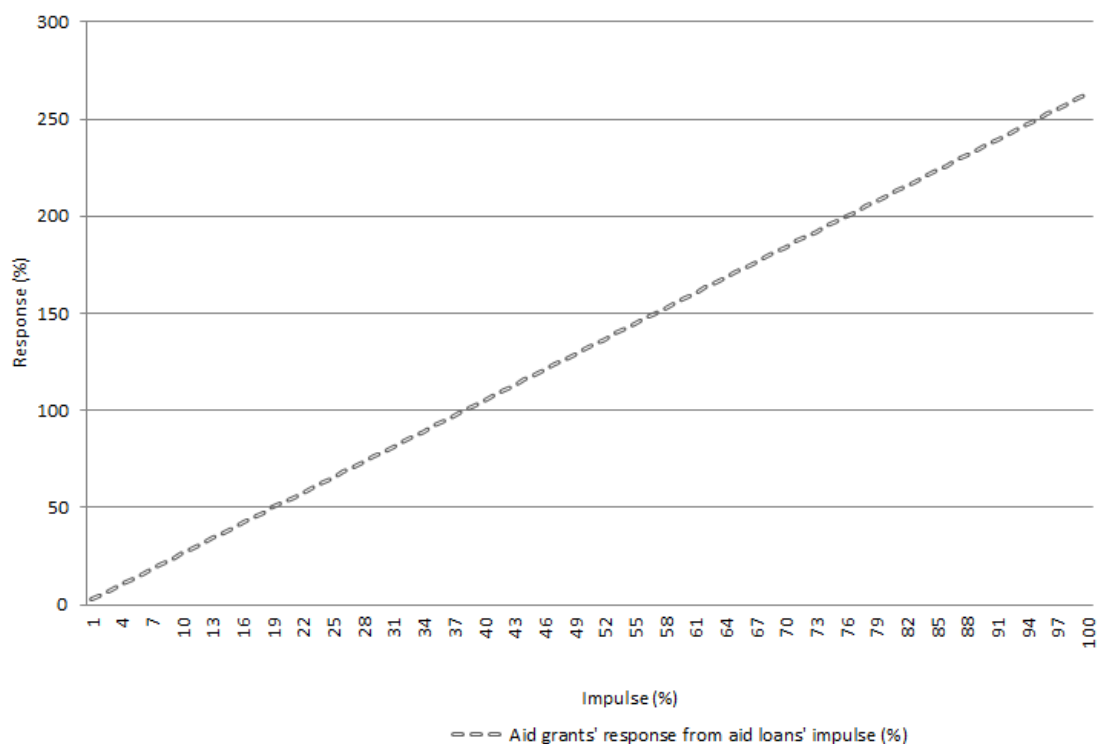


Source: author's estimations with 'R' software

Contrarily, part 3 of Table 5.2 shows that an increase in aid grants does not have a significant impact on aid loans. That underpins that aid loans is always complemented by aid grants and; therefore, suggests that the previously mentioned efficiency gain from the loans-grants reallocation would never lead to an extreme situation where all donors give all ODA in form of loans. That result has captured the fact that grants serve some donors' priorities which loans would not serve. Hence, they would never completely replace the former modality by the latter.

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That is the case for the share of ODA funding the fight against terrorism or the one underpinning policies controlling migration from recipient countries. It is also the case for the ODA share funding all projects promoting donors' values and convictions such as democracy and human right. On the one hand, note that recipient countries would have no —or very little— incentives to negotiate or to accept ODA in the form of loans in those and similar cases. On the other hand, unlike what would be in case of loans, grants allow donors to get a relatively higher control over such sensitive targets and make recipient countries more accountable to them. Figure 5.3 depicts the 'overall' impacts accounting for all the feedback and interaction effects and including effects which are too small to be statistically considered in the previous discussion.

Figure 5.3: 'Overall' impacts: direct, feedback and interaction effects
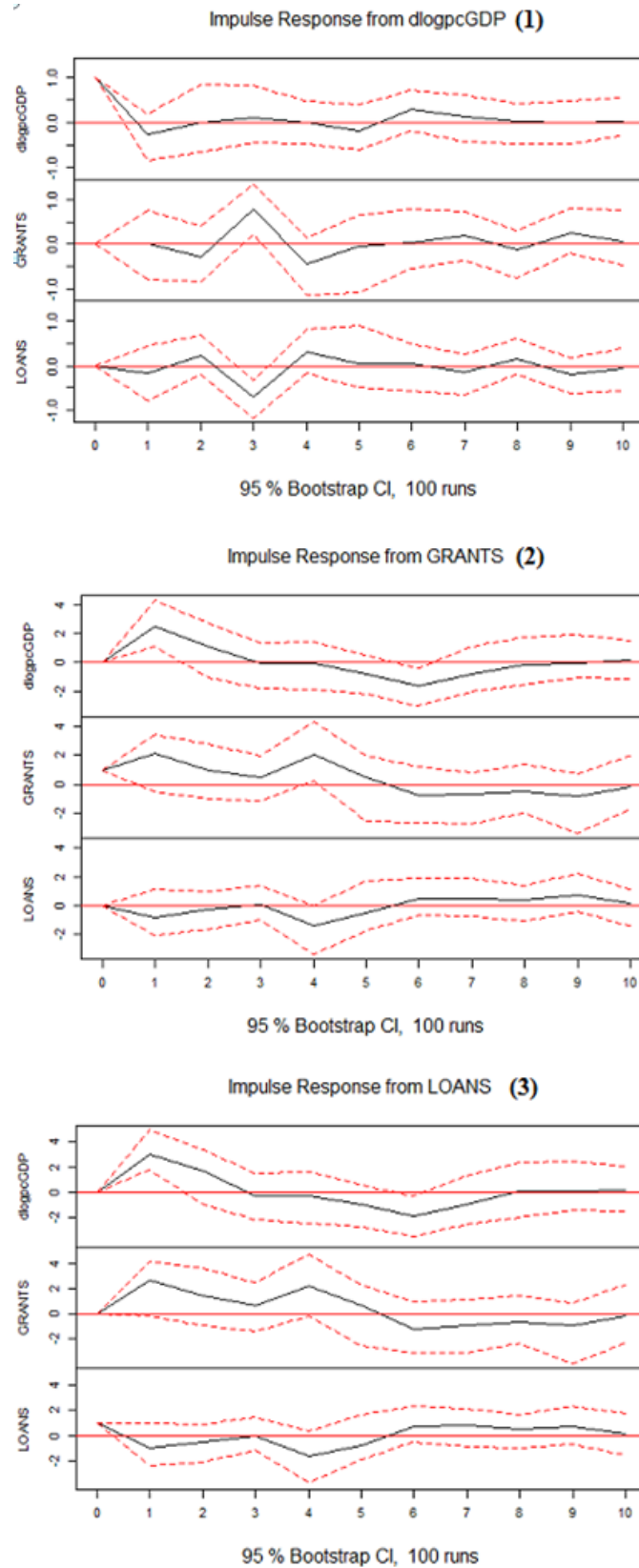


Source: author's computation and illustration with 'R' software

Let us explore Figure 5.3 from top to bottom. The first graph gives the 'overall' percentage change of GDP growth and aid grants induced by a temporary increase of 1% of aid loans. As already quantified in Table 5.1, such an impulse causes an increase of GDP growth. It also increases the level of aid grants. Both GDP growth and aid grants keep growing until the impulse is off ('aid loans' touches the horizontal axis). That matches with the previous results, suggesting that aid loans have positive impacts on growth and showing that aid grants complement aid loans to fund specific aims that the latter cannot adequately fund. The second graph provides the 'overall' percentage change of GDP growth and aid loans caused by a temporary 1% increase of aid grants. Table 5.1 also showed that economic growth is increased by such an impulsion. Subsequently, Graph 3 confirms that aid grants exert positive impacts on growth.

However, although we previously explained that aid grants do not affect aid loans, the second graph shows that an increase in aid grants decreases aid loans. This is not a contradiction but another way of presenting the same fact. Indeed, drawing on Table 5.2 (part 3), a 1% increase of aid grants induces a 0.8% decrease of aid loans. The p-value (0.385) suggests that that 0.8% impact is not significantly different from zero and hence was disregarded in our previous explanation. However, the impulse-response function still visualizes such a negligible effect and thereby gives an insight into the global interactions within the estimated VAR model. Unlike aid grants, which are strategically complemented by aid loans, that suggests that loans may be substituted by grants. In other words, donors may partly replace aid loans by aid grants without jeopardizing their strategic objectives.

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However, in addition to foregoing repayments, the previous results points out the efficiency loss of such a reallocation and the conditions in which it can be acceptable.

The graphical comparison of the effects of grants —Figure 5.3, Graph 2— and loans —Figure 5.3, Graph 3— on growth and their quantification in Table 5.1 proves aid loans to be more effective than aid grants. Consequently, the reallocation from loans to grants should be merely done when necessary. Countries having unsustainable debt burdens would logically benefit from such an exceptional reallocation. Graph 1 of Figure 5.3 visualizes the small feedback effects of economic growth on both grants and loans. Although statistically insignificant, they predict that foreign aid should never be considered as a never ending funding source for development of SSA. Indeed, it suggests that the more donors will assess SSA GDP as relatively high, the less they will provide grant and concessional loans. Therefore, as SSA GDP increases, more policy makers in SSA should look for alternative sources to sustain their development. One of the available options is resorting to market funds.

Beyond these impacts of both grants and concessional loans on SSA economic growth, which has been the effect on the 'inequality-adjusted' growth rate? Has aid reached the poorest citizens in SSA and stimulated their income growth? In order to test so, we estimate a similar VAR model and carry out the same analysis using the 'inequality-adjusted' GDP per capita growth rate.

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The estimation results show that neither concessional loans nor grants have statistically significant impacts on the 'inequality-adjusted' growth (Table 5.3, part 1). Furthermore, the latter has no significant effects on neither aid grants (Table 5.3, part 2), nor on aid loans (Table 5.3, part 3). In comparison to the positive and strongly significant effects for the case without inequality adjustment, this suggests that aid is not well targeting the poorest citizens —and/or it is used in a way that its effects on the poorest would be observable in a much longer period of time.

