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L'EMPLOI DANS LES PME EN AFRIQUE SUBSAHARIENNE

Thèse Nouveau Régime
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RESUME

Sur les deux milliards d'habitants qui devraient s'ajouter à la population mondiale d'ici à 2050, un peu plus de la moitié proviendrait des pays d'Afrique Sub-saharienne. Portée par une population active, instruite et qualifiée qui ouvrirait de nouveaux marchés, l'Afrique pourrait connaître une croissance économique rapide et soutenue. Mais ce "dividende démographique" ne pourra se réaliser que si les pays en Afrique Sub-saharienne parviennent à offrir des opportunités économiques à tous ses habitants. Ce travail de recherche portera ainsi sur le rôle des PME en matière d'emplois et les enjeux autour de la formalisation de ces emplois.

Le chapitre 1 s'intéresse à la création quantitative d'emplois pour déterminer si les PME africaines ont un potentiel de création d'emplois supérieur aux grandes entreprises. Grâce aux données extraites des *Enterprises Survey* de la Banque Mondiale, nous rejetons la loi de Gibrat en Afrique Sub-saharienne, *i.e.* les petites entreprises créent plus d'emplois que les grandes entreprises. Nous montrons que les explications habituelles (rendements décroissants, effet d'apprentissage ou taille optimale) ne permettent pas d'expliquer ce rejet. Nous présentons une nouvelle explication basée sur l'accès au capital. Les petites entreprises ont un ratio capital/travail plus faible car elles surutilisent le facteur travail en raison de contraintes financières.

Le chapitre 2 introduit la littérature existante sur la question de l'informalité afin de mieux cerner les enjeux autour de ce concept et les déterminants qui conduisent à cette situation.

Le chapitre 3 étudie plus en profondeur la volonté des employés d'adhérer à un système d'assurance santé en analysant leurs préférences individuelles. Nous montrons que malgré la préférence pour le présent et la faible aversion au risque qui pourrait pousser les individus à ne pas s'assurer, la sensibilisation des employés au rôle de l'assurance santé et ses bénéfices permet d'augmenter significativement leur volonté d'adhésion à un système d'assurance santé et la valorisation qu'ils ont d'un contrat de travail formel.

Le chapitre 4 permet de documenter l'impact du contrat de travail formel sur l'accès au crédit bancaire. A travers un modèle probit, nous montrons que la formalisation augmente la probabilité d'obtenir un crédit bancaire de 23%. Cet effet s'explique principalement par une plus grande bancarisation des travailleurs ayant un contrat de travail. Nous montrons que d'autres facteurs, comme le genre, le salaire ou le niveau d'éducation n'ont pas d'impact significatif.

Mots clés : Création d'emplois ; Contrat de travail ; Afrique ; Assurance santé ; Accès au crédit
Codes JEL: O55 ; O12 ; L11 ; L26 ; I13 ; C93 ; D12 ; G2

SUMMARY

Of the two billion people expected to join the world population by 2050, over half are expected to come from sub-Saharan Africa. With an employed, educated and skilled population, the region could experience rapid and sustained economic growth, but this can only be achieved if countries in sub-Saharan Africa succeed in offering sufficient economic opportunities that can absorb their burgeoning workforce. As such, this research work focuses on the role of Small and Medium Enterprises (SMEs) in addressing sub-Saharan Africa's significant employment needs and the issues surrounding the formalization of these jobs.

Chapter 1 looks at quantitative job creation to determine whether African SMEs have a greater potential for job creation than large firms do. Using data from the World Bank's Enterprise Surveys, we test Gibrat's law, which states that size does not influence firm growth. We find that this law does not hold in Sub-Saharan Africa, i.e. small companies create more jobs than large companies. We show that the usual explanations (diminishing returns, the learning effect, optimal size) do not explain this rejection. We present a new hypothesis based on access to capital and argue that small firms have a lower capital-to-labor ratio because they overuse labor input due to financial constraints.

Chapter 2 introduces the existing literature on informality in order to better understand the issues surrounding this phenomenon and the determinants that give rise to its widespread presence across sub-Saharan Africa.

Chapter 3 explores employees' willingness to join a health insurance system by analyzing their individual preferences. We show that despite the preference for the present and the low aversion to risk that would predispose an individual not to obtain health insurance, employees expressed a significant increase in their willingness to enroll in a health insurance system after receiving information on the role and benefits thereof.

Chapter 4 documents the impact of formalization on credit access. Through a probit model, we show that having a formal employment contract increases an employee's probability of obtaining a bank loan by 23%. We argue that this effect is mainly due to the fact that a greater share of formal workers has a bank account than do informal workers. We find that other factors, such as gender, wage or level of education, do not have a significant impact on credit access.

Keywords: Job creation; Employment contract; Africa; Health insurance; Credit access
JEL Classification : O55 ; O12 ; L11 ; L26 ; I13 ; C93 ; D12 ; G2

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CHAPTER 1

Introduction

Le Nigeria détient la première place d'un classement dont on ne sait pas trop quoi penser : celui de la croissance démographique la plus importante. Sa population a déjà triplé depuis son indépendance en 1960 et devrait encore au moins doubler d'ici à 2050, pour s'établir au troisième rang mondial devant les Etats-Unis. Une croissance exponentielle qui pose au pays un *« grand défi »* comme l'a soulignée Zainab Ahmed, la ministre nigériane des finances.

La trajectoire du Nigéria résume assez bien le contexte et les enjeux du continent africain. Alors que l'Afrique compte plus d'un milliard d'habitants à l'heure actuelle, sa population devrait doubler d'ici à 2050 et quadrupler vers la fin du siècle pour atteindre près de 4 milliards d'habitants selon les prévisions des Nations Unies.

Si ces futures générations parviennent à trouver un emploi décent, alors le 21ème siècle sera celui de l'Afrique. C'est ce que certains appellent le « dividende démographique ». La croissance et la jeunesse de la population africaine devraient contribuer à son développement. Mais cette vision ne tient que si l'Afrique est en mesure de relever les défis liés à cette croissance démographique et parvient à fournir un emploi décent à toute sa population.

Dans cette introduction, nous reviendrons ainsi sur le contexte démographique africain et les enjeux qui découlent de ce « dividende démographique ». Nous approfondirons alors un axe en particulier, à savoir le besoin de créer des emplois décents en quantité suffisante qui fait l'objet de cette thèse.

1.1. Le défi de la démographie africaine

1.1.1. Les chiffres de la démographie

Ces dernières décennies, la population mondiale s'est particulièrement accrue, pour atteindre environ 7,7 milliards d'habitants en 2019. C'est un milliard de plus qu'en 2007 et deux milliards de plus qu'en 1994. Dans l'ensemble, le pic de croissance a été atteint en 1965-1970, avec près de 2,1% de croissance démographique par an. Depuis, cette croissance s'est ralentie à 1,1% par an entre 2015 et 2020, et devrait continuer de décélérer au cours de ce siècle. D'après les projections des Nations Unies, la

population mondiale devrait ainsi atteindre 8,5 milliards d'habitants en 2030, 9,7 milliards en 2050 et environ 10,9 milliards en 2100.

Dans les prochaines décennies, l'Afrique Sub-Saharienne devrait être le principal contributeur de cette croissance démographique, alors même que d'autres continents pourraient connaitre une diminution de leur population. Sur les deux milliards d'habitants qui devraient s'ajouter à la population mondiale d'ici à 2050, 1,05 milliards (52%) proviendraient des pays d'Afrique Sub-saharienne. La région deviendrait alors la région la plus peuplée au monde vers 2062, surpassant la région de l'Asie de l'Est et du Sud-Est et la région de l'Asie du Sud et Centrale.

Bien qu'il soit difficile d'anticiper des prévisions crédibles sur des horizons aussi lointains, les Nations-Unis considèrent que les 2/3 de la croissance démographique prévue d'ici à 2050 serait liée à la structure des âges actuelles. Autrement dit, cette croissance de la population se produirait même si le taux de fécondité diminuait drastiquement dans les pays où il est encore élevé. La nouvelle génération de jeunes entrant dans leur âge de reproduction est plus nombreuse que la génération de leurs parents. Ainsi, même si le nombre de naissances chutait à deux enfants par femme, le nombre de naissances excèderait toujours le nombre de décès au cours des prochaines décennies. Quels que soient les changements de comportements et de politiques publiques à venir, la population mondiale devrait donc continuer à croître.

Cette explosion démographique n'est pas sans conséquence pour relever le défi de la pauvreté. La croissance démographique est particulièrement élevée dans les 47 Pays les Moins Avancés (PMA) désignés par les Nations unies, dont 32 pays sont en Afrique Sub-saharienne. Avec une croissance démographique prévisionnelle de 2,3% par an entre 2015 et 2020, la population des PMA croît 2,5 fois plus vite que le reste de la population mondiale. La population des PMA devrait presque doubler d'ici à 2050, passant de 1 milliard à 1,9 milliards en 2050, puis 3 milliards en 2100. Selon les prévisions, 18 PMA, tous en Afrique Sub-Saharienne, ont une très forte probabilité de doubler en taille d'ici à 2050 (et même tripler dans le cas du Nigéria).

Cette évolution démographique représente certainement le plus grand défi auquel devra faire face l'Afrique. La population africaine devrait atteindre au moins 2,5 milliards d'ici à 2050, dont la moitié seront des jeunes de moins de 25 ans. Les jeunes africains seront alors 10 fois plus nombreux que les jeunes européens. Portée par une population active, instruite et qualifiée qui ouvrirait de nouveaux marchés, l'Afrique pourrait connaître une croissance économique rapide et soutenue. L'Afrique pourrait alors bénéficier d'un « dividende démographique » considérable, à condition toutefois de relever les défis attenants.

1.1.2. Un « dividende démographique » potentiel

Le concept de « dividende démographique » a été introduit à la fin des années 1990 pour décrire l'interaction entre les changements dans la structure démographique et la croissance économique rapide en Asie de l'Est (Bloom, Canning et Malaney, 2000).

Le « dividende démographique » est un phénomène qui résulte des changements dans la structure d'âge d'une population en raison de la transition démographique. La baisse de la mortalité infantile, suivie d'une baisse de la fécondité, produit une génération nombreuse et une période où un pays compte un grand nombre de personnes en âge de travailler et un nombre réduit de personnes à charge. Cela permet de stimuler l'économie, à condition qu'il y ait des opportunités d'emplois pour tous les travailleurs.

En Afrique, le nombre de personnes en âge de travailler croît plus vite que les autres classes d'âge, ouvrant les conditions d'une croissance économique rapide liée au dividende démographique. L'Afrique sub-saharienne peut être considérée comme le continent de la jeunesse avec 62% de la population qui a moins de 25 ans en 2019. Ce pourcentage ne devrait descendre que légèrement pour atteindre 59% en 2030 et 52% d'ici à 2050. Cette population relativement dynamique et jeune va alors entrer massivement sur le marché du travail. La part de la population âgée entre 25 et 64 ans devrait croître fortement ces prochaines décennies, de 35% en 2019 à 43% en 2050 et 50% en 2100.

Mais ce dividende démographique n'a rien d'automatique et ne peut se réaliser que si trois étapes sont correctement franchies.

- Premièrement, l'amélioration de l'état de santé des enfants réduit la mortalité infantile et participe à la réduction du nombre d'enfants par femme. Le temps que cette transition se fasse, on assiste à une forte croissance de la population en raison du décalage entre une cohorte où le nombre d'enfants par femme reste élevé mais où le taux de mortalité infantile est faible. Cette cohorte nombreuse, qui devrait avoir un nombre plus faible d'enfants puisqu'elle aura pris conscience des progrès en santé, va alors parcourir la pyramide des âges avec des répercussions économiques importantes.
- Deuxièmement, les investissements dans la santé et l'éducation sont plus élevés dans les cohortes suivantes. Avec la baisse du nombre d'enfants par femme, les familles, comme le gouvernement, ont plus de ressources par enfant à investir dans l'éducation et la santé des enfants survivants, ce qui accroît le capital humain (Kalemli-Ozcan, Ryder et Weil 2000 ; Schultz 2005).
- Troisièmement, l'environnement économique est suffisamment favorable pour que cette cohorte nombreuse puisse trouver des emplois bien rémunérés, plutôt que d'être simplement

au chômage ou forcée de travailler à faible productivité. Un dividende démographique n'est possible que si ces jeunes qui entrent en masse sur le marché du travail parviennent à trouver des opportunités économiques suffisantes. Si ces trois étapes sont réalisées et se déroulent au bon moment, le continent bénéficiera d'un dividende démographique à mesure que l'importante cohorte occupera des emplois hautement productifs.