Table 5.3: Interactions of GDP growth adjusted for inequality, grants and loans

| 1. Direct effects of 1% increase of loans and grants on adjusted growth | | | | | | |
|---|---|---|---|---|---|---|
| Variable | Lag 1 | P-Value | Lag 2 | P-Value | Lag 3 | P-Value |
| Aid grants | 3.316 | 0.438 | 2.466 | 0.712 | -3.083 | 0.468 |
| Aid loans | 3.748 | 0.456 | 2.466 | 0.712 | -3.199 | 0.534 |
| 2. Direct effect of 1% increase of adjusted growth on grants | | | | | | |
| Variable | Lag 1 | P-Value | Lag 2 | P-Value | Lag 3 | P-Value |
| Aid grants | 0.078 | 0.511 | 0.080 | 0.325 | 0.0719 | 0.359 |
| 3. Direct effect of 1% increase of adjusted growth on loans | | | | | | |
| Variable | Lag 1 | P-Value | Lag 2 | P-Value | Lag 3 | P-Value |
| Aid loans | -0.049 | 0.611 | -0.076 | 0.253 | -0.065 | 0.309 |
| 4. Direct effects of 1% increase of aid loans on aid grants | | | | | | |
| Variable | Lag 1 | P-Value | Lag 2 | P-Value | Lag 3 | P-Value |
| Aid loans | 3.595 | 0.041 | -3.980 | 0.138 | 1.390 | 0.394 |
| 5. Direct effects of 1% increase of aid grants on aid loans | | | | | | |
| Variable | Lag 1 | P-Value | Lag 2 | P-Value | Lag 3 | P-Value |
| Aid loans | -1.918 | 0.090 | 2.525 | 0.162 | -0.978 | 0.372 |

Source: author's estimations with 'R' software

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As for the case without inequality adjustment, part 4 of Table 5.3 still confirms that an increase of aid loans induces a significant increase of aid grants. Similarly, part 5 of Table 5.3 confirms our previous argument, stating that an increase of aid grants does not induce an increase of aid loans.

## 5.2   Extension of the analysis in the long term

The main result of the previous section is that both aid grants and aid loans positively affect the 'overall' economic growth with a higher impact associated to the latter aid components. The previous section also indicated that both aid components do not significantly stimulate the 'inequality-adjusted' growth.

Let us recall that, like all the empirical conclusions drawn in that analysis, those two conclusions are based on the estimation of the retained VAR (3). Subsequently, the modeled and estimated interactions of growth and aid are those happening along a 3-year period. Beyond a 3-year period, we need a co-integration analysis.

From the stationarity analysis, we already know that the 'inequality-adjusted' per capita GDP growth is not impacted by both aid grants and aid loans in the long term. This is because they are not integrated at the same order for all acceptable significance levels (appendix A). In contrast, by re-conditioning stationarity to 1 % (or 5%) significance level, the 'overall' GDP per capita growth, aid grants and aid loans are integrated at the same order. That allows to estimate how they interact in a much longer term. It is in this framework that this section checks whether the previous conclusions hold in long term.

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As summarized by Tables 5.4 and 5.5 for the trace and maximal eigenvalue tests respectively, at 5% significance level, Johansen's (1991) Co-integration Test (CT) comes up with one valid long run equilibria.

Table 5.4: Johansen's (1991) trace CT for unadjusted data

| r | Test | 10% | 5% | 1% | Eignenvalue |
|---|------|------|------|------|-------------|
| 0 | 36.41 | 32.00 | 34.91 | 41.07 | 1.726016e-01 |
| 1 | 13.44 | 17.85 | 19.96 | 24.60 | 3.826421e-01 |
| 2 | 03.79 | 7.52 | 09.24 | 12.97 | 6.828918e-01 |

Source: author's computation with 'R' software

Table 5.5: Johansen's (1991) eigenvalue CT for unadjusted data

| r | Test | 10% | 5% | 1% | Eignenvalue |
|---|------|------|------|------|-------------|
| 0 | 22.97 | 19.77 | 22.00 | 26.81 | 1.726016e-01 |
| 1 | 9.65 | 13.75 | 15.67 | 20.20 | 3.826421e-01 |
| 2 | 3.79 | 7.52 | 9.24 | 12.97 | 6.828918e-01 |

Source: author's computation with 'R' software

The trace and maximal eigenvalues tests are sequential (Johansen, 1991). Therefore, we start checking the null hypothesis for lack of co-integration relationship, against the alternative of the existence of at most one co-integrating equation.

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In Tables 5.4 and 5.5, this corresponds to the second rows 'r=0'. Both Tables give test statistics largely higher than the critical values at 10%, 5% and 1% significance level, but smaller at 1% level. We consequently reject the null hypothesis in favor of the alternative at 5% percent significance level.

Then the latter hypothesis becomes the null against the alternative assuming at most two co-integrating equations. In this case, the third lines 'r=1' in both Tables provide smaller test statistics than critical values at all significance levels. This rejects the second null in favor of the second alternative hypothesis. Consequently, both the trace and maximal eigenvalue tests retain the null hypothesis of existence of at most one Co-integration Equation. Table 5.6 gives the corresponding CVs normalized to $\log(GDP_t)$.

Table 5.6: Johansen's (1991) significant CVs for unadjusted data

| Variables | Vector 1 |
|-----------|----------|
| $\log(y_t)$ | 1.00 |
| $\log(G_t)$ | -0.66 |
| $\log(L_t)$ | -2.89 |
| constant | 1.77 |
| ect | -0.30 |

Source: author's computation with 'R' software

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By equalizing the CV-based linear combinations of the three variables to the stationary residuals underpinning their co-integration, we end up with the CE 5.1 corresponding respectively to the CV 1.

$$log(y_t) - 0.66^*log(G_t) - 2.89^*log(L_t) + 1.77 = \delta_{1t} \qquad (5.1)$$

Where $y_t$, $G_t$, $L_t$ are GDP per capita, aid grants and aid loans respectively. The Equation 5.1, made explicit in terms of $log(y_t)$, result in Equation 5.2. The latter Equation provides the long run relative effectiveness of aid grants and aid loans. This co-integrating equation shows that both grants and concessional loans have positive long run elasticities, which are statistically and economically significant. Elsewhere, concessional loans exhibit higher relative effectiveness than grants.

$$log(y_t) = -1.77 + 0.66^*log(G_t) + 2.89^*log(L_t) + \delta_{1t} \qquad (5.2)$$

In general, the outcome of this long term analysis confirms that of the short term. Like the short term analysis, it confirms that aid grants and aid loans do have positive and significant impacts, however, only on the 'overall' growth and not on the 'inequality-adjusted' growth. In particular, grants elasticity of growth is much smaller in the long term than in the short term (Figure 5.4). In contrast, Figure 5.5 shows that the loans elasticity of growth's estimate of long term is roughly equivalent to that of short term.

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Figure 5.4: Grants elasticity of growth: short versus long term
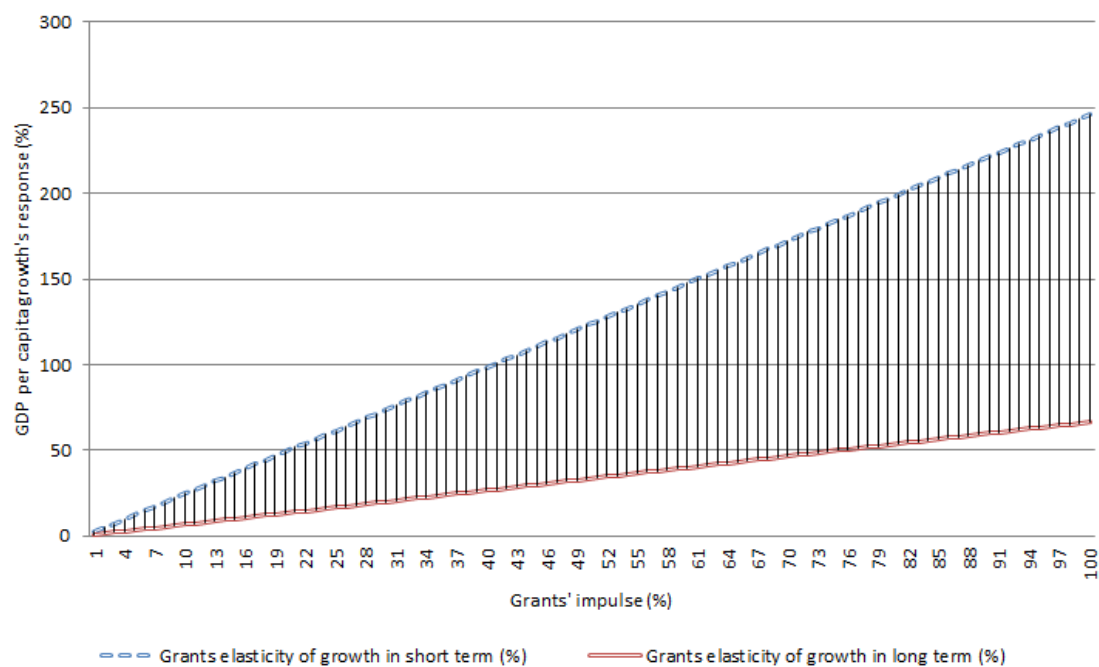


Source: author's estimation with 'R' software

Figure 5.5: Loans elasticity of growth: short versus long term
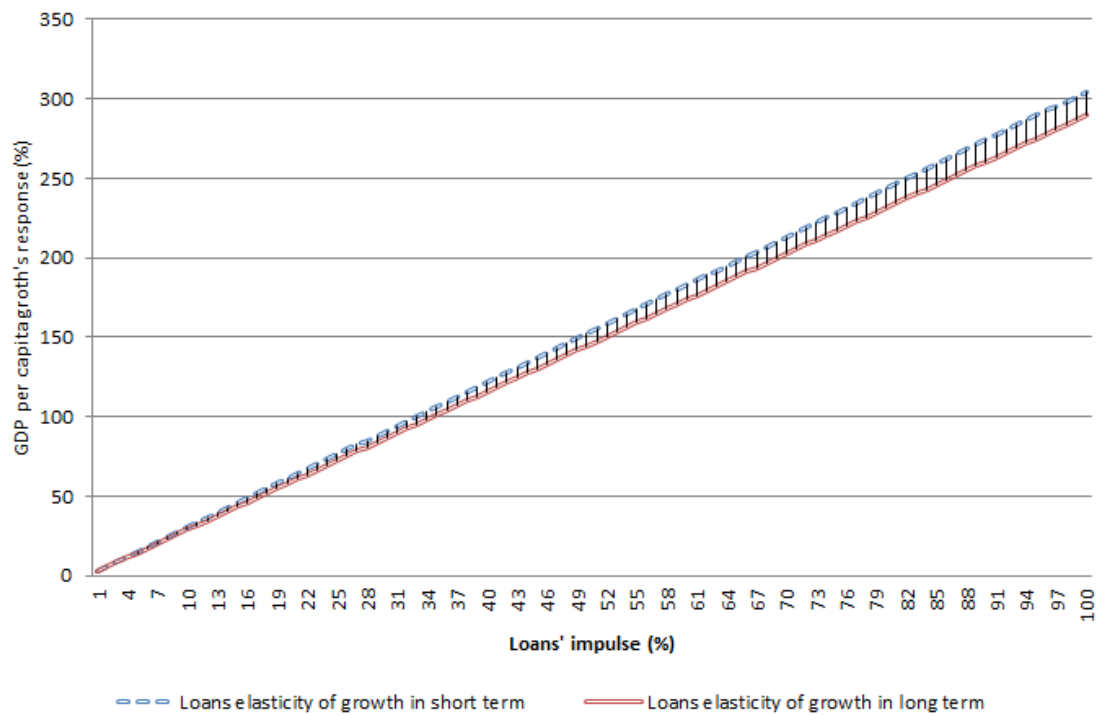


Source: author's estimation with 'R' software

That is due to the fact that Grants are more short-term oriented projects and programs whereas loans tend to finance longer-term projects and programs.

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# Chapter 6

# Conclusions

The new UN's *2030 Agenda for Sustainable Development* pledges to eradicate poverty in a 15-year period and, once again —as previously happened with the MDG— most of the attention is on SSA, as this is the region with the highest extreme poverty rates, but it is also the main global recipient of ODA. Given that the average income in this region is too low to generate savings and to sustain the necessary level of economic growth to achieve the SDG, a good functioning of ODA is crucial to make sure that SSA will not be left behind. Therefore, shedding light on the seemingly never-ending controversy about the effectiveness of aid in this African region is especially timely and relevant.

In fact, previous studies on the macroeconomic effectiveness of ODA have paid very little attention to the assessment of the existence of distorting effects of aid on SSA economies. Therefore, this Thesis has two core research objectives: firstly, to analyze the relative impacts of aid grants and aid loans on the rate of growth of SSA countries' per capita income. And secondly, to explore the main distorting effects that ODA causes on the recipient economies.

Besides the introduction and the conclusion, we have addressed these two research objectives in four chapters respectively analyzing ODA flows to SSA, reviewing the specialized scientific literature, presenting the estimation method and the empirical results.

The descriptive analysis showed that ODA is the main source funding SSA economic development. It is overwhelmingly larger than both official and private external flows to SSA and is also largely higher than domestic savings, which is insignificant in this region. In the same vein, SSA share of ODA has become the highest since the 1990s and is delivered mostly in terms of grants. However, ODA flows are still limited if we compute them in per capita terms with an annual average reception of 33.7 USD per person in SSA . Also, on average, donors disburse roughly 0.3% of their respective GNI, which is largely below the UN's 0.7% target. Nevertheless, ODA still exhibits positive and significant correlations with some HDI, including GDP and GDP per capita growth. In contrast, it coexists with other alarming macroeconomic indicators such as high employment rates, debt stock and inflation. Moreover, in terms of its sectoral allocation, ODA disbursed to SSA has funded the social, commodity and humanitarian sectors more than the economic and productive activities. Concerning the geographical distribution, some countries received higher quotas than others. We have pinpointed twelve relatively 'aid darlings' countries, which received quotas above the third quartile and fourteen relatively 'aid orphans' countries, which received quotas below the first quartile. The remaining thirteen countries received quotas between the first and third quartiles.

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In the literature review, we have opposed the 'optimistic' to the 'skeptic' streams of the aid effectiveness literature. While tenants of the first stream argue in favor of a 'big push' in terms of delivering more aid to overcome what they consider as a poverty trap in SSA, tenants of the second stream not only disagree with the existence of that poverty trap, but also claim that the distorting effect of aid on SSA economic and political institutions is the actual trap that should be fought. They suggest to replace aid with a marked-based development finding which —in their viewpoint— would not distort those SSA economies. Drawing on this inconclusiveness, RCT tenants propose a shift of focus from macro to micro investigations. From their perspective, RCT-based development policies which prove to work should be scaled up and those which do not work should be abandoned. Tenants of the 'Self-discovery Approach to Development' do not agree with this. According to them, nothing assures that a policy which worked in a specific region would work in another. The same applies to policies which worked at a given period of time in a region. There is no guarantee that they would work at a different point of time in the same region. Subsequently, they are against traditional aid and argue in favor of aid promoting entrepreneurship and adequate institutions as they are convinced that only local efforts would bring sustainable development to SSA.

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Exiting empirical studies inconclusively shed light on this controversy. We have reviewed all the four generations of studies on the macroeconomic effectiveness of aid. In those generations, some researchers found that aid stimulates growth — among others: Svensson (2000); Houdou and Njoupouognigni (2010); Tombofa et al. (2013); Juselius et al. (2014)— others the opposite —for instance: Girijasankar (2008); Juselius et al. (2014) — and yet another group conditioned the effectiveness of aid to 'good policies' — among others, Angeles and Neanidis (2009); Collier (2006); Muhammed (2005); Burnside and Dollar (2000). Consequently, both the aid-optimistic and the aid-skeptic streams have been underpinned by some of these empirical findings and contradicted by others. Very recently, a number of empirical investigations have paid special attention to the heterogeneous nature of aid. Particularly the consideration of different aid modalities such as aid grants and aid loans has proved to be informative regarding the estimation of the stimulating and the distorting effects of aid on growth and poverty reduction.

In the methodological chapter, we have elaborated on the way we have considered these two aid modalities and dealt with the endogeneity issue. We have specified our model in such a way it allows examining the relative effects of aid grants and aid loans on economic growth and discussing the strengths and weaknesses of those two aid modalities. To account for the SSA high level of income inequality, we have distinguished between the 'overall impact' of aid on growth and the 'inequality-adjusted' impact' of aid on the poorest citizens.

We have considered the lack of repayment burden on poor countries as the major strength of aid grants, but we have also associated it with higher risks of allocating such concessional resources into unproductive activities.

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Conversely, we have generally considered aid loans to exert positive incentives to productively invest the resources in order to meet repayment obligations. We have also considered that they generate a debt burden that may be unsustainable for some poor countries. Therefore, we have assumed for the estimations that the net impact of each aid modality would be positive if its strengths compensate for its weaknesses.

Furthermore, we have considered that both aid grants and aid loans not only affect economic growth but are also impacted by the latter within a kind of 'loop of causality'. Consequently, we have used VAR models and co-integrating equations in order to incorporate such inter-dependencies and control the effects of other omitted processes that would otherwise bias the empirical results. The estimation during the period 1991–2014 points out five relevant results in relation to the aggregate impact of ODA in SSA:

1. Although foreign aid exerted both distorting and stimulating effects on SSA's economic growth, its net impact was significantly positive. This positive net impact underpins the optimistic aid stream —among others, Fayissa and El-Kaissy (1999), Juselius et al. (2014), Sachs (2015) and Tombofa et al. (2013)— and contradicts the aid skeptics —among others: Akonor (2007), Moyo (2009) and Ogundipe et al. (2014). However, it also confirms the concerns raised by the latter stream about the existence of aid distorting effects —even though they are assessed to be lower than expected.

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2. While both aid components have positive and significant impacts on economic growth, aid loans are relatively more effective than aid grants. On the one hand, a 1% increase in aid grants raises SSA growth rate by around 2.46% in the short and 0.66% in the long term. On the other hand, 1% increase in aid loans raises SSA growth rate by around 3.04% in the short and 2.89% in the long term. Subsequently, both an increase of each of these two aid modalities and a reallocation from aid grants to aid loans for a given amount of ODA are expected to induce higher growth.

3. A reallocation from aid grants to aid loans may provide an adequate incentive to use aid resources in a more productive way, but its complete implementation —100% loans versus 0% grants— is not practical as some strategic targets of ODA are incompatible with aid loans. Nonetheless, donors still have relatively wide room for maneuver since ODA to SSA is largely delivered in terms of grants (91%). Moreover, the success of such a reallocation assumes a sustainable debt burden of the recipient country. Otherwise, the opposite reallocation —from aid loans to aid grants— would be preferable.

4. ODA does not yet sufficiently target the poor, as it does not significantly boost the income of the poorest citizens. This is an alarming result, since ODA is officially intended to reach the neediest people —especially if it is intended to underpin the first and the tenth SDG target of respectively eradicating poverty and reducing inequality.

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5. As in the short term, both aid grants and aid loans positively affect growth in the long term with a higher relative effectiveness for aid loans. Likewise, those two aid modalities do not have a significant impact on the 'inequality-adjusted' growth in the long term. Consequently, the outcome of the long term analysis meets that of the short term. However, it points out that the difference in aid-growth elasticities between aid grant and aid loans is much higher in the long than in the short term as Grants are more short-term oriented projects and programs whereas loans tend to finance longer-term projects and programs.

In sum, these results support both the increase of ODA resources for SSA in the SDG era and the use of both aid grants and loans in this —mainly— low-income region. Furthermore, we cannot infer that concessional loans are always preferable to grants. On the contrary, grants should still be concentrated in those African countries with lower repayment capacity and more restricted access to credit. However, the use of concessional loans should be increased in those economies that need resources for financing productive activities, offer guaranties of repayment and are more affected by institutional distortions. Therefore, this PhD Thesis opens the door for future analysis on the socio-economic, political and institutional conditions that are more appropriate for the —efficient— use of aid loans and aid grants.

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Finally, it should be taken into account that this mostly tests the 'macroeconomic effectiveness' of aid in relation to SSA's economic growth and (income) poverty reduction, and not in relation to the progress in other dimensions of human development. Consequently, it should be interpreted as a 'partial' evaluation of the effectiveness of aid, exclusively referring to the economic dimension of development.

As a next step, we wish to extend this analysis to other developing regions such as Asia, which is nowadays receiving less aid and getting more access to credit. This increasing access to credit would offer an opportunity to evaluate how the aid-skeptic streams' recommendation of replacing aid by market-based development funding works. Also, as Asia received the highest share of ODA until the mid-80s, it would allow us to assess to what extent aid would have contributed to alleviate the poverty trap in a region that used to be the poorest and is now performing relatively better than other developing regions.

# Bibliography

Acemoglu, D., Robinson, J. A., and Verdier, T. (2004). Alfred marshall lecture: Kleptocracy and divide-and-rule: A model of personal rule. *Journal of the European Economic Association*, 2(2/3):162–192.

Akonor, K. (2007). Foreign aid to africa: a hallow hope? *New York University journal of international law politics*, 40(4):1071–1078.

Alesina, A. and Dollar, D. (2000). Who gives foreign aid to whom and why? *Journal of Economic Growth*, 5(1):33–63.

Angeles, L. and Neanidis, K. C. (2009). Aid effectiveness: the role of the local elite. *Journal of Development Economics*, 90(1):120–134.

Arellano, M. and Bond, S. R. (1991). Some tests of specification for panel data: Monte carlo evidence and an application to employment equations. *The Review of Economic Studies*, 58(2):277–297.

Asiedu, E. and Nandwa, B. (2007). On the impact of foreign aid in education on growth: How relevant is the heterogeneity of aid flows and the heterogeneity of aid recipients? *Review of World Economics*, 143(3):631–649.

Banerjee, A. V. and Duflo, E. (2009). *Poor Economics: A Radical Rethinking of the Way to Fight Global Poverty*. Public Affairs.

Barro, R. (1991). Economic growth in a cross section of countries. *The Quarterly Journal of Economics*, 106(2):407–443.

Bearce, D. H. and Tirone, D. C. (2010). Foreign aid effectiveness and the strategic goals of donor governments. *Journal of Politics*, 72(3):837–851.

Boone, P. (1996). Politics and the effectiveness of foreign aid. *European economic review*, 40(2):289–329.

Buchanan, J. M. (1975). The samaritan's dilemma. In Phelps, E., editor, *Altruism, Morality, and Economic Theory*, pages 71–85. Russell Sage Foundation, New York.