1.1.3. Vers un dividende démographique ? Défis et opportunités

La croissance démographique a des répercussions importantes sur les enjeux du développement durable et affectera l'ensemble des Objectifs de Développement Durable (ODD). L'explosion démographique suppose d'abord d'être en mesure d'étendre et d'améliorer les infrastructures de santé à destination des mères et des nouveaux nés (ODD 3). Pour bénéficier de ce dividende démographique, plusieurs enjeux de développement doivent être relevés afin de satisfaire les conditions précédemment évoquées. La réduction de la pauvreté (ODD 1) s'applique sur un nombre beaucoup plus important d'individus auxquels il faut fournir des emplois décents et productifs (ODD 8). Les investissements dans la santé et l'éducation (ODD 3 et 4) au profit de ces jeunes générations qui entreront bientôt sur le marché du travail sont aussi essentiels. En outre, les villes devraient accueillir la plus grande partie de cette croissance démographique selon les projections des Nations unies. Cette urbanisation rapide et importante soulève aussi un certain nombre de défis pour rendre les villes inclusives, sûres, résilientes et durables (ODD 11).

Si l'Afrique parvient à saisir les opportunités de cette croissance démographique, le 21ème siècle pourrait être le siècle de l'Afrique. Plusieurs facteurs permettent de justifier cet optimisme. En premier lieu, les progrès technologiques, notamment la forte pénétration des smartphones et des moyens de paiement associés, peuvent permettre de dépasser les contraintes liées aux infrastructures en Afrique Sub-saharienne. Ces progrès ne sont évidemment qu'à leur début et l'accélération et la généralisation de ces progrès technologiques peuvent alimenter le moteur de la croissance africaine.

Mais le développement des services numériques ne pourra à lui seul assurer le développement du continent africain. Selon une étude de l'association ONE (2017), sans la création de 17 millions de postes dans l'enseignement et de 6 millions dans le secteur de la santé d'ici à 2030, l'Afrique ne sera pas en mesure de réaliser son dividende démographique. Des investissements significatifs, de la part des gouvernements comme des familles, dans la santé et l'éducation des enfants est indispensable pour la prospérité du continent. Une population active jeune, instruite, productive et en bonne santé est la clé du développement africain.

Si ces conditions ne sont pas atteintes, l'explosion démographique en Afrique pourrait être un facteur particulièrement déstabilisant et représenterait un risque majeur pour la sécurité régionale et

internationale. La stabilité de l'Afrique est déjà sérieusement menacée par les crises sécuritaires au Sahel. De nombreux pays de la région, dont certains parmi les plus peuplés comme le Nigéria, font l'objet de conflits armés avec des groupes terroristes islamistes solidement implantés. Les conséquences du conflit syrien ont été ressenties bien au-delà du Proche Orient, notamment en Europe, alors même que la superficie de la Syrie ne représente qu'une fraction du territoire nigérian par exemple. Le conflit syrien a conduit à un déplacement de plus de la moitié de la population syrienne. Or, la moitié de la population nigériane dépasse de loin la population totale du Royaume-Uni par exemple. L'instabilité politique, la mauvaise gouvernance et la corruption sont donc autant de facteurs qui peuvent menacer les perspectives de croissance du continent et mettre à mal le dividende démographique.

Pauvreté et insécurité allant souvent de pairs, il sera d'autant plus important de relever les défis du développement durable pour assurer la stabilité et la prospérité du continent. L'Afrique peut certes s'appuyer sur la richesse de ses ressources naturelles, que ce soit les productions agricoles ou les minerais, et qui fournissent un certain filet de sécurité économique. Mais les récentes famines, comme celles en Somalie, au Yémen, au Soudan du Sud ou encore au nord-Est du Nigéria montrent toutes les difficultés pour accéder équitablement à ces ressources. Les changements environnementaux, combinés aux conflits armés avec Boko Haram, ont décimé les productions agricoles dans la région du lac Tchad. De telles menaces, qui plus est dans l'un des pays les plus peuplés d'Afrique et bientôt du monde, pourraient conduire à un embrasement de la région qui minerait le potentiel de dividende démographique.

Les défis à relever sont encore immenses mais les opportunités existent pour améliorer la situation actuelle et se mettre sur le bon chemin pour atteindre les Objectifs du Développement Durable et bénéficier pleinement du dividende démographique.

1.2. Créer des emplois décents : les contributions de cette thèse

Surtout, le dividende démographique ne pourra se réaliser que si les pays en Afrique Sub-saharienne parviennent à offrir des opportunités économiques à tous ses habitants. Seuls 3 millions d'emplois sont créés chaque année alors qu'environ 10 à 12 millions de jeunes africains entrent sur le marché du travail chaque année (BAD, 2018). Parallèlement, seulement 28% de la population dispose actuellement d'un emploi stable et rémunéré en Afrique (Mc Kinsey, 2012).

En suivant les tendances actuelles, une étude de l'ONE (2017) a montré que le nombre de personnes au chômage en Afrique (41,4 millions) sera pratiquement identique au nombre total de travailleurs en Allemagne (40,7 millions) en 2022. Ces millions de personnes sans perspectives d'emplois, souvent sans compétences, seront les premières victimes de la pauvreté et du changement climatique et

représentent un terreau fertile pour le développement des mouvements armés. Le continent africain semble encore loin d'avoir réuni les conditions nécessaires pour bénéficier de ce dividende démographique. Il existe donc un réel besoin de créer des opportunités d'emplois, non seulement en quantité suffisante, mais aussi de qualité satisfaisante (rémunération, stabilité, accès à une assurance maladie, *etc.*), pour offrir des conditions de vie décentes à l'ensemble de la population.

Dans cette perspective, il est intéressant d'étudier plus en profondeur le rôle joué par les Petites et Moyennes Entreprises (PME). En effet, l'idée est largement répandue selon laquelle les PME sont au premier rang dans la création d'emplois. D'après une étude d'Ayyagari, Demirgüç-Kunt, et Maksimovic pour la Banque Mondiale (2011), les PME représentent près de 95 % de l'ensemble des entreprises et emploient près de 60 % de la main d'œuvre du secteur privé dans les pays de l'OCDE. Néanmoins, peu de travaux empiriques se sont intéressés à cette thématique et nous sommes encore loin d'évaluer pleinement le rôle des PME dans les économies en développement où les données font souvent défaut. Ce travail de recherche portera sur le rôle des PME en matière d'emplois et les caractéristiques de ces emplois à travers une étude approfondie de l'activité d'Investisseurs & Partenaires (I&P).

- **<u>Chapitre 1:</u> "Financial constraints, factor combination and Gibrat's law in Africa"**

Le premier chapitre se demandera si les PME africaines ont un potentiel de création d'emplois supérieur aux grandes entreprises. En d'autres termes, les PME ont-elles des dynamiques propres leur permettant de créer proportionnellement plus d'emplois que les grandes entreprises ?

Pour répondre à cette problématique, ce chapitre s'intéresse à la validité de la loi de Gibrat en Afrique Sub-saharienne. En approchant la taille des entreprises françaises par le nombre d'employés, Robert Gibrat (1931) a montré que les taux de croissance suivent une distribution log-normale, *i.e.* le taux de croissance d'une entreprise donnée est indépendant de sa taille initiale. Jusqu'à présent, la plupart des travaux de recherche se sont focalisés sur les pays développés, notamment les Etats-Unis. Nous pouvons légitimement nous demander dans quelle mesure l'expérience américaine peut se généraliser aux autres pays, notamment les pays les moins développés comme en Afrique Sub-Saharienne. Nous apportons des éléments de réponse en utilisant les données de 22 495 entreprises opérant dans 45 pays africains sur des secteurs divers, incluant aussi bien les secteurs industriels que les secteurs des services. Ces données proviennent des *Enterprises Surveys* de la Banque Mondiale.

Nos résultats indiquent que la loi de Gibrat ne s'applique pas en Afrique puisque nous constatons un lien négatif important entre la taille des entreprises et la croissance de l'emploi, c'est-à-dire que les petites entreprises créent plus d'emplois que les grandes entreprises. Ces résultats apportent une contribution importante à la littérature sur la croissance des entreprises.

Nous soulignons que les explications habituelles (comme les rendements décroissants, le processus d'apprentissage et la taille minimale efficace) n'expliquent pas ce résultat. Nous présentons une nouvelle justification fondée sur l'accès aux capitaux. Selon notre hypothèse, la croissance de l'emploi parmi les petites entreprises en Afrique est plus rapide parce que les petites entreprises adoptent des technologies à forte intensité en main-d'œuvre et économes en capital pour développer leurs activités commerciales. Les PME ont un ratio capital/travail plus faible parce qu'elles ont tendance à surutiliser la main-d'œuvre et à sous-utiliser le capital en raison de contraintes financières, d'où leur plus grande dynamique de croissance de l'emploi. Différents tests économétriques viennent étayer notre hypothèse. Plus précisément, nous prouvons que la relation négative entre la taille et la croissance des entreprises est atténuée pour les entreprises qui ont accès au crédit.

- **<u>Chapitre 2:</u> "Informality: a literature review on causes and consequences"**

La création quantitative d'emplois est essentielle pour créer des emplois pour tous. Cependant, la prospérité du continent ne sera possible que si ces emplois créés sont décents, avec des niveaux de rémunération adéquats et de bonnes conditions de travail associées à des droits sociaux. Les PME sont peut-être les plus créatrices d'emplois, mais ces emplois sont le plus souvent informels. L'emploi informel est étroitement lié à la pauvreté, à la faible productivité, au manque de travail décent, à la mauvaise qualité de l'emploi, à l'insécurité et à la vulnérabilité sur le marché du travail ou encore à la discrimination et à l'exclusion. C'est pourquoi l'informalité reste un défi d'actualité, qui est directement abordé dans les Objectifs de Développement Durable (ODD 8.3) et a des répercussions indirectes sur de nombreux autres objectifs.

Il semble donc important de comprendre comment les employés abordent le secteur informel. Quels sont les déterminants qui motivent les travailleurs à participer au secteur informel ? Quelles sont les conséquences sur leurs conditions de travail et leur vie privée ? Pour répondre à ces questions, nous reprenons dans ce deuxième chapitre le cadre théorique entourant le concept d'informalité et sa définition. Nous discuterons également les déterminants de la participation au secteur informel, tant macroéconomiques que microéconomiques, et nous étudierons les conséquences de l'informalité pour les travailleurs. Enfin, nous verrons les difficultés du passage de l'informel au formel pour les salariés.

- **<u>Chapitre 3</u>: "The importance of information on enrollment in a health insurance system: an employee survey in Senegal"**

Les gouvernements du monde entier ont fixé l'objectif d'un accès universel à l'assurance maladie d'ici 2030 (ODD 3.8). Malgré les efforts, les taux d'adhésion à l'assurance restent faibles dans la plupart des pays en développement, en particulier parmi les ménages les plus défavorisés (Acharya et al., 2013). Le secteur privé et les entreprises peuvent jouer un rôle important dans la réalisation de l'accès universel à l'assurance maladie, en particulier par la formalisation. En effet, l'accès à l'assurance maladie peut être considéré comme le principal avantage de la formalisation et l'une de ses conséquences les plus directes.

Notre étude apporte une contribution importante à la littérature existante, qui s'est principalement concentrée sur les questions d'élasticité des prix. Si la majorité des études ont montré que des subventions importantes augmentent significativement le taux de souscription à l'assurance maladie, ces études n'expliquent pas pourquoi, dans le cas de subventions à 100%, certains refusent de souscrire à l'assurance maladie gratuite. Le prix n'est donc pas le seul facteur qui influence la décision de s'assurer.

L'originalité de notre étude, à travers une enquête auprès des employés, est de montrer que les salariés sénégalais ont une forte préférence pour le court terme plutôt que le long terme et une faible aversion pour les pertes, ce qui contraste avec le mécanisme de l'assurance maladie. Les employés peuvent préférer utiliser leur revenu actuel pour couvrir leurs dépenses de santé futures. Les caractéristiques individuelles, comme le sexe, l'âge et le niveau de scolarité, n'ont pas d'influence significative sur les préférences temporelles et l'aversion pour les pertes. D'autre part, notre étude montre le rôle essentiel que joue l'information sur la perception de l'assurance maladie et sur la volonté d'adhésion des individus. Alors que 12 % des employés qui n'ont reçu aucune information sur l'assurance maladie ne voudraient pas être assurés s'ils pouvaient choisir, cette proportion chute à 2% parmi les employés qui ont reçu une information positive sur l'assurance maladie. Il est donc essentiel de communiquer sur le fonctionnement de l'assurance maladie et les avantages d'être couvert afin de renforcer l'adhésion à un système d'assurance maladie.