Burnside, C. and Dollar, D. (2000). Aid, policies, and growth. *The American Economic Review*, 90(4):847–868.

Chang, C. C., Fernandez, A., and Serven, L. (2002). Measuring aid flow: a new approach. *Global Economy Quarterly*, 3(2):197–218.

Chauvet, L. and Guillaumont, P. (2004). Aid and growth revisited: Policy, economic vulnerability and political instability. In Tingodden, B. and Stern, N.and Kolstad, I., editors, *Towards pro-poor policies  Aid, Institutions and Globalization*, pages 95–109. World Bank-Oxford University Press, Washington DC.

Cobham, A. and Summer, A. (2013). Is it all about the tails? the palma measure of income inequality. Working Paper 343, Center for Global Development, Washington DC.

*Pacifique Mongongo Dosa*

Cohen, J. and Easterly, W. (2009). Thinking big and thinking small. In Cohen, J. and Easterly, W., editors, *What works in development?*, pages 1–29. Brooking institutions press, Washington DC.

Collier, P. (2006). African growth: why a big push? *Journal of African Economies*, 15(2):188–211.

Collier, P. (2007). *The bottom billion: Why the poorest countries are failing and what can be done about it.* Oxford University Press.

Collier, P. and Gunning, J. W. (1999). Why has africa grown slowly? *Journal of economic perspectives*, 13(3):3–22.

Collier, P. and Rohner, D. (2008). Democracy, development, and conflict. *Journal of the European Economic Association*, 6(2-3):531–540.

DAC (2016). Aid statistics. `http://www.oecd.org/dac/stats/`. [Online; accessed 19-July-2016].

Dalgaard, C. and Hansern, H. (2010). Evaluating aid effectiveness in the aggregate: A critical assessment of the evidence. *Munich Personal RePEc Archive MPRA*, Evaluation Study 2010/1.

Denkabe, P. (2004). Policy, aid and growth: A threshold hypothesis. *Journal of African Development*, 1(1):39–45.

Djankov, S., Montalvo, J., and Reynal-Querol, M. (2009). Aid with multiple personalities. *Journal of Comparative Economics*, 37(2):217–229.

Domar, E. (1946). Capital expansion, rate of growth, and employment. *Econometrica*, 14(2):137–147.

*Pacifique Mongongo Dosa*

Doucouliagos, H. and Paldam, M. (2006). Aid effectiveness on growth: A meta study. *Kyklos*, 59(2):227–254.

Doucouliagos, H. and Paldam, M. (2008). Aid effectiveness on growth: A meta study. *European Journal of Political Economy*, 24(1):1–24.

Doucouliagos, H. and Paldam, M. (2010). Conditional aid effectiveness. a meta-study. *Journal of International Development*, 22(4):391–410.

Doucouliagos, H. and Paldam, M. (2011). The ineffectiveness of development aid on growth: An update. *European Journal of Political Economy*, 27(2):399–404.

Dovern, J. and Nunnenkamp, P. (2007). Aid and growth accelerations: An alternative approach toassessing the effectiveness of aid. *Kyklos*, 60(3):359–383.

Duflo, E. (2009). Scaling up and evaluation. In Bourguignon, F. and Pleskovic, B., editors, *Accelerating development*, pages 341–369. Oxford university press.

Dunning, T. (2004). Conditioning the effects of aid: Cold war politics, donor credibility, and democracy in africa. *International Organization*, 58(2):409–423.

Easterly, W. (2002). *The elusive quest for growth: Economists' adventures and misadventures in the Tropics*. The MIT Press, Cambridge.

Easterly, W. (2006). *The White Man's Burden: Why the West's Efforts to Aid the Rest Have Done So Much Ill and So Little Good*. Penguin Press.

Ekanayake, E. M. and Chatrna, D. (2010). The effect of foreign aid on economic growth in developing countries. *Journal of International Business and Cultural Studies*, 3(1):1–13.

*Pacifique Mongongo Dosa*

European Commission (2016). Special eurobarometer 441: The european year for development   citizens' views on development, cooperation and aid. Technical report, European Commission.

Fayissa, B. and El-Kaissy, M. I. (1999). Foreign aid and the economic growth of developing countries (ldcs): Further evidence. *Studies in Comparative International Development*, 34(3):37–50.

Feeny, S. and McGillivray, M. (2009). Aid allocation to fragile states: Absorptive capacity constraints. *Journal of International Development*, 21(5):618–632.

Fosu, K. A. (2009). Inequality and the impact of growth on poverty: Comparative evidence for sub-saharan africa. *Journal of Development Studies*, 45(5):726–745.

Fosu, K. A. (2013). Impact of the global financial and economic crisis on development: whiter africa? *Journal of International Development*, 25(8):1085–1104.

Fosu, K. A. (2015). Growth, inequality and poverty in sub-saharan africa: Recent progress in a global context. *Oxford Development Studies*, 43(1):44–59.

Girijasankar, M. (2008). Foreign aid and economic growth: A cointegration analysis of the six poorest african countries. *Economic analysis and policy*, 38(2):251–260.

Griffin, K. B. and Enos, J. (1970). Foreign assistance: objectives and consequences. *Economic Development and Cultural Change*, 18(3):313–327.

Hagemann, H. (2009). Solow's 1956 contribution in the context of the harrod-domar model. *History of Political Economy*, 41(1):67–87.

*Pacifique Mongongo Dosa*

Hansen, H. and Tarp, F. (2000). Aid effectiveness disputed. *Journal of International Development*, 12(3):375–398.

Harrod, R. F. (1939). An essay in dynamic theory. *The Economic Journal*, 49(193):14–33.

Houdou, N. and Njoupouognigni, M. (2010). Foreign aid, foreign direct investment and economic growth in sub-saharan africa: Evidence from pooled mean group estimator (pmg). *International Journal of Economics and Finance*, 2(3):39–45.

Jain, S. (2007). Project assistance versus budget support: An incentive-theoretic analysis of aid conditionality. *Review of World Economics*, 143(4):694–719.

Johansen, S. (1991). Estimation and hypothesis testing of cointegration vectors in gaussian vector autoregressive models. *Econometrica*, 59(6):1551–1580.

Juselius, K., Moller, N. F., and Tarp, F. (2014). The long-run impact of foreign aid in 36 african countries: Insights from multivariate time series analysis. *Oxford Bulletin of Economics and Statistics*, 76(2):153–184.

Kakwani, N. (1977). Applications of lorenz curves in economic analysis. *Econometrica*, 45(3):1–53.

Kathavate (2013). Direct Indirect Effects of Aid Volatility on Growth: Do Stronger Institutions Play a Role? `http://mpra.ub.uni-muenchen.de/45187/`. [Online; accessed 19-July-2016].

Knack, S. (2004). Does foreign aid promote democracy? *International Studies Quarterly*, 48(1):251–266.

Kraay, A. and Raddatz, C. (2007). Poverty traps, aid, and growth. *Journal of Development Economics*, 82(2):315–347.

Lancaster, C. (2007). *Foreign aid: Diplomacy, Development, Domestic Politics.* University of Chicago Press.

Maddison, A. (2006). *The World Economy: A Millennial Perspective.* OECD-Development Centre Studies, Paris.

Massell, B., Pearson, S., and Fitch, J. (1972). Foreign exchange and economic development: an empirical study of selected latin american countries. *Review of Economics and Statistics*, 54(2):208–212.

Mavrotas, G. and Nunnenkamp, P. (2007). Foreign aid heterogeneity: Issues and agenda. *Review of World Economics*, 143(4):585–595.

Mavrotas, G. and Ouattar, B. (2007). Aid modalities and budgetary response: Panel data evidence. *Review of World Economics*, 143(4):720–741.

McGillivray, M., Feeny, S., Hermes, N., and Lensik, R. (2006). Controversies over the impact of development aid: it works; it doesnt; it can, but that depends. *Journal of International Development*, 18(7):1031–1050.

Molenaers, N., Gagiano, A., Smets, L., and Dellepiane, S. (2015). What determines the suspension of budget support? *World development*, 75:62–73.

Mongongo, P. D. (2016). On the measurement and use of equality weighted growth. *Iberoamerican Journal of Development Studies*, 5(2):126–139.

Moyo, D. (2009). *Dead aid: Why aid is not working and how there is another way for Africa.* Penguin Books.

*Pacifique Mongongo Dosa*

Muhammed, N. I. (2005). Regime changes, economic policies and the effect of aid on growth. *Journal of Development Studies*, 41(8):1467–1492.

Narayan, D., Pritchett, L., and Kapoor, S. (2009). *Moving Out of Poverty: Success from the Bottom Up, World Bank Publications*. Palgrave Macmillan.

Ogundipe, A., Ojeaga, P., and Ogundipe, M. O. (2014). Is aid really dead? evidence from sub-saharan africa. *International Journal of Humanities and Social Sciences*, 10(1):300–314.

Overseas Development Institute (2013). European report on development 2013: Post-2015 global action for an inclusive and sustainable future. Technical report, European Commission.

Overseas Development Institute (2015). European report on development 2015: Combining finances and policies to implement a transformative post-2015 development agenda/ european report on development 2015. Technical report, European Commission.

Padro, G. (2007). The control of politicians in divided societies: The politics of fear. *Review of Economic Studies*, 74(4):1259–1274.

Pedersen, K. L. (2001). The samaritans dilemma and the effectiveness of development aid. *International Tax and Public Finance*, 8(5):693–703.

Pinkovskiy, M. and Sala-i Martin, X. (2014). Africa is on time. *Journal of economic growth*, 19(3):311–338.

Pritchett, L. and Sandefur, J. (2014). Context matters for size: Why external

validity claims and development practice do not mix. *Journal of Globalization and Development*, 4(2):161–197.

Pritchett, L. and Sandefur, J. (2015). Learning from experiments when context matters. *American Economic review*, 105(5):471–475.

Punam, C. L., Christiaensen, L., Angwafo, M., Buitano, M., Dennis, A., Korman, V., Sanoh, K., and Ye, X. (1991). An analysis of issues shaping africas economic future. *Africa's pulse: The world bank publications*, 7(2):1–26.

Rajan, R. and Subramanian, A. (2008). Aid and growth: what does the cross-country evidence really show? *Review of Economics and Statistics*, 90(4):643–665.

Ramsey, F. (1928). A mathematical theory of saving. *The economic journal*, 38(152):543–559.

Ravallion, M. (2012). Fighting poverty one experiment at time: A review of abhijit banerjee and easter duflos poor economics: A radical rethinking of the way to fight global poverty. *Journal of economic literature*, 50(1):103–114.

Roodman, D. (2006). How to do xtabond2: An introduction to difference and "system" gmm in stata. Working Paper 103, Center for global development.

Rosenstein-Rodan, P. N. (1943). Problems of industrialisation of eastern and south-eastern europe. *The Economic Journal*, 53(210/211):202–211.

Rosenstein-Rodan, P. N. (1961a). International aid for underdeveloped countries. *Review of Economic Statics*, 43:1–53.

*Pacifique Mongongo Dosa*

Rosenstein-Rodan, P. N. (1961b). International aid for underdeveloped countries. *Review of Economics and Statistics*, 43(2):107–138.

Rosenstein-Rodan, P. N. (1961c). Notes on the theory of the big push. In Ellis, H. S. and Wallich, C. H., editors, *Economic Development for Latin America: Proceedings of a Conference held by the International Economic Association*, pages 57–67. Macmillan Press LTD, London.

Sachs, J. (2005a). *The end of poverty: economic possibilities for our time*. Penguin, London.

Sachs, J. (2005b). Investing in development: A practical plan to achieve the un millennium development goals. Technical report, UN Millennium Project.

Sachs, J. (2015). *The age of sustainable development*. Columbia university press, New York.

Sachs, J. and Warner, A. M. (1997). Sources of slow growth in sub-saharan economies. *Journal of African economies*, 6(3):335–76.

Sen, A. (1976). Poverty: An ordinal approach to measurement. *Econometrica*, 44(2):219–231.

Solow, R. (1956). A contribution to the theory of economic growth. *The Quarterly Journal of Economics*, 70(1):66–94.

Solow, R. (2007). The last 50 years in growth theory and the next 10. *Oxford Review of Economic Policy*, 23(1):3–14.

Svensson, J. (2000). Foreign aid and rent-seeking. *Journal of International Economics*, 51(2):437–461.

Tezanos, S. (2010). América Latina y el Caraibe: Ayuda Oficial al Desarrollo en el punto de infléxion del milenio. *Revista Problemas del Desarrollo*, 162(41):31–56.

Tezanos, S., Quiñones, A., and Guijarro, M. (2013). Inequality, aid and growth: macroeconomic impact of aid grants and loans in Latin America and the Caribbean. *Journal of applied economics*, 16(1):153–177.

Tezanos, S. V. (2015). Geographical allocation of aid: lessons from political economy. In Arvin, M. B. and Lew, B., editors, *Handbook on the Economics of Foreign Aid*, pages 90–108. Edward Elgar Publishing Ltd, UK.

Thiele, R., Nunnenkamp, P., and Dreher, A. (2007). Do donors target aid in line with the millennium development goals? a sector perspective of aid allocation. *Review of World Economics*, 143(4):596–630.

Tombofa, S. S., Edoumiekumo, G. S., and Obudah, C. B. (2013). Foreign aid, debt and growth nexus in nigeria. *Research Journal of Economics, Business and ICT*, 8(2):18–24.

United Nations (2006). *Doubling Aid: Making the Big Push work*. United Nations, New York and Geneva.

United Nations (2013). A new global partnership: eradicate poverty and transform economies through sustainable development/ the report of the high-level panel of eminent persons on the post-2015 development agenda. Technical report, UN Secretariat.

United Nations (2015a). The millennium development goals report 2015. Technical report, United Nations.

*Pacifique Mongongo Dosa*

United Nations (2015b). Transforming our world: the 2030 agenda for sustainable development, a/res/70/1. Technical report, United Nations.

Weisskopf, T. E. (1972). An econometric test of alternative constraints on the growth of underdeveloped countries. *Review of economics and statistics*, 54(1):67–78.

White, H. (1992). The economic analysis of aid policy. *Journal of International Development*, 4(2):121–137.

World Bank (2015). World Bank Forecasts Global Poverty to Fall Below 10% for First Time; Major Hurdles Remain in Goal to End Poverty by 2030. `http://www.worldbank.org/en/news/press-release/2015/10/04/world-bank-forecasts-global-poverty-to-fall-below\-10-for-first-time-major-hurdles-remain-in-goal-to-end\-poverty-by-2030`. [Online; accessed 01-December-2016].

World Bank (2016a). PovcalNet: an online analysis tool for global poverty monitoring. `http://iresearch.worldbank.org/PovcalNet/home.aspx`. [Online; accessed 07-December-2016].

World Bank (2016b). World Development Indicators. `http://data.worldbank.org/products/wdi`. [Online; accessed 19-July-2016].

Wright, J. (2008). To invest or insure? how authoritarian time horizons impact foreign aid effectiveness. *Comparative Political Studies*, 41(7):971–1000.

# Appendix A

# Stationarity analysis

Figure A.1: Graphical and ADF test for GDP per capita



| Formal test of stationarity (Not stationary) | | | |
|---|---|---|---|
| ADF test | | | |
| Data | ADF (1) | P-value | Delta: sample estimates |
| pcGDP_ts | 0.37411 | 0.9769 | 0.01357653 |
| Alternative hypothesis: true delta is less than 0 | | | |
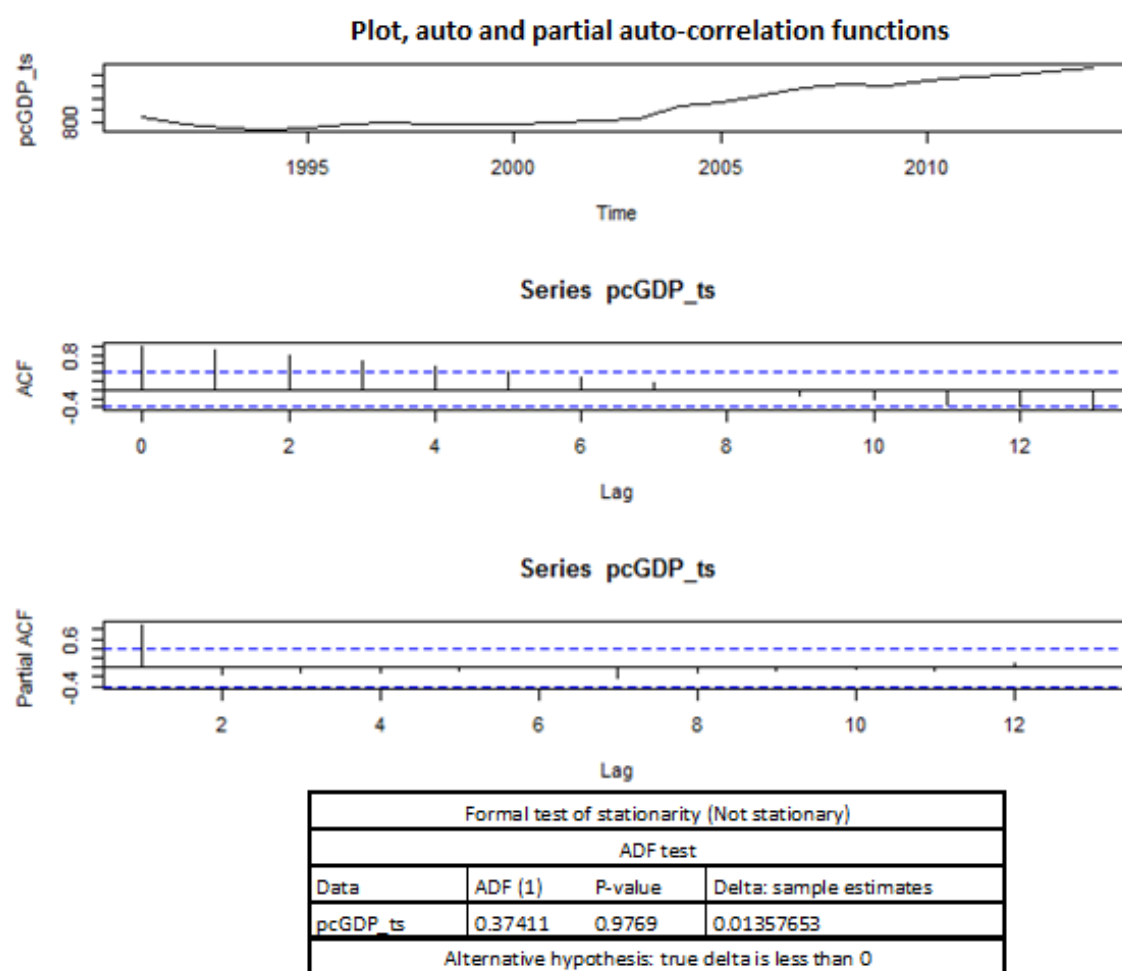
Source: author's computation and illustration with 'R' software

Figure A.2: Graphical and ADF test for GDP per capita once log-differenced



**Plot, auto and partial auto-correlation functions**

**Series (dlogpcGDP_ts)**

**Series (dlogpcGDP_ts)**

| Formal test of stationarity (Stationary at 10% significant level) | | | |
|---|---|---|---|
| ADF test | | | |
| Data | ADF (1) | P-value | Delta: sample estimates |
| dlogpcGDP_ts | -2.8685 | 0.06659 | -0.5973933 |
| Alternative hypothesis: true delta is less than 0 | | | |
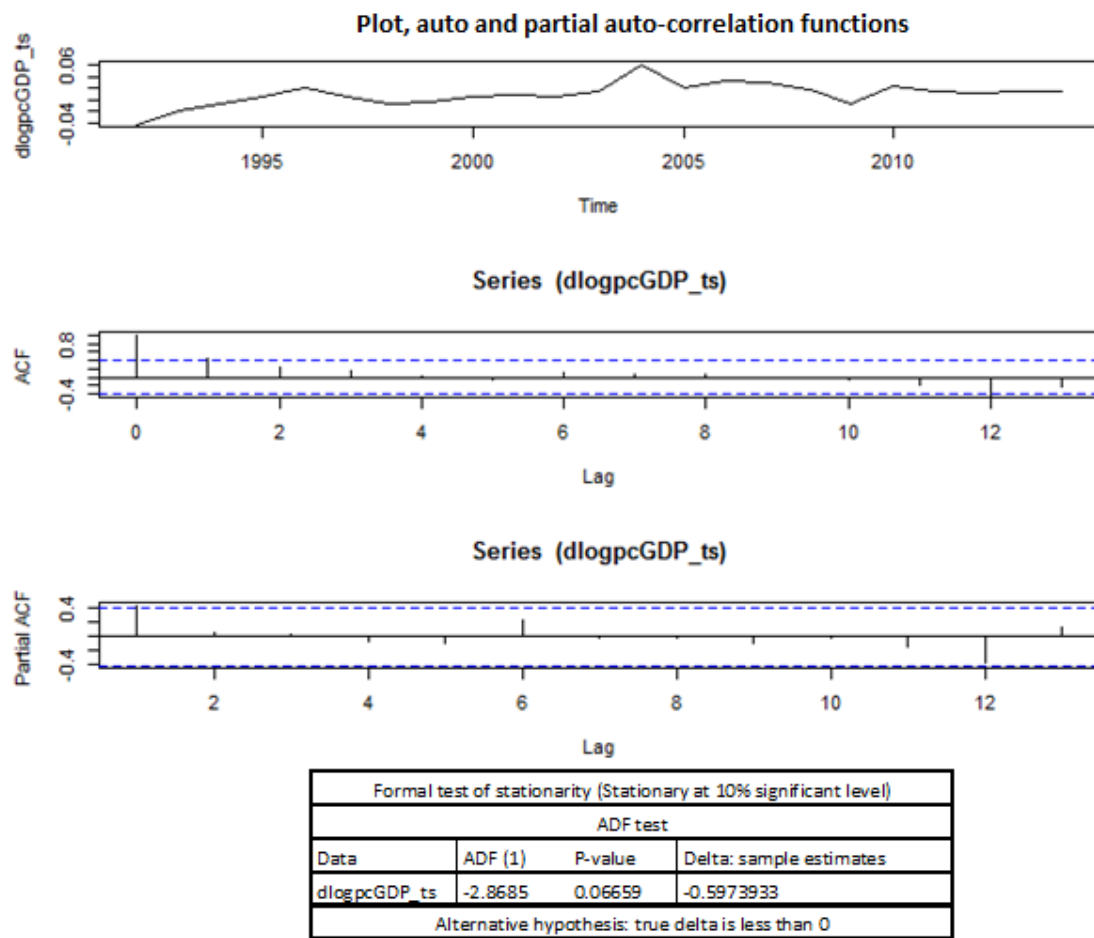
Source: author's computation and illustration with 'R' software