La façon dont les employés valorisent les prestations sociales est en effet essentielle pour convaincre les salariés de se formaliser et de signer un contrat de travail formel. Certains voudront peut-être rester informels s'ils ne voient pas la valeur de ces avantages sociaux. Ce chapitre est donc important pour comprendre comment sensibiliser les employés aux avantages de la formalisation et faire avancer l'agenda du travail décent promu par l'OIT.

❖ **<u>Chapitre 4</u>: "The impact of formal employment contract on credit access in Africa"**

Dans le contexte des Objectifs du Développement Durable et de la lutte contre la pauvreté, l'accès au crédit est souvent cité comme un outil efficace de développement (ODD 1.4). Le raisonnement sous-jacent est qu'en fournissant des services financiers aux plus pauvres, par exemple sous forme de crédit bancaire, ils peuvent gérer leur argent différemment, atténuer les chocs, investir, acquérir des actifs productifs, accroître leur niveau de compétences, créer une entreprise, etc.

Si l'on considère que l'accès au crédit permet des impacts financiers et non financiers importants, il est nécessaire de mieux comprendre les déterminants qui influencent l'accès au crédit afin de permettre au plus grand nombre d'y avoir accès. En utilisant une nouvelle base de données de plus de 200 employés au Sénégal, nous démontrons l'impact de la formalisation et des contrats de travail sur l'accès au crédit.

Cette relation s'explique par une bancarisation plus forte des salariés formels. Cette bancarisation affecte à la fois l'offre et la demande de crédit. D'une part, il permet aux employés de se familiariser avec les services financiers offerts par les banques et d'améliorer leurs connaissances financières. D'autre part, il fournit un historique bancaire qui réduit l'asymétrie d'information et les risques associés à l'octroi de crédit. Au moyen d'un modèle probit, nous montrons que d'autres déterminants potentiels étudiés dans la littérature existante, comme le genre, l'éducation ou le salaire, n'ont pas d'impact significatif sur l'accès au crédit. Ces résultats mettent en évidence l'impact de la formalisation sur l'accès au crédit et le développement économique qui pourrait en découler. Ce chapitre est un vibrant appel à poursuivre les efforts de formalisation entrepris dans les économies africaines, encore très largement informelles.

1.3. Conclusions

Cette thèse a été réalisée dans un contexte spécifique puisqu'elle est issue d'un partenariat avec Investisseurs & Partenaires (I&P), un groupe d'*impact investing* entièrement dédié au continent africain. Depuis sa création en 2002, I&P a accompagné plus de 90 petites et moyennes entreprises basées dans 16 pays d'Afrique Subsaharienne. I&P investit dans des initiatives à fort impact social sur l'économie réelle, principalement dans les pays pauvres et fragiles du continent africain, et accompagne des entreprises responsables, favorisant une croissance inclusive et ayant un fort potentiel d'impact sur leurs parties prenantes locales : employés, clients, fournisseurs et distributeurs, Etat.

Dans le cadre de cette collaboration, il nous semblait important de mieux comprendre les enjeux autour de la création d'emplois décents dans les PME en Afrique Sub-saharienne. Les travaux de recherche dans le cadre de cette thèse sont riches en enseignements pour I&P.

La première partie de ces travaux s'est focalisée sur la création quantitative d'emplois. Le premier chapitre a permis de documenter et d'argumenter le plaidoyer effectué par I&P sur l'importante contribution des PME africaines aux enjeux de création d'emplois. Ce chapitre permet d'aller au-delà des simples convictions personnelles et des discours en étayant de façon empirique l'impact des PME sur la création d'emplois.

La deuxième partie de ces travaux a permis de creuser les questions de la formalisation des emplois. Ce sujet est au cœur de la thèse d'impact d'I&P dont les investissements permettent de structurer et de formaliser tout un écosystème de PME. Ces réflexions ont commencé suite aux difficultés rencontrées par une des entreprises du portefeuille d'I&P qui a vu une grande partie de ses employés partir lorsque l'entreprise a voulu les formaliser. Nous avons alors souhaité comprendre et documenter les enjeux et les impacts de cette formalisation en creusant deux axes en particulier qui sont souvent évoqués par I&P comme les principaux impacts d'un contrat de travail formel : l'assurance santé et l'accès au crédit bancaire.

Dans le troisième chapitre, nous montrons que malgré la préférence pour le présent et la faible aversion au risque qui pourrait pousser les individus à ne pas s'assurer, la sensibilisation des employés au rôle de l'assurance santé et ses bénéfices permet d'augmenter significativement leur volonté d'adhésion à un système d'assurance santé. Lors des enquêtes réalisées au Sénégal, il apparaissait clairement un manque de compréhension du système d'assurance et une certaine défiance envers un tel système pour certains employés. Il peut alors être difficile de les convaincre d'accepter un contrat de travail formel s'ils ne valorisent pas l'accès à l'assurance santé permise par le paiement des cotisations sociales. Ce chapitre permet de montrer que le partage d'information et la sensibilisation des employés est un moyen efficace de renforcer leur valorisation de l'assurance santé et leur volonté d'y adhérer.

Dans le quatrième chapitre, nous documentons l'impact du contrat de travail formel sur l'accès au crédit bancaire. Ce chapitre permet de renforcer les discours d'impact en s'appuyant sur une étude empirique. Les résultats montrent l'importance du contrat de travail dans la bancarisation et l'accès au crédit. Les politiques de versement du salaire par virement bancaire doivent donc être encouragées pour renforcer les impacts de la formalisation. Elles sont un tremplin important vers la bancarisation qui facilite ensuite l'accès au crédit.

Cette dissertation n'a évidemment pas pu couvrir les différentes dimensions d'un emploi décent, tel que le niveau de salaire ou encore les conditions de travail. Mais ces différentes conclusions, parfois très opérationnelles pour I&P, apportent une contribution significative aux réflexions d'I&P sur ses impacts en matière d'emplois décents et la manière de les renforcer.

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CHAPTER 2

Informality: a literature review on causes and consequences

Almost forty years after the creation of the concept of the "informal sector", informality remains a challenge in many developing countries which is directly addressed in the Sustainable Development Goals (SDG 8.3) and is closely associated with in-work poverty, low productivity, lack of decent work, poor job quality, insecurity, labor market vulnerabilities, discrimination and exclusion.

It therefore seems important to understand how workers approach the informal sector. What are the determinants that motivate or compel workers to participate? What are the consequences of informal working conditions on their well-being? To answer these questions, we will return to the theoretical framework surrounding the concept of informality and its definition. In the second part, we will discuss the both macroeconomic and microeconomic determinants of participation in the informal sector. The third part will study the consequences of informality for workers. Finally, we will examine the difficulties of the transition from informal to formal work for employees.

2.1. Informality: theoretical framework and definition

The term "informal sector" was coined by the ILO (International Labor Office) in a 1972 report following a mission to analyze employment in Kenya. This study found that many economic activities were not recognized, registered, protected or regulated by the government and observed that this “informal sector” included a range of activities from marginal jobs done to survive to work performed for profitable enterprises.

In the 1950s, the informal economy was generally considered marginal and unrelated to the formal economy or to modern capitalist development and many economists believed that the informal sector would gradually be absorbed by the modern formal sector as economies developed. Over the following decades, the nature and causes of the informal sector gave rise to an ongoing debate.

- *The "dualist" school*, notably espoused by Lewis (1954) and Hart (1973), argues that the informal sector includes peripheral activities not linked to the formal sector. They argue that it is a residual sector that exists because the formal economy is not able to offer employment opportunities to part of the workforce. With economic growth and transformation, the informal economy will ultimately be absorbed by the formal sector.
- *The "legalist" school*, notably popularized by De Soto (1989), considers that the informal sector is made up of micro entrepreneurs trying to avoid the costs and responsibilities of formal registration. Monetary and time costs stifle private enterprises and drive them underground. As long as the costs of formalization outweigh the benefits, they argue, economic agents will continue to choose informality. For this school of thought, regulatory reforms, including property rights and tax cuts are the only means of combating informality. This trend of thought introduces the idea that informality could be chosen after a cost-benefit analysis.
- *The "structuralist" school*, widely defended by Portes (1989), considers that the informal sector is an inherent characteristic of capitalism. Unlike other schools of thought, the structuralists argue that the informal sector appears to be subordinated and even exploited by the formal sector in order to reduce corporate costs and increase the competitiveness of large companies. Global production networks generate a demand for flexibility that only the informal economy can provide.

During the 1990s, a renewed interest in the informal sector highlighted an important phenomenon: the informal economy had persisted and was continuing to grow. It then became necessary to fundamentally change the ways of thinking about the informal sector in order to better understand its dimensions and dynamics. In 2002, the International Labor Conference introduced a major change in its analysis of the sector, moving from a firm-based concept to one that encompassed not only the production unit but also workers. This broader concept of informality provided a more nuanced and country-specific perspective on the causes and consequences of informality and its characteristics.

Nowadays, the ILO defines the informal economy as "a set of units producing goods or services mainly with a view to creating jobs and income for the people concerned. These units, with a low level of organization, operate on a small scale and in a specific way, with little or no division between labor and capital as factors of production. Employment relationships - where they exist - are based primarily on casual employment, kinship or personal and social relationships, rather than contractual agreements with formal guarantees".

Several important clarifications around this definition are necessary. First of all, informal work does not equate to illegality. In general, informal enterprises produce ordinary and legally authorized goods and

services. It is the way in which they engage in their business activities - for example, by evading taxes - that positions them as informal. Secondly, informal work does not imply an absence of remuneration. Employment is considered informal when the worker does not have an employment contract registered with the appropriate public authorities. However, most undeclared work is paid. Finally, the boundaries between formal and informal work are very often blurred in many parts of the world. Companies rarely operate 100% in the formal or informal economy: most of them have one foot in each sector. As a concrete example: a company can declare part of its income (formality), but not all of it (informality). It can also provide an employment contract to certain employees, while using undeclared subcontractors, in order to exercise more flexibility. This mixture of formality and informality can take many forms.

As we have just seen, the definition of informality has evolved considerably in recent decades and has been the subject of much discussion. The debate is not clear as to whether or not the informal sector is interdependent with the formal sector or whether it is transitional or permanent. It is equally difficult to set a clear definition that would allow a binary line to be drawn between formality and informality, given the presence of intermediate forms and nuances between the two. Despite these challenges in identifying and defining what constitutes informality, many researchers have studied it to better understand its determinants.

2.2. Factors that cause workers to turn to the informal sector

Beyond the theoretical framework of defining informality, it is important to understand the factors that will drive workers to do informal work. These factors may be external to the individual and based on the macroeconomic context of the country, over which the worker has little possible influence. However, these factors can also be linked to the specific characteristics of individuals, such as gender or age for example, which can have a significant impact on the probability of an individual doing informal work.

2.2.1. The importance of the macroeconomic context

Cyclical fluctuations, labor market conditions, a country's migration levels and even the quality of institutions help determine an individual's likelihood of working in the formal or informal sector. All these factors, over which individuals have no control, act as structures that frame individuals' decisions. Consequently, while working in the informal sector is not always a voluntary choice for workers in developing countries, it is sometimes considered as a fatality predetermined by the economic context. The macroeconomic determinants can be divided into two categories: cyclical and structural.

During periods of economic crisis that are characterized by a decline in production and income, unemployment increases. Such an economic slowdown has an impact on the size of the informal sector. For example, during the 2002 crisis in Madagascar, the informal sector increased by 8 percentage points,

which was a positive feature of the informal sector's contra-cyclical reactions. When employment in the formal economy shrinks during a period of economic stagnation, the informal sector acts as a safety net for former formal workers who are now unemployed (Nordman et al., 2016).

Nordman et al. (2016) also point out that job creation in the informal sector is characterized by growth that is more extensive than intensive. Workers made redundant from formal employment tend to prefer to create their own informal microenterprise, and thus become self-employed, rather than to become employees of an existing informal enterprise. We can therefore deduce that informal firms with several employees are not able to absorb the surplus of unemployed formal workers in times of crisis.

The size of the informal sector can also be explained by the massive entry of young people due to population growth. It is estimated that the African continent will have about 2.1 billion inhabitants in 2050, which means that the working-age population is expected to triple in the next 40 years. To meet this increase in labor supply, the continent will have to create 18 million jobs per year until 2035, according to the IMF. Based on current trends, the formal sector will not be able to provide jobs to all these young workers, especially since this surplus of workers is putting downward pressure on real wages. Already households in Kenya have been forced to diversify their income sources by joining the informal economy to compensate for a decline in income (Wamuthenya, 2010). When formal wages are too low to provide a decent standard of living, employed workers often take up parallel employment, especially in the informal sector.

Second, in an increasingly globalized economy, developing countries have opened up to international trade later than high-income countries, and globalization has not benefited all countries and sectors equally. International institutions have advocated structural adjustment plans as a first condition for highly indebted countries, particularly in Latin America and Africa, to obtain loans. Although the objective was to increase the solvency of indebted governments in order to help them attract capital and boost growth, these reforms have had negative side effects. One of the main components of these schemes was the privatization of public enterprises. However, the resulting decline in public employment that was characterized by stable and decent incomes, has been accompanied by an increase in informal employment (Gallo and Kucera, 2004). In addition, the reduction in tariffs required by the "Washington Consensus" led to layoffs in formal firms. However, the specialization that was to take place according to the sectoral adjustment theories of international trade, did not lead to sufficient formal job creation. As a result, the dismissed formal workers were unable to find work contracts and turned to the informal sector.

The structure of the economy also has an impact on participation in the informal economy as this can encourage certain individual behaviors. First, the share of the agricultural sector in a country's

production plays an important role since most of the informal labor force in developing countries is made up of agricultural workers who are generally self-employed and try to support themselves through their undeclared agricultural activities.

Urbanization in developing countries is accompanied by internal migration toward cities. As agriculture becomes more productive and industrialized, particularly through mechanization and the aid of fertilizers, many rural workers who no longer have an economic opportunity migrate to the cities. However, in urban areas, migrants are more likely to join the ranks of the informal sector than workers born in metropolitan areas (Freije, 2002).

Finally, the quality of institutions and the level of corruption in a country can also influence the decision of some workers to move to the informal sector. Studies have found that the size of a country's informal economy increases with the level of corruption. Entrepreneurs prefer working in the informal sector to avoid the high costs associated with bureaucracy and corruption (Schneider and Enste, 2000; Ferraira-Tiryaki, 2008). However, the government is not encouraged to undertake reforms to encourage formalization since officials prefer an imperfect system and a large number of unregistered informal participants in order to continue to receive bribes. For example, in Nigeria, Igudia et al. (2016) find that the level of corruption and poor governance are among the five main determinants of participation in the informal economy, along with unemployment, unwillingness to pay taxes, freedom of autonomy and the necessity to survive.

While the macroeconomic context of a country structures the framework in which individuals operate, the specific characteristics of workers also influence the probability of working in the informal economy.

2.2.2. Individual characteristics: the “typical” informal worker

Theoretical models of occupational choice, whose cornerstone remains the rationality hypothesis of individuals, stipulate that the decision to work in the informal sector results from an arbitration of expected utility between the status of formal sector employees and informal workers. However, El Aynaoui (1997) shows that individuals do not turn to the informal sector for a higher expected income, but rather because of decisive personal characteristics. Thus, according to specific characteristics, some individuals are more likely to work in the informal sector than to have a formal employment contract.

One of the first determinants of participation in the informal sector is the level of education (Mintah and Darkwah, 2017). The higher an individual’s education level, the lower his or her probability of working in the informal sector. In Kenya, having a primary school diploma reduces the probability of doing informal work by 5%, graduating from secondary school by 20% and reaching university level by 31% (Wamuthenya, 2010). However, these results are particularly valid for young people, since the

education level of individuals between the ages of 35 and 64 no longer has significant influence on the probability of doing informal work. We can therefore deduce that from a certain age, formal employers value experience over any diplomas obtained. Other studies, including studies on Ghana and Turkey, also conclude that education is one of the main determinants of participation in the informal sector (Mintah and Darwah, 2017; Dogrul, 2012). Several theories explain why the less educated turn to the informal sector (Cano-Ubina, 2015). First, low-skilled youth see the informal sector as a starting point, since it represents a barrier-free employment opportunity. From then on, the informal sector has a springboard function: unskilled young people begin their careers doing informal work in order to prove themselves and acquire skills that will allow them to compete for formal jobs later on. However, formal employers need to value the skills acquired in the informal sector, which is not always the case. Second, formal firms do not hire low-skilled workers because of information asymmetries. Thus, employers tend to prefer informally hiring young people without a diploma in order to see what they are worth before offering them formal employment. Informal employment may therefore be perceived by some employers as a trial period in which to observe the real skills of workers. In a study of Turkish households, Dogrul (2012) finds that being young, due to lack of education and experience, increases the chances of participating in the informal sector. Informal education is therefore prevalent among 15-24-year-olds (Heintz, 2012).

Second, gender is also an important characteristic that determines whether or not a person does informal work (Mintah and Darwah, 2017). According to an ILO report (2017), in most countries where gender-disaggregated data are available, women are disproportionately employed in the informal market compared to men. First, in developing countries, it is mainly women who take care of children. In addition, the lack of childcare infrastructure increases the burden of educating children. As the number of dependent children increases, women must have more flexible working hours in order to devote time to raising their children. However, only informal jobs can provide this flexibility. We can assume that women also value certain benefits of the employment contract, such as maternity leave or health insurance. Indeed, these types of benefits are partly aimed at women since they are the ones who will take a break from their careers to raise children. Unlike most men, women are willing to accept a lower salary in the formal sector in exchange for these benefits. Gender pay inequalities are thus greater in the formal sector than in the informal sector (Yahmed, 2018). Indeed, employers expect women to leave the labor market temporarily during pregnancy to care for their children. As a result, they are more likely to take leave than men. To prevent these potential future costs, employers lower the wages paid to women. This "gender gap" in formal wages therefore does not encourage women to work in the formal sector. Moreover, women face discrimination upon entry to the formal sector. For example, a family's initial under-investment in a daughter's education may affect her future

employability. As noted above, the less education an individual has, the higher her chances of working in the informal sector (Gibson, 2005). Also, early marriages of young girls play a large part of their anchoring in domestic work (UNICEF, 2005). Domestic activities are never paid but occupy a large part of women's available time, since women represent 83% of the world's domestic labor force (ILO, 2017). Thus, the traditional role of housewife deprives women of gainful employment and leaves them outside the formal labor market. Finally, some women are not allowed to travel far from home, which effectively reduces their work mobility. Finally, all the discrimination that women face in borrowing from credit institutions, in accessing markets, and in obtaining training and property, hinders female entrepreneurship and drives women to join the ranks of informal workers.

Marital status is also one of the determinants of informal employment. Bellache et al. (2014), find that married workers are more likely to have access to formal employment in any sector. Indeed, a married person has more responsibility, especially if he or she is a parent. This increases the incentive to receive a regular source and level of income, not to mention benefits such as health insurance that can cover the spouse and even children.

Finally, social reproduction creates a strong social inertia, i.e. family origin and social background influence an individual's career choices (Pasquier-Doumer, 2012). In a study of seven African capitals, the author analyzes the inequality of a worker’s opportunities according to the socio-professional category of their parents. As a result, having a father as a civil servant increases the probability of a son or daughter finding formal employment. Similarly, ethnicity could also increase an individual's chances of doing informal work since some ethnic groups are over-represented in the informal economy in Ouagadougou. In Bamako, being born in the capital or in a rural area has a significant influence on the probability of doing informal work. To conclude, when the father has one foot in the informal sector, the child is more likely to become an informal worker in almost all of the cities studied. Family heritage is associated with the importance of networks that characterize the informal sector. In these networks, participants exchange information about employment opportunities, as well as money, through redistribution channels. These networks act as "social glue" since reciprocity provides a safety net for these workers who have no protections or guarantees (Gaughan and Ferman, 1987). Despite the precarity inherent in informal work, once an individual is an integral part of an informal network, it is difficult to leave it, especially if most of his or her relatives are also members.

Unfortunately, many studies have highlighted the limited upward mobility of workers in the informal sector towards the formal sector for reasons mentioned above (ILO, 2010), not to mention the set of regulatory and administrative barriers that hinder the natural process of formalization. As a result, some people, particularly those with certain characteristics are virtually condemned to remain employed in

the informal sector. This hysteresis effect explains why the size of the informal sector tends to stagnate or even increase in developing countries. The underground economy remains, while the causes that have partly caused it, particularly macroeconomic ones, are gradually ceasing to exist. However, the preponderance of informality is often synonymous with poverty, inequality and deterioration of human capital. This generates real traps of informality, that is to say a vicious circle from which it is difficult for the worker to escape.

2.3. The consequences of informality for workers

Whether or not informal work is a choice, working in the informal sector has many negative consequences for workers. This sector can perpetuate poverty and inequality, due to more flexible wage regulation. It can also lead to working conditions that are below the standards in force in other sectors of the country, thus affecting the health of workers.

2.3.1. An increase in poverty and inequality for workers

In French-speaking Africa, the remuneration of informal workers is 13% to 22% lower than that of formal workers, according to some studies (Poapongsakom, 1992). This difference may be related to rigidities in the formal sector that guarantee decent incomes for its workers. Indeed, in Francophone Africa, wage and benefit grids tend to be inspired by those observed in France, in particular the existence of a minimum wage. In Dakar, only 2% of formal employees are paid less than the minimum wage, while this figure jumps to 41% in the informal sector. High wages are also less common in the informal sector. 91% of firms in Dakar pay salaries above 200,000 CFA francs in the formal sector, while this figure is only 77% in the underground economy (Benjamin and Mbaye, 2012).

If we refine our analysis by breaking down sectors by branches, we realize that poverty is almost always higher for workers in the informal sector. In Burkina Faso, the wealth gap between formal and informal workers is even greater in agriculture and transport than other sectors. Logically, the expenses of formal workers are much higher than those of informal workers, as their incomes are higher. This leads to a higher prevalence of poverty in the informal sectors. In Burkina Faso, 3% of formal workers are classified as poor, compared to 40% of informal workers (Benjamin and Mbaye, 2012). In the same vein, Chen, Vanek and Heintz (2006) observe that the higher the share of informal workers in the household, the lower the expenditure.

Two theories exist in the literature to explain the wage differences between work in the formal and informal sectors. The first explains that the difference is due to the segmentation of the labor market. Indeed, some formal jobs are rationed due to greater union protections or segregation on the basis of gender, race or ethnicity. The most sought-after workers then find work in the formal sector, and those

who are excluded from it take refuge in the informal sector, mechanically leading to wage differences in favor of formal workers. In other words, the selection bias pushes wage up in the formal sector and down in the informal sector. The second theory is that wage differences are the market's response to differences in preferences, human capital and job characteristics between actors in the formal and informal sectors (Freije, 2002). The cause of these differences may also vary among countries. For example, Stuart, Samman and Hunt (2018) show that poverty among unorganized workers in India is four times higher than that of organized workers, i.e. workers who belong to trade unions and workers' associations. However, traditional trade unions have difficulty representing the interests of informal workers. This union under-representation appears to be at the root of an increase in poverty among shadow workers.

It should also be noted that wage fluctuations tend to be more significant in the informal economy. In Madagascar, Nordman et al. (2016) find that wages in the informal sector overreact to market fluctuations compared to those in the formal sector. Indeed, during exceptional periods of growth, informal workers have seen their real incomes increase by 65%, which is higher than the average increase for all other sectors. Conversely, during periods of crisis following the economic downturn, real wages in the informal sector fell by 11%, compared to decreases of 5% for the rest of the economy.

Workers in the informal sector also face greater non-income poverty, which can be illustrated by the equipment in their households. According to Benjamin and Mbaye (2012), 77% of formal households have access to electricity compared to 26% of informal households in Dakar. In Ouagadougou, these figures are 68% and 8%, respectively. As electricity is the basis of many essential household activities, not having access to it seriously complicates the daily lives of these households.

There are also remarkable disparities between formal and informal workers in terms of water supply. In Senegal, 66% of formal workers have access to tap water in their home compared to only 44% of non-formal workers. Those who do not have access to tap water at home must drink public tap water (24%) or unprotected well water (8%), which increases the risk of exposure to contaminated water and serious diseases such as cholera, typhoid, meningitis, etc. In addition, individuals without access to a private water source in their home also tend to pay much higher prices for water than others, as they have to bear other direct costs, such as storage or transport (if water is transported by a third party), and indirect costs such as the procurement time that cannot be used for another economic activity or the physical cost of transporting liters of water several times a week.

Finally, in Senegal, 77% of formal workers use butane gas, compared to 26% of informal workers. More than 90% of informal workers use firewood for cooking in Burkina Faso (Benjamin and Mbaye, 2012). In addition to indirect costs that are quite similar to those associated with accessing water from public

sources, the use of firewood also has negative consequences on the health of household members. Surveys show that furnaces in which this wood is burned emit particles in the household at levels 10 to 100 times higher than that recommended by WHO over the long term. Women and children are the primary victims of these particles because they are most often present in the household during meal preparation.