Figure A.3: Graphical and ADF test for GDP per capita twice log-differenced



**Plot, auto and partial auto-correlation functions**

**Series (ddlogpcGDP_ts)**

**Series (ddlogpcGDP_ts)**

| Formal test of stationarity (Stationary at 1% significant level) | | | |
|---|---|---|---|
| ADF test | | | |
| Data | ADF (1) | P-value | Delta: sample estimates |
| ddlogpcGDP_ts | -43.009 | 0.003502 | -1.586299 |
| Alternative hypothesis: true delta is less than 0 | | | |

Source: author's computation and illustration with 'R' software

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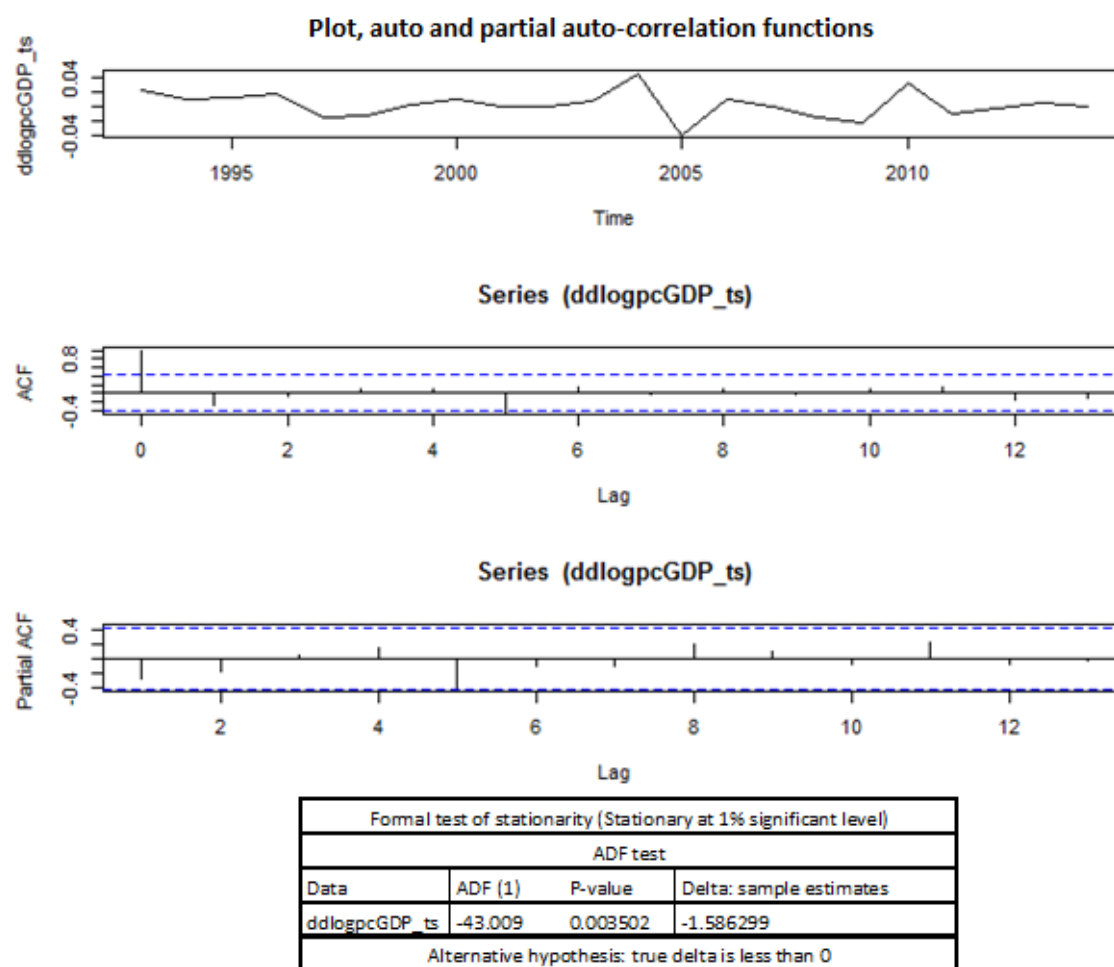
Figure A.4: Graphical and ADF test for grants

**Plot, auto and partial auto-correlation functions**

**Series GRANTS_ts**

**Series GRANTS_ts**

| Formal test of stationarity (Borderline stationary at 10% significant level) | | | |
|---|---|---|---|
| ADF test | | | |
| Data | ADF (1) | P-value | Delta: sample estimates |
| GRANTS_ts | -2.6125 | 0.1055 | -0.7721039 |
| Alternative hypothesis: true delta is less than 0 | | | |

Source: author's computation and illustration with 'R' software

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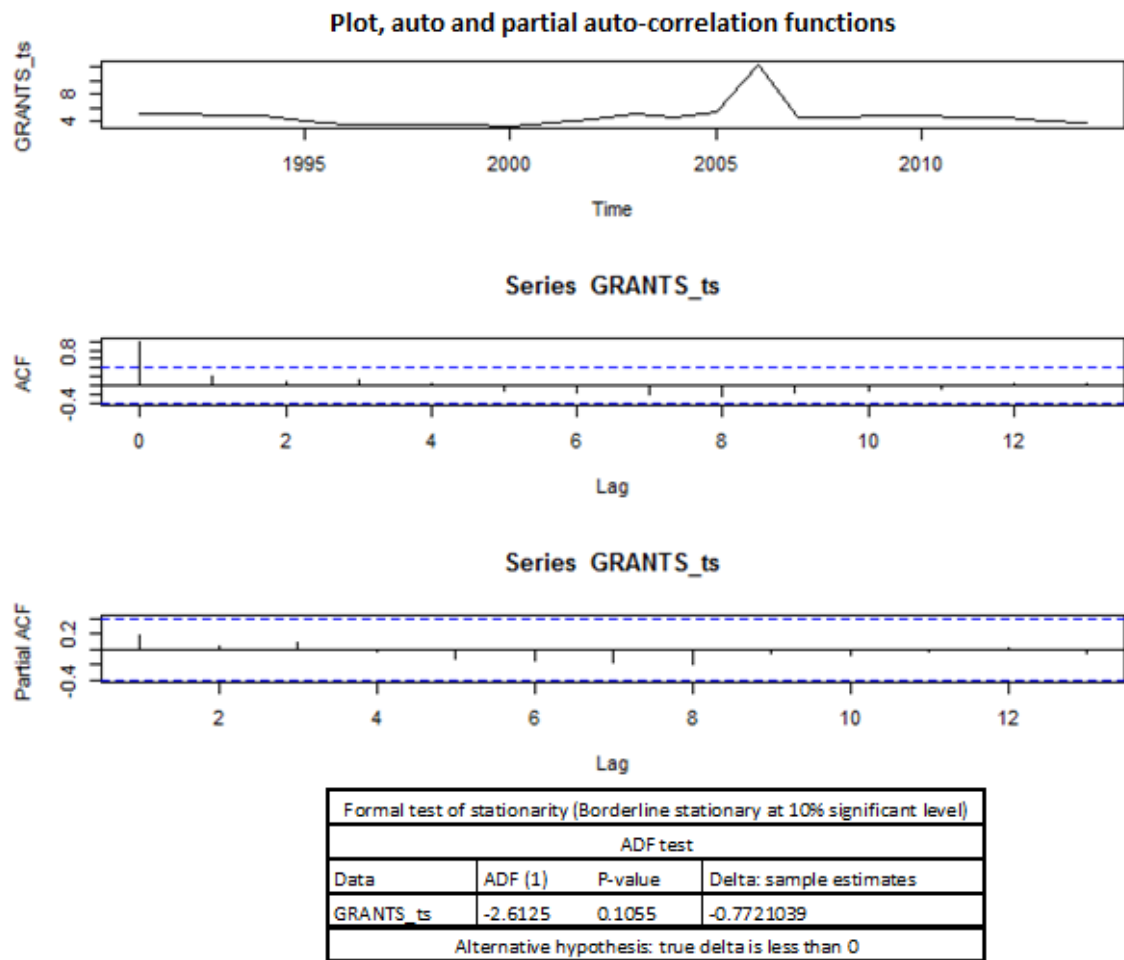
Figure A.5: Graphical and ADF test for grants once differenced

**Plot, auto and partial auto-correlation functions**

**Series dGRANTS_ts**

**Series dGRANTS_ts**

| Formal test of stationarity (Stationary at 1% significant level) | | | |
|---|---|---|---|
| ADF test | | | |
| Data | ADF (1) | P-value | Delta: sample estimates |
| dGRANTS_ts | -5.097 | 0.0005631 | -1.922895 |
| Alternative hypothesis: true delta is less than 0 | | | |