Working in the informal sector therefore appears to have significant consequences on people's living standards. In addition, working conditions for informal workers are generally inferior to those of formal workers.

2.3.2. Difficult working conditions that directly influence workers' human capital

First, informal work can have negative consequences on the health of the worker and his or her entire household. Indeed, informal workers are more likely to work in unhealthy conditions and to suffer from poor working conditions, such as staggered and excessive working hours or lack of annual leave, and without access to a social protection system (Ruiz et al., 2017). Workers may then find themselves trapped in a vicious circle because their poor health does not allow them to develop their careers and therefore obtain better pay, which worsens the situation of the entire household and can impact the health of its members. The authors point out that the greatest impact on workers' health is in terms of mental health. Lack of social security coverage, safety regulations and job security create severe stress and pressure and ends up seriously affecting the mental health of informal workers.

In addition, informal workers benefit from significantly less professional development than their counterparts in the formal economy. Not only do they generally start out with a lower level of education, but during their professional careers they rarely benefit from training and apprenticeship within companies. They are often perceived as a temporary resource that may leave the company at any time, which makes it riskier for companies to invest in them as human capital. Moreover, training programs are often unsuitable for informal workers since they may require too high a level of education for the majority of informal workers (Freije, 2012). Finally, job training during working life is often carried out in large companies, which makes it less accessible for informal workers, who often belong to small companies. In a study in Kenya, Zimbabwe and Zambia, Stuart et al. (2018) find that less than 5% of companies with 10 or fewer employees provided training to their workers, while 81% of companies with more than 150 employees did. However, we know that the vast majority of informal jobs are in small businesses where training would be largely beneficial for informal workers, as it could increase their wages by up to 50% (Monk et al., 2008). In other words, the gap in educational attainment between formal and informal workers will only increase over time, making it even more difficult for the average worker to move from the informal to the formal economy.

Besides, informal workers are de facto excluded from social benefits, especially access to national health insurance schemes provided through the employment contract. The absence of social security contributions does not allow them access to health insurance in return.

Given the arguments just mentioned, one might expect that the perception of job satisfaction of informal workers would be lower than that of workers in the formal sector. In practice, the truth is more nuanced. On the one hand, surveys in South America and Asia tend to show that informal sector workers express lower job satisfaction than formal workers (Pagès and Madrigal, 2008; Perry et al., 2007; Razafindrakoto et al., 2012). However, these results seem to be different in Africa. In Madagascar, a study shows that satisfaction is higher in the informal sector (Rakotomanana, 2011). Another study in Ghana also indicates that informal workers do not appear less satisfied than their formal counterparts do (Falco et al., 2011). However, these results must be taken with caution because informal workers are often at the beginning of their careers or discriminated against in other sectors, which does not allow them to aspire to higher situations. It is therefore difficult to distinguish between what would result from real job satisfaction and what would correspond to acceptance of the situation when other options are not available.

2.4. Mobility from the informal to the formal sector

There is very little empirical work on the movement of workers from the informal to the formal sector. However, after having established a potential "typical profile" of informal workers and the drawbacks of informal work, it is important to understand whether informal workers find themselves trapped in a vicious circle. At first glance, it would seem that the consequences of employment in the informal sector would be self-perpetuating and would constantly increase the gap between formal and informal workers. The preponderance of both monetary and material poverty among informal workers, influences their health and access to education, which does not allow them to mobilize the capital necessary to raise themselves socially. This process feeds on itself because poor health and lower education levels reduce future job prospects, which push workers further into poverty and further penalize them in their search for formal employment. In addition, the lack of training in the workplace that we have mentioned also contributes to maintaining the gap between formal and informal workers. The informal economy therefore seems to take the form of a trap door through which the majority of its members enter and cannot escape.

In 2010, an ILO report attempts to explain the main obstacles to upward mobility for workers. First, they argue that informal workers suffer from a lack of information on formal job opportunities and the skills required to access them. This problem is all the greater because public administrations are often inefficient and fail to bring together the unemployed and employers looking to hire. Second, skills

acquired in informal employment are not always transferable and some have little value in the formal labor market. Moreover, within the informal sector, due to major inequalities between workers, some do not have the financial, physical and social capital to move into the "upper segment" of the sector. Fields (2005) distinguishes two segments in the informal economy: the upper segment in which informal employment has been chosen for higher incomes, and a lower segment into which workers have been forced. However, it is from this upper segment that the transition to the formal sector is easiest. Finally, when workers find themselves unemployed, they tend to accept the first jobs they can get, which are often in the informal sector.

Despite these arguments, the question of upward mobility, i.e. movement from the informal to the formal sector, seems less clear-cut in the few empirical studies conducted on this subject. In a survey on Costa Rica, it was shown that informal workers are much less likely to change sectors than formal workers. In other words, downward mobility seems to exist, but not upward mobility (Tokman, 1987). On the other hand, in Mexico City, it seems that the mobility prospects are the same for both formal and informal workers (Maloney, 1999). For his part, Freije (2001) considers that informal workers have lower mobility because he shows that they are more likely to fall into poverty and remain in it.

2.5. Conclusion

Informality is an issue that is directly or indirectly at the heart of the Sustainable Development Goals. The theoretical framework surrounding it is the subject of much discussion, particularly on the transitory or permanent nature of the informal economy as well as on its chosen or constrained dimension. The formalization of workers, encouraged by the ILO as part of a decent work framework, thus requires a better understanding of the causes of informality. As we have seen, macroeconomic factors play a significant role in the prevalence of informality, whether it is the level of corruption in the country, the weight of the primary sector, or the rate of urbanization. But informality does not affect populations in a homogeneous way. Some characteristics specific to individuals, such as gender, age and level of education, have a significant impact on the probability of a worker becoming employed in the informal sector. It is important to better understand the extent of informality and the populations concerned, since the consequences are so significant. Informality is generally linked to poverty and inequality, due to more flexible wage regulation. It often leads to working conditions that are below the standards in force in other sectors of the country, thus affecting the health of workers.

However, informal work also provides flexibility for individuals who can more easily seize economic opportunities elsewhere and adjust their life choices as they wish. Informality also makes it possible to avoid taxes and duties from governments in countries where there is a strong distrust of institutions. This is why many workers prefer informal work. Despite the efforts made, large parts of African economies continue to be predominantly informal and progress in this area has been relatively limited.

As part of this thesis, we wanted to better understand the issues surrounding formalization by developing two areas of study. First, while access to health insurance seems to be the main benefit of formalization, this advantage may not be sufficiently valued by employees. By studying the temporal preferences and risk aversion of Senegalese workers, as well as the role of information, we show that information can play a significant role in the willingness of employees to join a health insurance system and that a greater awareness among workers of the mechanisms and issues surrounding health insurance would strengthen their appreciation of this social benefit. Second, access to bank credit through stable and formal employment is often brandished as one of the main advantages of formalization. We sought to document the impact of the employment contract on credit access. These two axes thus make it possible to strengthen the existing literature on the impacts of formalization.

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CHAPTER 3

Financial constraints, factor combination and Gibrat's law in Africa[1]

3.1. Introduction

One of the most prominent challenges for sub-Saharan African countries in the 21st century is to absorb the rapid growth of the active workforce by providing sufficient jobs. As stated by McKinsey, over the next ten years Africa is expected to create 54 million new jobs over the next ten year following the current trends, a figure that will be insufficient to absorb the 122 million new entrants into the labor force expected over the same period. Therefore, understanding which firms create the most jobs is crucial for both academics and policymakers. To shed light on this question, we investigate the relationship between firm size and job creation in sub-Saharan African countries. We show that Small and Medium Enterprises (SMEs) create more jobs than large firms do and explain this finding by a combination of production factors that overuse labor due to lack of access to capital.

In 1931, Robert Gibrat stated that firm growth is independent of initial size, after observing firm distribution in French manufacturing establishments. Gibrat's law has since been tested widely in both developed and developing countries (see Daunfeld and Elert, 2013; Aga et al., 2015). Econometric results often indicate that small firms are the main contributors to net job growth, especially in developing countries (Ayyagari et al., 2014; Rijkers et al., 2014; Aga et al., 2017), in contradiction to Gibrat's law. However, recent studies have challenged the validity of this conclusion (Lotti et al., 2009; Haltiwanger et al., 2013). Evidence from Africa is rather scarce and results are mixed.

Our paper adds to the existing literature on firm growth and private sector development in sub-Saharan Africa. First, while Gibrat's law has often been tested, to our knowledge there are no studies based

[1] This chapter is joint work with Florian Léon (University of Luxembourg, CREA)

exclusively on African firms from different countries and different sectors. To fill the gap in the literature, we test whether Gibrat's law is valid in sub-Saharan Africa using firm-level variables from the World Bank Group's Enterprise Surveys (henceforth ES). We consider 22,945 firms from 45 African countries over the period 2006-2016. We rely on existing literature to provide an empirical test of Gibrat's law (Lotti et al., 2009; Daunfeld and Elert, 2013; Haltiwanger et al., 2013) and document that small firms grow faster than larger firms do.

Second, despite a burgeoning body of literature, explanations for the rejection of Gibrat's law are rarely investigated (one notable exception is Daunfeld and Elert, 2013). We first show that the usual explanations advanced in the literature (the mechanical effect, the learning process or the minimum efficient size) are irrelevant in our case. We therefore propose a new channel to shed light on our econometric results. We argue that SMEs use a different combination of production factors than their larger counterparts, regardless of the sector. Suppose that a firm employs only capital and labor to produce an output. In the absence of access to capital, SMEs tend to overuse labor because of lack of access to capital. Since SMEs in Africa are more financially constrained than larger firms, they cannot employ capital to the extent that they otherwise would (Beck et al., 2005). As a result, they tend to underuse capital and overuse labor in order to grow, resulting in a lower capital-labor factor and greater job growth momentum. We empirically test this possible explanation. First, we show that the negative relationship between firm size and firm growth is more than two times larger for financially constrained firms as for unconstrained firms. In other words, financially constrained firms create more jobs more quickly than non-constrained firms. This finding is robust to several measures of financial access. Second, we document that the capital-labor ratio is lower for both small firms and for constrained firms, in line with our hypothesis. To summarize, we first argue that financially constrained firms create more jobs, then show that SMEs are more financially constrained to explain the stronger job creation of SMEs over their larger counterparts.

The article is organized as follows. Section 2 discusses the existing literature on Gibrat's law, drawing special attention to works on African firms and to explanations of the law's rejection in Africa. Section 3 presents our baseline results, indicating a rejection of Gibrat's law. Section 4 displays the potential factors that could explain this rejection, developing an original explanation based on credit constraints, input access and factor combination. The final section concludes.

3.2. Literature review

3.2.1. Empirical tests of Gibrat's law

By considering the size of French firms in terms of employees, Robert Gibrat (1931) showed that growth rates follow a lognormal distribution, creating the eponymous Gibrat's law (also called the law of

proportionate effect). This law states that the growth rate of a given firm is independent of its initial size (Sutton, 1997). Researchers have attempted to verify the validity of Gibrat's law with, so far at least, highly divergent results (see Daunfeld and Elert, 2013; Aga et al., 2017). Most of the research has focused on developed economies. One may question whether the experience of industrialized economies can be generalized to developing countries, especially lesser developed countries such as many in Africa. Small firms are predominant in low-income countries (Ayyagari et al., 2014; Aga et al., 2017). Thus, it is of interest to extend the existing literature to the specific case of African countries.

Studies on Gibrat's law in sub-Saharan Africa are rather scarce and provide mixed results. Cross-country evidence often supports the rejection of Gibrat's law (Ayyagari et al., 2014; Aga et al., 2017). However, country-specific studies are less clear-cut. While some (Teal, 1999; Biggs and Saha, 2003; Bigsten et al., 2007) indicate that SMEs are the main contributors to net job growth, other papers fail to confirm this relationship (Page and Soderbom, 2012; Arrow et al. 2014).