Source: author's computation and illustration with 'R' software

*Pacifique Mongongo Dosa*
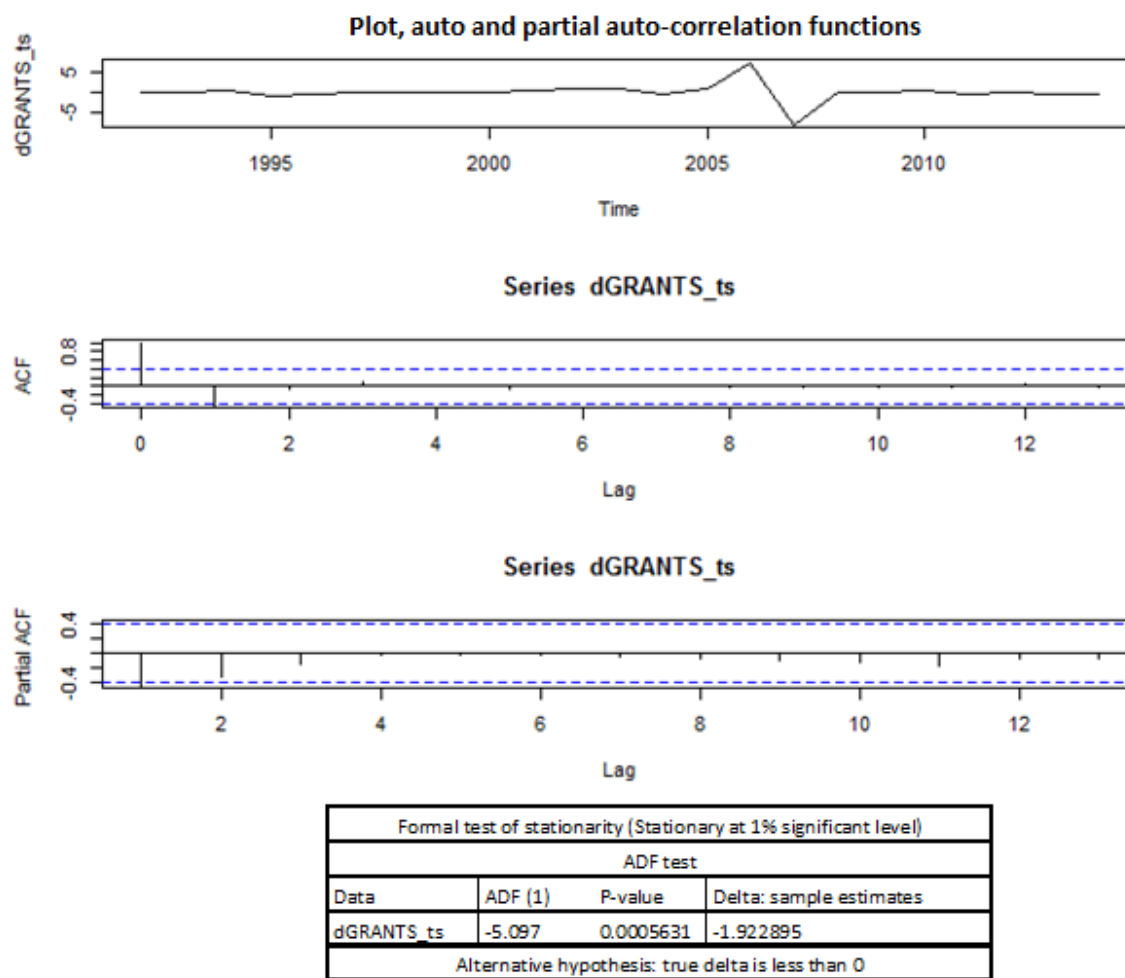
Figure A.6: Graphical and ADF test for loans

**Plot, auto and partial auto-correlation functions**

**Series  LOANS_ts**

**Series  LOANS_ts**

| Formal test of stationarity (Stationary at 10% significant level) | | | |
|---|---|---|---|
| ADF test | | | |
| Data | ADF (1) | P-value | Delta: sample estimates |
| LOANS_ts | -2.7487 | 0.08209 | -0.8096547 |
| Alternative hypothesis: true delta is less than 0 | | | |

Source: author's computation and illustration with 'R' software

*Pacifique Mongongo Dosa*
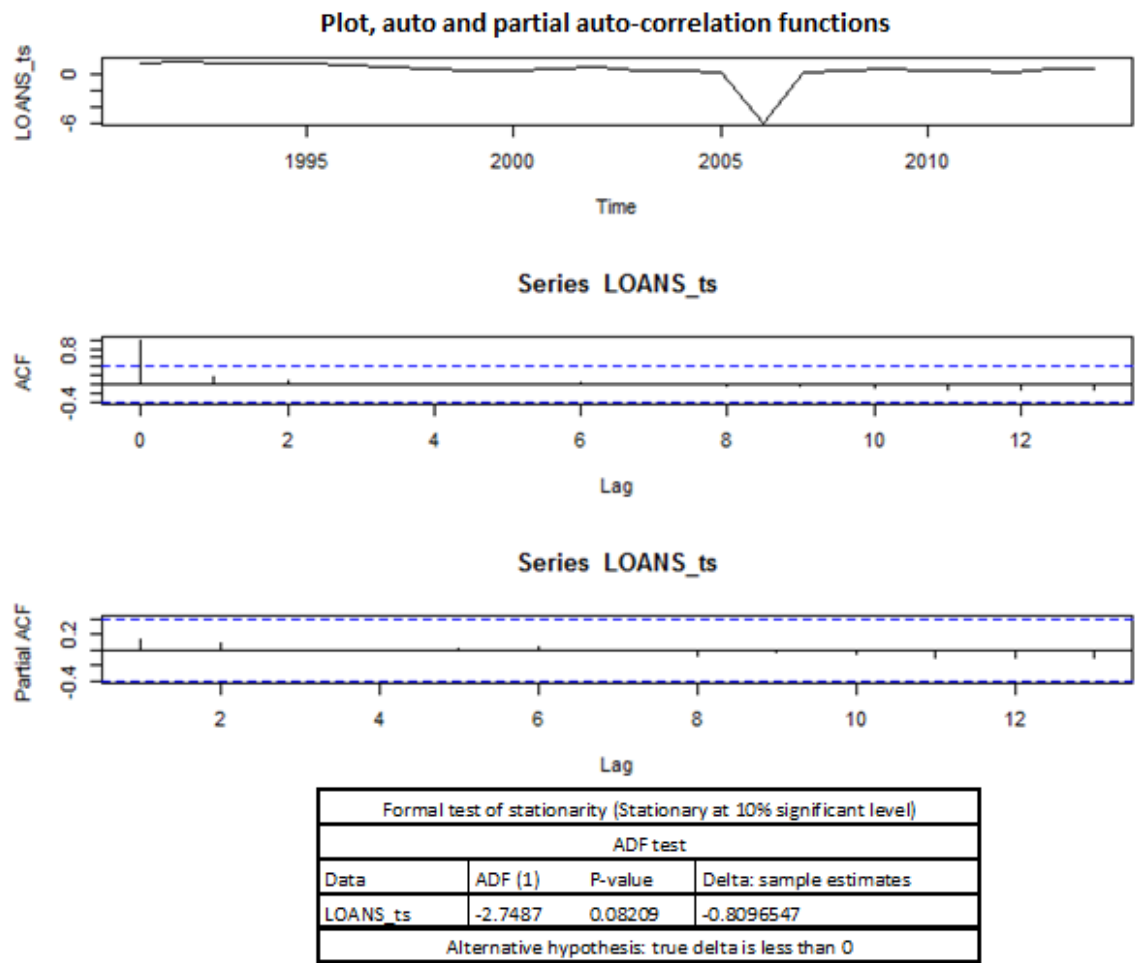
Figure A.7: Graphical and ADF test for loans once differenced

**Plot, auto and partial auto-correlation functions**

**Series  dLOANS_ts**

**Series  dLOANS_ts**

| Formal test of stationarity (Stationary at 1% significant level) | | | |
|---|---|---|---|
| ADF test | | | |
| Data | ADF (1) | P-value | Delta: sample estimates |
| dLOANS_ts | -4.8241 | 0.001033 | -1.883882 |
| Alternative hypothesis: true delta is less than 0 | | | |

Source: author's computation and illustration with 'R' software

*Pacifique Mongongo Dosa*
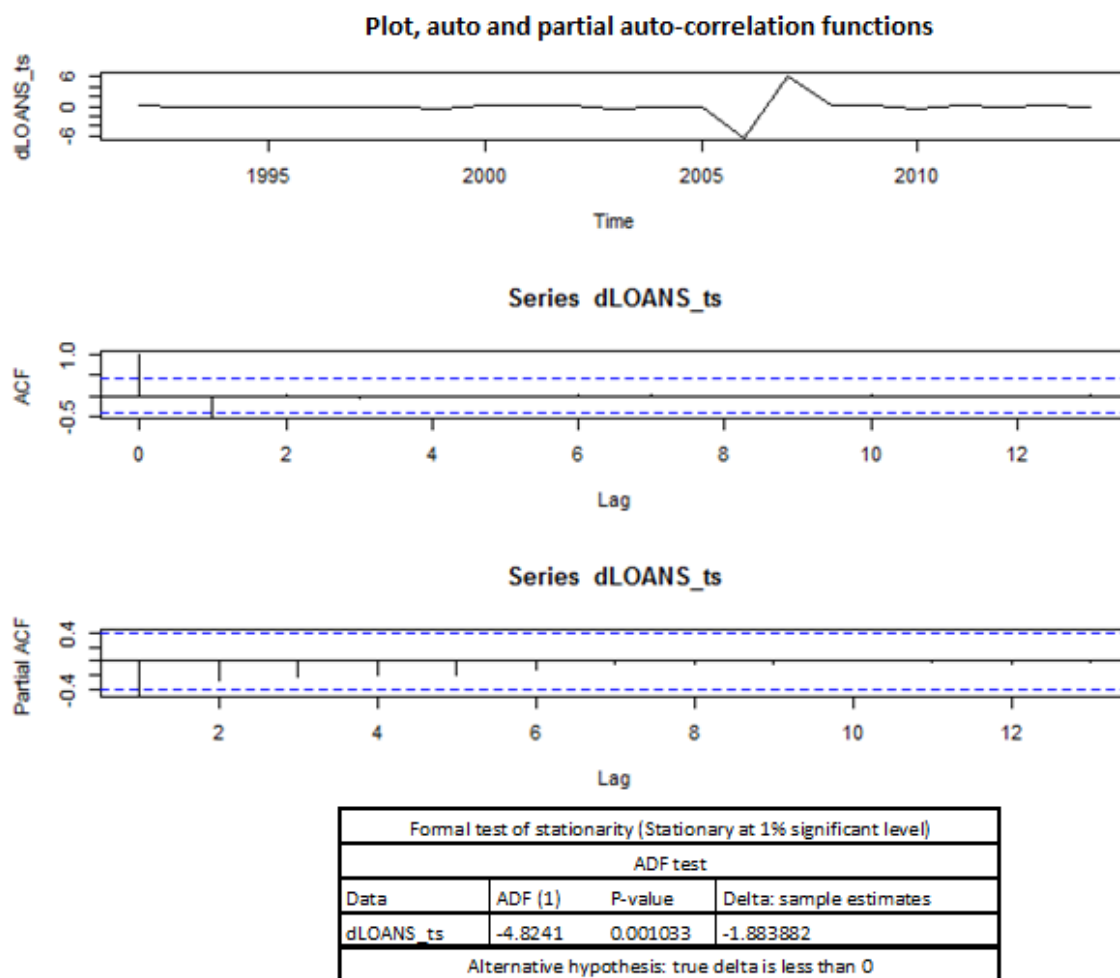
Figure A.8: Graphical and ADF test for 'inequality-adjusted' GDP per capita

**Plot, auto and partial auto-correlation functions**

**Series iapcGDP_ts**

**Series iapcGDP_ts**

| Formal test of stationarity (Not stationary) | | | |
|---|---|---|---|
| ADF test | | | |
| Data | ADF (1) | P-value | Delta: sample estimates |
| iapcGDP_ts | -0.21087 | 0.9235 | -0.02834338 |
| Alternative hypothesis: true delta is less than 0 | | | |