3.2.2. Explanations advanced to justify the rejection of Gibrat's law

Divergences can be justified by differences in methodology and samples considered. Alongside endogeneity, measurement and selection issues (Haltiwanger et al., 2013), results from empirical papers may be conditional to the econometric specifications used. In particular, results are sensitive to the inclusion of firm age (Haltiwanger et al., 2013). The rejection of Gibrat's law can be justified by the learning effect. Jovanovic (1982) provides an explanation for higher growth of small and young firms. Firms begin learning about their efficiency once they are established. Because least efficient firms are forced out of the market, more efficient managers can adjust their business accordingly and gain market shares. Hence, young firms grow faster by discovering their efficiency level, but there is no reason to believe that size matters. However, insofar as size and age are strongly related, regressing firm growth on firm size without considering firm age induces bias. Yet, from the approximately 60 papers taken into account by Santarelli et al. (2006), only a third control for age. Haltiwanger et al. (2013) show that net employment growth rates are higher for smaller firms, but this negative relationship disappears after controlling for firm age in the United States. Lotti et al. (2009) provide additional evidence in line with this argument. In the case of Côte d'Ivoire, Sleuwaegen and Goedhyus (2002) show that the effect of firm size is attenuated for older firms.

Differences in findings can be explained not only by differences in methods but also by different samples considered. In particular, several papers have argued that Gibrat's law holds in some sectors but not in others.[2] This theoretical intuition is based on the minimum efficient size required to operate (Manfield,

[2] Daunfeld and Elert (2010) present additional arguments to explain why Gibrat's law may hold in some sectors but not in others. These explanations are based on degree of competition, of uncertainty, and of innovation, the age of the sector or the survival rate in the industry.

1962; Cabral, 1995). According to this hypothesis, small entrants have to grow quickly to attain the minimum efficient size or must exit. We therefore observe that small firms grow faster than firms having already attained the minimum efficient size. As a result, Gibrat's law is more likely to hold in the services sector than in manufacturing, due to differences in sunk costs. Empirical papers give support to this explanation (Audretsch et al., 2004; Teruel-Carrizosa, 2010; Nassar et al., 2014).

3.2.3. Credit constraints and job creation

In this paper, we advance another possible explanation based on the idea that the lack of credit access may distort factor combination and favor labor-extensive technology. While the relationship between financial constraints, capital structure choices and capital investments has been studied extensively, little is known about the role that financial constraints play in job creation. On the one hand, facilitating access to financing makes it possible to increase investments in capital, which can result in a greater demand for labor because labor and capital are complements. Moreover, labor has fixed costs (hiring costs, training, paying wages) so that easing financial constraints can stimulate employment. From this perspective, labor, similar to capital, needs to be financed. Some papers thus show that increased access to finance results in higher employment growth, especially among SMEs (Ayyagari et. al., 2017; Dao and Liu, 2017; Boustanifar, 2014; Benmelech et al., 2011). On the other hand, easing financial constraints may allow firms to optimally substitute capital for labor by moving towards a more capital-intensive production process. Access to finance will therefore play a key role in the capital-labor ratio because constrained firms, by definition, cannot optimally invest in capital. Indeed, a financially constrained firm will not be able to borrow the funds for capital investment and might partially satisfy the demand for growth by hiring more labor. A rare point of reference is Garmaise (2008), who shows that financially restricted firms use relatively more labor than physical capital. Our study adds to this growing body of literature in the area of labor and finance by examining the linkages between firm financing and job creation.

3.3. Do African SMEs grow faster than their counterparts?

3.3.1. Methodology

3.3.1.1. Econometric model

To test Gibrat's law, we follow the existing literature (Lotti et al., 2009; Daunfeld and Elert, 2013). The basic test of Gibrat's law related the logarithm of previous size on the logarithm of actual size as follows:

$$lnS_{it} = \alpha + \gamma lnS_{it-1} + \varepsilon_{it} \quad (1)$$

where $S_{i,t}$ is the size of firm *i* at time *t*, $S_{i,t-1}$ the same size in the previous period and $\varepsilon_{i,t}$ is a random variable. As stated by Chesher (1979), Gibrat's law holds if $\hat{\gamma}$ equals unity. By contrast, if $\hat{\gamma} < 1$, small firms grow at a systemically higher rate than do their larger counterparts (the opposite is true if $\hat{\gamma} > 1$).

To make interpretation easier, we follow Lotti et al. (2009) and regress the growth of employment size on firm size. In addition, to control for unobserved country- and sector heterogeneity, as well as individual characteristics, we estimate the following equation:

$$g_{i,t/t-1} = \alpha_{ct} + \alpha_{st} + \beta lnS_{it/t-1} + \delta lnA_i + \nabla \boldsymbol{X}_i + \varepsilon_{it} \quad (2)$$

where i, c, s, and t refer to firm *i* in country *c* in sector *s*, at period *t*. $g_{i,t/t-1}$ is the annual growth of a firm's size from t-1 to t, and $S_{it/t-1}$ the (average) firm's size. $\alpha_{c,t}$ is a list of country-year dummies and $\alpha_{s,t}$ a list of sector-year dummies. A_i is the logarithm of the age of firm *i* at the time of the survey. We add a set of firm-level variables $(\boldsymbol{X}_i)$ to control for observable firm-level heterogeneity. The list of firm-level control variables includes the experience of the manager, a dummy if the firm is an exporter, a dummy if a firm is part of a larger firm, a dummy for foreign-owned firms, a dummy for state-owned firms, a dummy if the firm is privately-held and a dummy for listed firms. The coefficient of interest is $\beta = (\gamma - 1)$.[3] Gibrat's law holds if $\hat{\beta} = 0$ $(\hat{\gamma} = 1)$. Small firms grow faster if $\hat{\beta} < 0$ and large firms grow faster if the estimated β is positive. We also expect that firm age has a negative impact on firm growth, so we expect that $\hat{\delta} < 0$.

3.3.1.2. Data and variables

Firm-level data were extracted from the World Bank Enterprise Surveys (ES), which include a variety of firm-level information, such as number of employees, total sales, ownership structure, industry, and age of the firm, etc. An advantage of ES is their coverage of firms of all sizes in many developing countries, contrary to other databases (such as ORBIS). ES were retrieved in October 2017. Some filter rules are applied. First, we consider only firms based in sub-Saharan Africa. Second, firms for which dependent variables were not available and for which at least one of the firm-level control variables was missing were dropped. Third, we remove outliers (firms for which growth is below the first percentile or above the 99th percentile). In addition, we exclude firms whose size exceeds 1,000 employees or whose age is over one century. Finally, we excluded observations when the interviewer did not believe that the responses were reliable (question a16 in the ES). Our final sample includes 22,495 firms from 45 African countries (73 surveys). The number of firms per country is provided in Table A3.1 in the Appendix.

[3] To prove this, we simply change the annual growth as difference in the logarithm as follows: $g_{i,t/t-1} = lnS_{it} - lnS_{it-1}$.

3.3.1.3. Variables

We employ the number of employees to compute a firm's growth. In doing so, we use data on the number of employees in the year before the survey and three-years before the survey. The number of employees refers to permanent and full-time workers (questions l1 and l2 in the ES). To avoid the regression-to-the-mean effect (Davis et al., 1996; Haltiwanger et al., 2013), growth of employment refers to the change of the variable during the period *t* and three years before, divided by the firm's simple variable average during the same period (instead of using the initial value).

All independent variables are extracted from the Enterprise Surveys[4]. Our main interest variable is the size of firm *i*. Gibrat's law provides a relationship between a firm's size and its subsequent growth. The firm size is based on the number of employees. A simple way to compute a firm's size consists of using the number of total employees in the beginning of the period. However, the regression-to-the-mean problem may occur when we rely on initial size (Davis et al., 1996). Employing initial size may induce a biased relationship between firm size and subsequent growth. We therefore follow recent works (e.g., Haltiwanger et al., 2013) and use the average size over the period by using the average between the initial size and final size.

Haltiwanger et al. (2013) also point out that the negative relationship between size and growth vanishes when controlling for firm age in the U.S. We therefore control for firm age by using the time lapse between firm creation (question b5 in the ES) and year of the survey. In line with recent works, using ES (e.g., Beck et al., 2005; Harrison et al., 2014), we add usual firm-controls that correct for firm heterogeneity. We include the top manager's years of experience in the sector. We also consider dummy variables capturing whether the firm is an exporter, foreign-owned, or government-owned and if the firm belongs to a larger firm, is privately held or is listed.

3.3.2. Results

3.3.2.1. Descriptive statistics

Table 3.1 displays basic descriptive statistics. On average, firms experienced a positive growth in employment. However, there are hidden variations in growth. For instance, one quarter of firms destroyed employment while another quarter witnessed employment growth over 10 percent.

Firms retained in our sample have 37 employees on average. However, this figure is driven by outliers, as documented in Figure A1. The median average size is 12 employees, and more than three quarters of firms have less than 30 employees. Table 3.1 also indicates that firm age is on average 15 years. In addition, 15% of firms are exporters, 18% are part of a larger group and 12% are foreign-owned (the

[4] We control for country differences by adding country-year fixed effects.

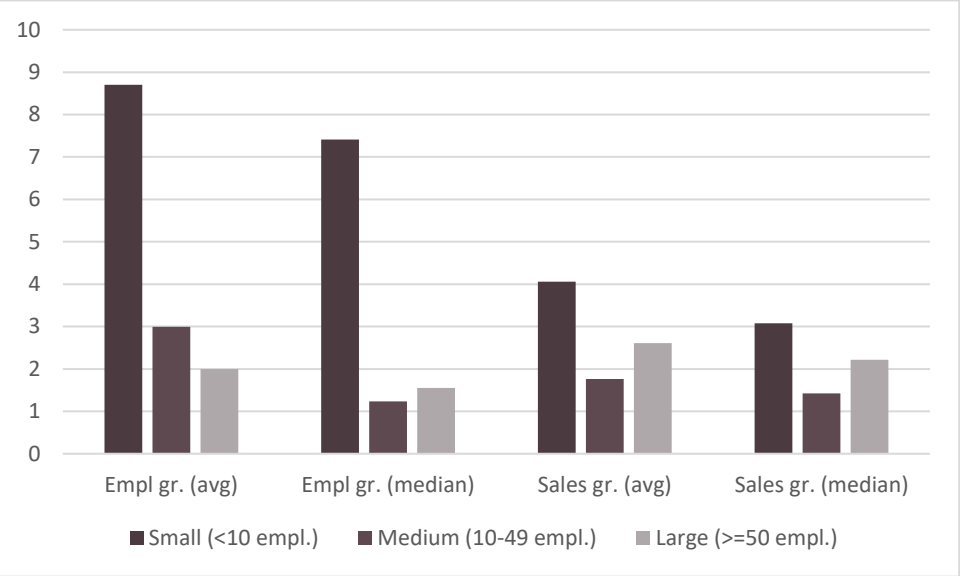
number of state-owned firms is marginal and concerns less than 1% of firms). The definition of all variables is reported in Table A3.2.

Table 3.1 : Descriptive statistics

Variables	Obs.	Mean	Std. Dev.	Min	Max
Gr(Empl)	22,495	5.40	11.36	-32.95	47.51
Gr(Sales)	18,232	2.92	23.21	-66.67	66.67
Empl	22,495	37.34	82.18	1	1000
Age	22,495	15.58	12.72	0	100
Export	22,495	0.150	0.357	0	1
Subsidiary	22,495	0.184	0.387	0	1
Manag Exp	22,495	14.53	9.44	0	50
Foreign-owned	22,495	0.129	0.335	0	1
State-owned	22,495	0.005	0.068	0	1
Privately-held	22,495	0.209	0.407	0	1
Sole proprietorship	22,495	0.552	0.497	0	1
FIN1	16,006	0.454	0.498	0	1
FIN2	21,929	0.373	0.484	0	1
FIN3	13,389	0.196	0.397	0	1

In Figure 3.1, we show that firm growth is negatively correlated with firm' size, as expected (results are unchanged when we consider initial size). Small firms have created 8.7 jobs on average over the last three years prior to the survey, a rate that is more than four times the growth of employment in large firms (only 2 jobs created on average). Moreover, while only 7% of small firms have experienced job destruction, more than a quarter of large firms have experienced negative employment growth.

Figure 3.1: Relationship between firm size and firm growth



3.3.2.2. Baseline results

In Table 3.2 we report the baseline model testing the relevance of Gibrat's law in Africa using Eq. 2. In column 1, we report the model without control variables, sector or country dummies. We then include control variable in column (2), country-year dummies in column (3) and sector-year dummies in column (4). In column (5), we report the complete specification.

Our findings, displayed in Table 3.2, provide strong evidence in favor of rejection of Gibrat's law. The coefficients associated with average size are negative and highly significant in all specifications. The impact of size is also economically significant. When the number of employees doubles, growth is reduced by 0.7 points, representing more than 10% of average employment growth. It should be noted that young firms grow faster than their older counterparts. In addition, the impact of age is particularly strong in economic terms. An additional year reduces employment growth by almost 2 points. Among our control variables, we show that growth is stronger for exporters, subsidiaries, firms with experienced managers, foreign-owned, state-owned and privately held firms.