Source: author's computation and illustration with 'R' software

*Pacifique Mongongo Dosa*
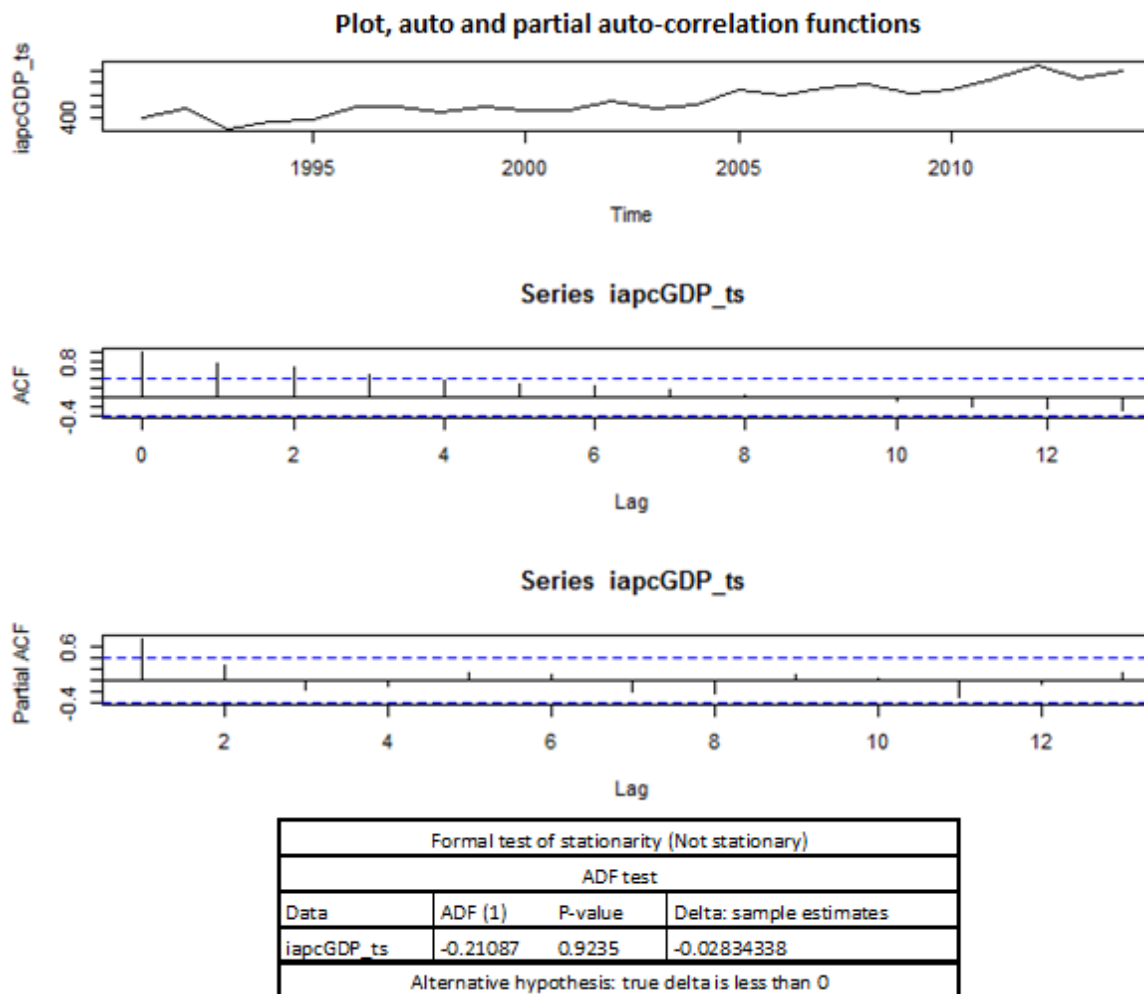
Figure A.9: Graphical and ADF test of 'inequality-adjusted' GDP per capita once differenced

**Plot, auto and partial auto-correlation functions**

**Series (dlogiapcGDP_ts)**

**Series (dlogiapcGDP_ts)**

| Formal test of stationarity (Stationary at 1% significant level) | | | |
|---|---|---|---|
| ADF test | | | |
| Data | ADF (1) | P-value | Delta: sample estimates |
| dlogiapcGDP_ts | -5.7349 | 0.0001 | -1.721905 |
| Alternative hypothesis: true delta is less than 0 | | | |

Source: author's computation and illustration with 'R' software

*Pacifique Mongongo Dosa*
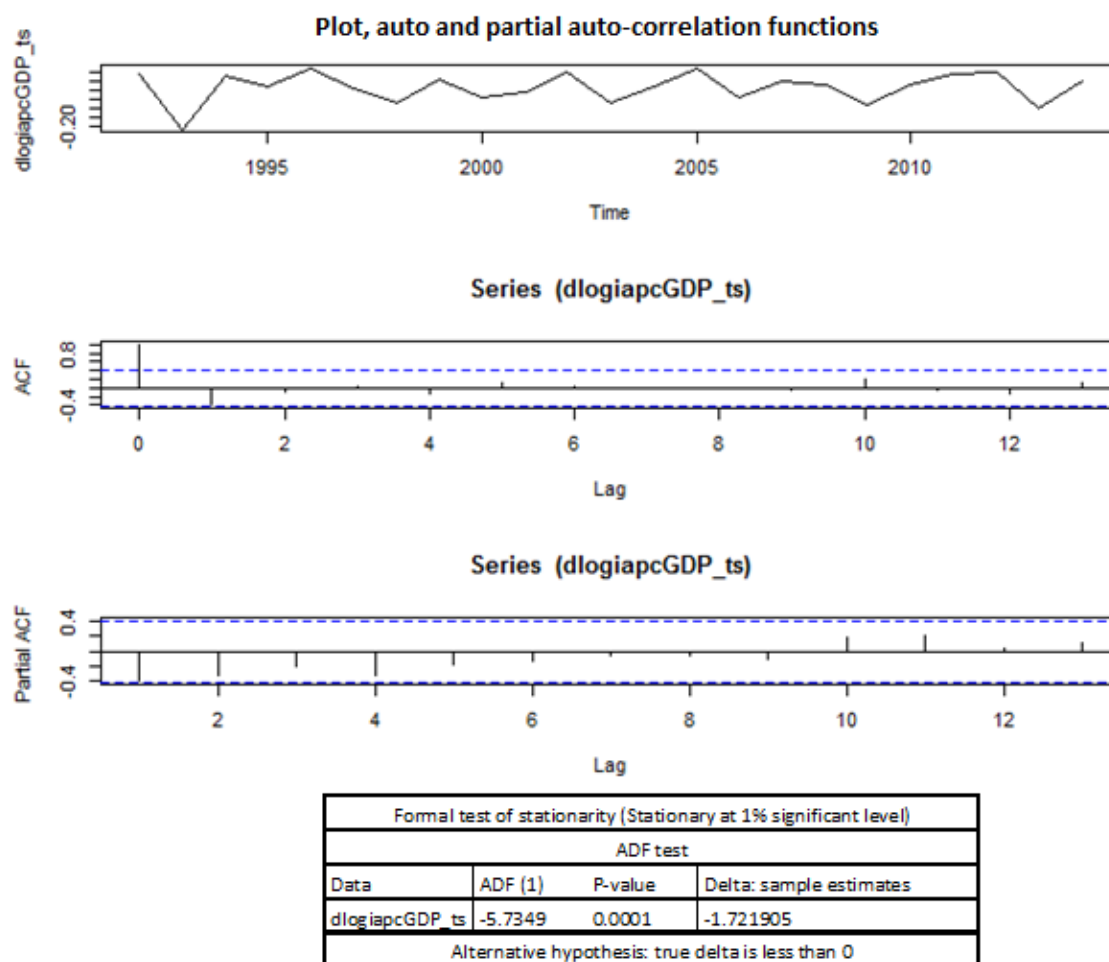
# Appendix B

# Summary statistics and dataset

Table B.1: Descriptive statistics

| Variable | Obs. | Mean | St. Dev. | Min. | Max. |
|---|---|---|---|---|---|
| GDP per capita ($) | 24 | 867.80 | 92.55 | 768.80 | 1034.00 |
| GINI coefficient (%) | 24 | 0.45 | 0.03 | 0.34 | 0.53 |
| In. adj. GDP per capita ($) | 24 | 478.2 | 67.65428 | 360.7 | 623.6 |
| ODA, Total (GDP %) | 24 | 5.16 | 3.19 | -2.58 | 14.06 |
| Aid grants (GDP %) | 24 | 4.65 | 1.77 | 3.31 | 12.42 |
| Aid loans (GDP %) | 24 | 0.51 | 1.42 | -5.89 | 1.64 |

Source: author's computation with 'R' software

Table B.2: Primary data

| Year | GDP per Cap. ($) | GINI (%) | Grants (millions $ ) | Loans (millions $) |
|------|------------------|----------|----------------------|--------------------|
| 1991 | 822.60 | 50.49 | 21625.47 | 5729.92 |
| 1992 | 788.93 | 43.47 | 21042 | 6965.53 |
| 1993 | 774.69 | 53.44 | 20219.31 | 6242.31 |
| 1994 | 768.80 | 49.40 | 21289.87 | 6439.79 |
| 1995 | 772.34 | 48.47 | 18066.02 | 6212.95 |
| 1996 | 789.00 | 43.30 | 16882.52 | 5060.78 |
| 1997 | 793.30 | 42.78 | 16731.86 | 4593.7 |
| 1998 | 788.66 | 46.14 | 17253.58 | 3768.54 |
| 1999 | 785.26 | 42.44 | 17186.05 | 2000.76 |
| 2000 | 790.72 | 44.90 | 17438.09 | 2558.33 |
| 2001 | 796.81 | 45.84 | 19587.86 | 3459.97 |
| 2002 | 802.26 | 40.68 | 24487.36 | 4963.6 |
| 2003 | 814.65 | 45.24 | 30107.96 | 3073.49 |
| 2004 | 865.98 | 47.16 | 29499.95 | 2541.29 |
| 2005 | 885.55 | 41.62 | 35969.05 | 2364.85 |
| 2006 | 914.13 | 45.51 | 88862.19 | -42111.89 |
| 2007 | 943.06 | 44.32 | 34378.66 | 2629.93 |
| 2008 | 958.56 | 43.62 | 36335.52 | 3918.09 |
| 2009 | 952.20 | 47.33 | 37996.76 | 6546.78 |
| 2010 | 976.19 | 46.79 | 42030.56 | 3474.04 |
| 2011 | 990.10 | 42.85 | 40739.72 | 4314.05 |
| 2012 | 1001.43 | 37.73 | 41978.34 | 3139.54 |
| 2013 | 1017.75 | 44.55 | 39150.17 | 7024.52 |
| 2014 | 1034.14 | 42.31 | 36437.43 | 7741.87 |

Source: DAC (2016) and World Bank (2016b)