To summarize, our baseline regressions indicate that Gibrat's law can be rejected in models that explain employment growth. In other words, SMEs appear to have a stronger employment dynamic than large firms.

Table 3.2: Baseline results, employment growth

	(1)	(2)	(3)	(4)	(5)
$\ln(Empl_{initial})$	-0.677***	-0.701***	-0.782***	-0.715***	-0.757***
	(-10.06)	(-9.24)	(-10.24)	(-9.14)	(-9.61)
ln(Age)	-3.257***	-3.204***	-2.618***	-2.719***	-2.647***
	(-26.21)	(-22.58)	(-18.39)	(-19.00)	(-18.49)
Export		0.198	0.450**	0.412*	0.421*
		(0.90)	(2.04)	(1.85)	(1.87)
Subsidiary		0.174	0.539***	0.591***	0.539***
		(0.89)	(2.72)	(3.01)	(2.71)
Manag		-0.00953	0.0129	0.00836	0.0126
		(-1.05)	(1.41)	(0.91)	(1.36)
Foreign-owned		0.149	0.0575	0.243	0.0486
		(0.66)	(0.25)	(1.07)	(0.21)
State-owned		0.901	0.266	0.678	0.402
		(0.83)	(0.25)	(0.63)	(0.37)
Privately held		1.935***	0.0777	0.0955	0.0543
		(8.85)	(0.33)	(0.42)	(0.23)
Sole proprietorship		1.198***	0.212	0.316	0.179
		(6.21)	(1.08)	(1.64)	(0.91)
Dummy					
- Country#year	No	No	Yes	No	Yes
- Sector#year	No	No	No	Yes	Yes
Obs.	22495	22495	22495	22495	22495
Adj. R2	0.049	0.052	0.112	0.098	0.115

The dependent variable is the annual growth of employment. Robust t-statistics are reported in parentheses. *, **, *** indicate significance at 10%, 5%, and 1%, respectively.

3.3.2.3. Robustness checks

First, we change measures of dependent variables (growth) and interest variables (firm size). In the baseline model, to avoid the regression-to-the-mean bias, we employ average growth and firm size growth. In our robustness check, we consider usual measures of growth (based on initial size) and initial

size instead of average firm size. Our results, unreported but available upon request, indicate that our conclusions are not altered by these changes.

Second, we also confirm that our findings are not altered by the method retained to correct standard errors. Using clustered standard errors at the country-year or sector-year level provides similar results. Only statistical significance of control variables is affected by this change.

Third, to test whether our findings are sensitive to the inclusion of one country or one sector, we apply the baseline model by excluding each country and sector one by one. Once again, our econometric results are unchanged: size has a negative effect on a firm's employment growth but not on its sales growth. Next, we present an explanation for this paradox. Before we do so, we show that the usual suspects cannot help us to explain this puzzle.

Why do African SMEs create more jobs? Our paper not only tests whether Gibrat's law is valid for African firms but also tries to understand why it appears not to be. There are three possible suspects for this rejection: diminishing returns, the learning process (Jovanovic, 1982) and the minimum efficient size (Manfield, 1962; Cabral, 1995). However, these three possible explanations do not fully explain why African SMEs create more jobs than their larger counterparts. Nonetheless, we provide additional tests to prove that our results cannot be explained by these three factors.

To test the diminishing returns hypothesis, we merely consider the growth based on sales. If a mechanical process explains the rejection of Gibrat's law, we should observe a similar result when we consider alternative measures of growth (e.g., sales growth). Total annual sales refer to a firm's declaration regarding its activity in the previous year (question d2) and three years before (question n3). Sales values have been deflated using the same base year (100 = 2010) and the country's GDP deflators from the World Development Indicators (WDI). Growth of sales refers to the change of the variable during the period *t* and three years before, divided by the firm's simple average of variable during the same period (instead of using the initial value) in order to avoid the regression-to-the-mean effect (Davis et al., 1996; Haltiwanger et al., 2013). In Table 3.3, we consider the sales growth as dependent variable. While age continues to play a role in explaining sales growth, the impact of size is less clear-cut. Indeed, coefficients associated with size are only negative and statistically significant in column 4. In addition, if we ignore statistical significance, we observe that the impact of size is also economically reduced. An increase of a firm's size by six employees reduces sales growth by 0.35 points (around 10 percent of its average). In other words, the negative relationship between firm size and firm growth holds for employment growth but vanishes when we consider sales growth. The rejection of Gibrat's law is less clear-cut when we consider sales growth, suggesting that the employment dynamic is not solely explained by sales momentum.

Table 3.3: Baseline results, sales growth

	(1)	(2)	(3)	(4)	(5)
$\ln(Empl_{initial})$	0.275*	0.00524	-0.282	-0.339*	-0.229
	(1.71)	(0.03)	(-1.55)	(-1.77)	(-1.22)
ln(Age)	-3.040***	-3.406***	-2.357***	-2.902***	-2.443***
	(-10.44)	(-10.06)	(-7.36)	(-8.75)	(-7.59)
Export		-1.113**	1.504***	0.541	1.323**
		(-2.02)	(2.81)	(0.99)	(2.45)
Subsidiary		0.344	-0.268	0.0220	-0.427
		(0.71)	(-0.55)	(0.05)	(-0.88)
Manag		0.0507**	0.0340	0.0456**	0.0346*
		(2.35)	(1.63)	(2.14)	(1.65)
Foreign-owned		1.935***	0.628	1.261**	0.629
		(3.65)	(1.19)	(2.40)	(1.20)
State-owned		1.863	0.938	2.376	1.829
		(0.58)	(0.31)	(0.78)	(0.62)
Privately held		2.182***	-0.220	0.396	-0.257
		(4.22)	(-0.42)	(0.74)	(-0.49)
Sole proprietorship		0.197	-0.143	-0.208	-0.170
		(0.40)	(-0.30)	(-0.43)	(-0.36)
Dummy					
- Country#year	No	No	Yes	No	Yes
- Sector#year	No	No	No	Yes	Yes
Obs.	18232	18232	18232	18232	18232
Adj. R2	0.006	0.009	0.130	0.073	0.135

The dependent variable is the annual growth of sales (in constant US$). Robust t-statistics are reported in parentheses. *, **, *** indicate significance at 10%, 5%, and 1%, respectively

We then investigate whether the relationship between firm size and firm growth can be explained by the learning effect. We run our baseline model for firms of different ages (by 5-year windows). We confirm the findings obtained in previous articles (Sleuwaegen and Goedhyus, 2002) indicating that the rejection of Gibrat's law is stronger for young firms. In particular, for firms older than 20 years, the negative relationship between firm size and employment growth vanishes. However, the learning effect hypothesis does not provide clear arguments to justify why there is an absence of impact of firm size on sales growth but a negative impact on employment growth.

Table 3.4: Testing Gibrat's law by age group

	[0. 5[	[5; 10[	[10; 15[	[15; 20[
	(1)	(2)	(3)	(4)
$\ln(Empl_{avg})$	-1.628***	-1.003***	-0.778***	-0.707***
	(-5.55)	(-6.44)	(-4.39)	(-3.31)
Control variables	Yes	Yes	Yes	Yes
Dummy - Country#year	Yes	Yes	Yes	Yes
Dummy - Sector#year	Yes	Yes	Yes	Yes
N	3300	6799	4477	2789
adj.	0.100	0.088	0.081	0.088

	[20; 25[	[25; 30[	[30; 35[	[35; 40[
	(5)	(6)	(7)	(8)
$\ln(Empl_{avg})$	-0.362	-0.443	0.455	-0.493
	(-1.34)	(-1.28)	(1.09)	(-0.82)
Control variables	Yes	Yes	Yes	Yes
Dummy - Country#year	Yes	Yes	Yes	Yes
Dummy - Sector#year	Yes	Yes	Yes	Yes
N	1636	1094	694	497
adj.	0.071	0.075	0.001	0.059

The dependent variable is the annual growth of employment. Robust t-statistics are reported in parentheses. *, **, *** indicate significance at 10%, 5%, and 1%, respectively.

A third explanation often advanced in the literature refers to sunk costs, i.e., costs that cannot be recovered if a firm goes bankrupt, and minimum efficient size. SMEs that invest less in the first period must rapidly adjust their capabilities to their optimum level. SMEs will thus have a higher growth rate in the first period. If this explanation is true, Gibrat's law should hold in a sector where sunk costs are law (as in the services sectors) but should be rejected when sunk costs are high (as in the manufacturing sectors). Yet, in the case of African countries, we can show that Gibrat's law holds for every sector. Indeed, we distinguish between firms in manufacturing and firms in the services sector in order to test the role of minimum efficient scale (Teruel-Carrizosa, 2010). Using sub-sample analysis and interaction between firm size and a dummy for manufacturing firms, we have not found any difference in the relationship between firm size and growth for firms in the manufacturing and services sectors.

Table 3.5: Testing Gibrat's law, by sector

	MANUF.	SERV.	Inter.
	(1)	(2)	(3)
$\ln(Empl_{avg})$	-0.741***	-0.774***	-0.746***
	(-6.67)	(-6.81)	(-7.00)
$\ln(Empl_{avg})$*Manufacturing			-0.0205
			(-0.15)
ln(Age)	-2.916***	-2.461***	-2.647***
	(-13.93)	(-12.39)	(-18.49)
Export	0.616**	0.107	0.425*
	(2.09)	(0.30)	(1.88)
Subsidiary	0.976***	0.251	0.538***
	(3.26)	(0.93)	(2.70)
Manag	-0.00175	0.0282**	0.0125
	(-0.13)	(2.16)	(1.35)
Foreign-owned	-0.0161	0.0439	0.0486
	(-0.05)	(0.14)	(0.21)
State-owned	-0.215	0.859	0.400
	(-0.14)	(0.56)	(0.37)
Privately held	0.352	-0.234	0.0558
	(1.04)	(-0.71)	(0.24)
Sole proprietorship	0.516*	-0.154	0.180
	(1.76)	(-0.58)	(0.92)
Dummy	Yes	Yes	Yes
Obs.	10410	12085	22495
Adj. R2	0.126	0.106	0.115

The dependent variable is the growth of employment. Robust t-statistics are reported in parentheses. *, **, *** indicate significance at 10%, 5%, and 1%, respectively

To summarize, the three usual suspects for this rejection of Gibrat's law (diminishing returns, the learning process and minimum efficient size) do not help us understanding the negative relationship between firm size and employment growth. Next, we propose an alternative explanation based on credit constraint and factor combination.

3.4. Credit constraint, factor combination and rejection of Gibrat's law

We argue that the negative relationship between firm size and employment growth may be, at least partially, explained by the role of firm size on the optimal factor combination. As stated earlier, small firms face higher financial constraints and limited access to capital. As a consequence, our intuition is that small firms overuse labor in their production process. This hypothesis helps us to explain why Gibrat's law is rejected when we consider employment growth but not always when we consider sales growth (as shown previously). Below, we propose additional tests in line with our intuition.

3.4.1. Does credit access shape the firm's size-growth relationship?

In this section, we argue that the relationship between firm size and growth can be shaped by a firm's access to credit. We firstly investigate whether correlations between size and growth are stronger for financially constrained firms than for financially unconstrained firms but only when we consider employment growth. To capture credit constraints, we employ three different frequently used measures based on a subjective evaluation of a firm's credit constraints and objective credit experience, in line with recent works (e.g., Léon and Weill, 2018). Our three dummies have been built the same way: each dummy takes the value of zero if the firm is financially constrained and one if unconstrained. First, we consider a firm's subjective evaluation of credit constraints (FIN1). The firms were asked in ES whether finance is an obstacle to their growth (question k30). We create a dummy equal to one if a firm declares that finance is not an obstacle, a minor obstacle, or a moderate obstacle. This dummy equal zero if the manager's answer indicates that finance is a major or very severe obstacle. Second, we consider a firm as unconstrained if the firm has a loan or an overdraft (questions k7 and k8). We create a dummy equal to one if a firm has a loan and 0 otherwise (FIN2). Contrary to the subjective measure, this variable is based on real credit experience. Third, we consider the firm's precise credit experience in the past year (questions k16 to k20). Indeed, firms without credit may be credit constrained or may simply not need a loan for their operations. To control for this aspect, we create a final dummy based on credit experience in the past year (FIN3). This new variable allows us to distinguish between firms without a need for credit and those that are truly credit constrained. A firm is declared as credit constrained if (i) the firm applied for a bank loan but its application was rejected; or, (ii) the firm did not apply because it had been discouraged to do so. Based on the question on credit experience, we built a dummy equal to one for unconstrained firms (applied and received a loan) and 0 for rejected and discouraged firms. We therefore ignore firms that did not apply due to a lack of demand (for more

details on data construction, see Léon and Weill, 2018). Descriptive statistics, displayed in Table 3.1, indicate that between 55% (FIN1) and 80% (FIN3) of firms are credit constrained. In Table A3.3 in the Appendix, we document that small firms are more credit constrained than medium-size and large firms, irrespective of the measures of financial access considered. Indeed, while more than half of large firms have access to credit (FIN3), only 12% of small firms and 28% of medium-size firms have access to credit.

In Table 3.6, we display the correlation coefficients between firm growth and firm size. We report coefficients for all firms and distinguish between unconstrained firms (FIN=1) and constrained firms (FIN=0). We also report Jenrich's (1970) test for equality of correlation coefficients between two groups. Our intuition is valid if correlation coefficients are stronger for unconstrained firms but only when we consider employment growth. Statistics and tests reported in Table 3.6 give support to our hypothesis. We show that correlation coefficients are stronger for constrained firms, irrespective of the measures of credit access considered; the difference is statistically significant at the 1% level. In the next sub-section, we present a more robust analysis.

Table 3.6: Coefficient correlations between size and growth

Employment growth						
	FIN1		FIN2		FIN3	
	coef.	Obs.	coef.	Obs.	coef.	Obs.
All firms	-0.121	16,006	-0.135	21,929	-0.160	13,389
Unconstrained firms	-0.081	7,274	-0.085	8,187	-0.112	2,625
Constrained firms	-0.159	8,732	-0.173	13,742	-0.184	10,764
Jenrich test (p-value)	0.00		0.00		0.00	

We then empirically test our hypothesis by adding an interaction in our baseline model, as follows:

$$g_{i,t/t-1} = \alpha_{ct} + \alpha_{st} + \beta_1 lnS_{it/t-1} + \beta_2 lnS_{it/t-1} * FIN_i + \theta FIN_i + \delta lnA_i + \nabla \boldsymbol{X}_i + \varepsilon_{it} \quad (3)$$

Where FIN_i is a dummy equal to one if a firm has access to credit and zero if a firm is credit constrained. As explained above, we employ three different ways to compute FIN_i. Our hypothesis is confirmed if $\beta_1 < 0$ and $\beta_2 > 0$ when we consider employment growth as the dependent variable.

Results are displayed in Table 3.7. In the first three columns, we consider the subjective measures of financial access (FIN1), in columns (4-6) financial access is assessed by the use of loan or overdraft (FIN2) and in the last three columns we consider a firm's credit experience during the previous year (FIN3) (for details, see Section 3.3.2.). For each proxy of financial constraint, we firstly display models without measure of financial access and interaction (because the number of observations decreases when we consider different proxies of financial access). We then include each measure of financial access (FIN1,

FIN2, and FIN3) and finally we report the model with interaction. Econometric results are in line with our prediction. The coefficients associated with the interaction are positive and highly statistically significant, irrespective of the measures of financial constraints considered (FIN1, FIN2, or FIN3). In addition, in economic terms, we note that the relationship between firm size and employment growth is three times larger for constrained firms than for their unconstrained counterparts. In addition, we underline that unconstrained firms have a higher level of growth.

Table 3.7: Model with interaction between size and financial constraint

	FIN1			FIN2			FIN3		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
ln(Empl)	-0.635***	-0.655***	-0.964***	-0.761***	-0.842***	-1.347***	-0.973***	-1.098***	-1.406***
	(-6.49)	(-6.67)	(-7.47)	(-9.54)	(-10.35)	(-12.47)	(-8.88)	(-9.83)	(-10.79)
FIN		0.548***	-1.114**		0.903***	-1.949***		1.615***	-1.370**
		(2.97)	(-2.38)		(5.22)	(-4.57)		(5.91)	(-2.05)
ln(Empl)*FIN			0.612***			1.004***			0.982***
			(3.99)			(7.55)			(5.10)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Dummy									
- Country#year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Sector#year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	16006	16006	16006	21929	21929	21929	13389	13389	13389
Adj R^2	0.110	0.111	0.112	0.112	0.113	0.115	0.132	0.134	0.136

The dependent variable is the growth of employment. Control variables as well as country-year and sector-year dummies are included but unreported. Robust t-statistics are reported in parentheses. *, **, *** indicate significance at 10%, 5%, and 1%, respectively.

In an unreported analysis (available upon request), we test whether these econometric results are robust to alternative specifications. First, we consider sub-samples instead of an interaction between financial access and firm size. Our conclusions are not altered by this change. In addition, financially constrained firms can be the most dynamic ones. To control for this aspect, we add sales growth in models as independent variable (in spite of its endogeneity). Econometric results are very close to those obtained in Table 3.3.

3.4.2. Relationship between credit access and capital-labor ratio

According to our hypothesis, we expect that the ratio of capital to labor is lower for constrained firms than for unconstrained firms, hence small firms should have a lower capital to labor ratio because they

are more financially constrained. This hypothesis is confirmed by our data: large firms have a capital to labor ratio eighteen times higher than small firms.

To empirically test this prediction, we run the following model:

$$k/l_{i,t} = \alpha_{ct} + \alpha_{st} + \beta FIN_{it} + \nabla \boldsymbol{X}_i + \varepsilon_{it} \quad (4)$$

where $k/l_{i,t}$ is the ratio of capital to labor for firms i, FIN_{it} is an index of financial access (see above), and $\boldsymbol{X}_i$ is a matrix of control variables, including the average firm's size, age, and other control variables employed above. According to our hypothesis, we expect that $\beta > 0$, indicating that firms with credit access employed more capital per worker. To compute the capital-labor ratio, we need a measure of capital intensity and of labor intensity. We follow Enterprise Surveys staff (World Bank Group – Enterprise Analysis Unit, 2017) that define a measure of capital and labor in order to assess the total productivity factor. Capital is assessed by the replacement value of machinery, vehicles, and equipment (question n7a) and labor is proxied by the total annual cost of labor (question n2a). Our aim is not to provide a casual analysis but rather to offer some advanced stylized facts between the capital-labor ratio and financial constraints.

Econometric results are displayed in Table 3.8, where we scrutinize the determinants of the capital-labor ratio. We first report the model without the measure of financial access and then include it. We consider the three measures of financial access presented above. First, it should be noted that we are only able to compute the ratio of capital to labor for less than half of the firms (due to lack of data). Nonetheless, results indicate that firms with access to credit have a higher level of capital per worker. Specifically, coefficients associated with financial access are always positive and statistically significant when we consider the fact that they have a loan (FIN2). Among control variables, we observe that firm size is not related to capital intensity, contrary to firm age or to be a subsidiary.

Table 3.8: Determinants of capital-labor ratio

	(1)	(2)	(3)	(4)	(5)	(6)
ln(Empl)	-0.199	-0.205	0.0528	-0.0373	-0.473*	-0.558**
	(-0.67)	(-0.69)	(0.21)	(-0.15)	(-1.75)	(-2.07)
ln(Age)	1.419***	1.421***	0.541	0.529	0.826*	0.812*
	(2.62)	(2.62)	(1.26)	(1.23)	(1.80)	(1.77)
Export	-0.152	-0.157	-0.480	-0.543	-0.326	-0.424
	(-0.21)	(-0.22)	(-0.84)	(-0.95)	(-0.47)	(-0.61)
Subsidiary	1.226	1.217	1.674***	1.643***	1.944**	1.903**
	(1.56)	(1.55)	(2.66)	(2.61)	(2.24)	(2.19)
Manag	-0.0255	-0.0256	-0.00268	-0.00203	-0.0165	-0.0165
	(-0.78)	(-0.79)	(-0.10)	(-0.08)	(-0.51)	(-0.51)
Foreign-owned	0.931	0.925	0.651	0.674	1.572*	1.600*
	(1.12)	(1.11)	(0.99)	(1.03)	(1.85)	(1.88)
State-owned	7.658	7.666	5.349	5.429	4.654	4.783
	(1.02)	(1.02)	(1.03)	(1.04)	(1.02)	(1.05)
Privately held	-0.0345	-0.0422	0.351	0.282	0.102	0.0578
	(-0.04)	(-0.05)	(0.53)	(0.43)	(0.14)	(0.08)
Sole proprietorship	-1.134	-1.133	-0.752	-0.705	-1.222*	-1.196
	(-1.41)	(-1.41)	(-1.14)	(-1.07)	(-1.66)	(-1.62)
FIN1		**0.168**				
		(0.33)				
FIN2				**0.988****		
				(2.09)		
FIN3						**0.994**
						(1.35)
Obs.	4913	4913	7285	7285	4870	4870
Adj R^2	0.051	0.051	0.066	0.066	0.069	0.069

The dependent variable is the ratio of capital to labor. FIN1, FIN2, and FIN3 take value one for unconstrained firms and 0 for constrained firms. Robust t-statistics are reported in parentheses. *, **, *** indicate significance at 10%, 5%, and 1%, respectively.

3.5. Conclusion

Using a database of over 22,000 firms from 45 African countries over the period 2006-2016, our results indicate a strong link between firm size and employment growth. The rejection of Gibrat's law in Africa implies that SMEs create more jobs than their larger counterparts do. These findings appear to be of particular interest and make an important contribution to the literature on firm growth. To date, most of the research has focused on developed economies, with a particular emphasis on the United States. One may legitimately question to what extent the American experience generalizes to other economies, especially less developed countries such as African countries. We provide evidence on this issue using Enterprise Surveys data covering a broad range of sub-Saharan African countries in various sectors including both the manufacturing and services sectors.

While the literature would explain this finding by either diminishing returns, the learning process or minimum efficient size, we show that these factors are irrelevant. We propose a new channel to shed light on our econometric results. We argue that SMEs use a different combination of production factors, regardless of the sector. SMEs tend to overuse labor because of a lack of access to capital. Indeed, small firms are more financially constrained and therefore cannot employ capital as they would like. As a result, SMEs have a lower capital-labor factor because they tend to underuse capital and overuse labor to grow hence their greater job growth momentum. Different econometric tests provide support to our hypothesis. Specifically, we prove that the negative relationship between firm size and growth is more than two times greater for financially constrained firms than for unconstrained firms. This finding is robust to several measures of financial access. We then document that the capital-labor ratio is smaller for small firms and for constrained firms, in line with our hypothesis.

These results have strong implications for African countries. Because small businesses are at the heart of job creation in Africa, fostering the emergence of small businesses must be a top priority in order to provide job opportunities to all Africans in the workforce

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Appendices to chapter 3

Table A3.1: Sample description

Country	Wave 1		Wave 2		Wave 3	
	year	# Obs.	year	# Obs.	year	# Obs.
Angola	2006	270	2010	186		
Benin	2009	107	2016	128		
Botswana	2006	243	2010	237		
Burkina-Faso	2009	304				
Burundi	2006	211	2014	139		
Cameroon	2009	323	2016	264		
Cape Verde	2009	100				
Central Afr. Rep.	2011	121				
Chad	2009	126				
Congo	2009	65				
Côte d'Ivoire	2009	284	2016	246		
Dem. Rep. Congo	2006	269	2010	288	2013	399
Eritrea	2009	134				
Ethiopia	2011	474	2015	706		
Gabon	2009	120				
Gambia	2006	124				
Ghana	2007	438	2013	609		
Guinea	2006	175	2016	97		
Guinea-Bissau	2006	125				
Kenya	2007	560	2013	539		
Lesotho	2009	104	2016	104		
Liberia	2009	140				
Madagascar	2009	384	2013	297		
Malawi	2009	119	2014	351		
Mali	2007	421	2010	247	2016	124
Mauritania	2006	198	2014	119		
Mauritius	2009	272				
Mozambique	2007	402				

(Continued on the next page)

Namibia	2006	232	2014	370
Niger	2009	102	2017	98
Nigeria	2007	1 637	2014	1 267
Rwanda	2006	151	2011	196
Senegal	2007	408	2014	453
Sierra Leone	2009	138		
South Africa	2007	781		
South Sudan	2014	379		
Sudan	2014	197		
Swaziland	2006	198	2016	92
Tanzania	2006	354	2013	463
Togo	2009	117	2016	130
Uganda	2006	485	2013	553
Zambia	2007	394	2013	608
Zimbabwe	2011	478	2016	437

Table A3.2: Variable definition

Variable	Definition
Gr(Empl)	Growth of the total number of permanent and full-time employees (annual average)
Gr(Sales)	Growth of the total sales, deflated using the GDP deflator (annual average)
Empl	Number of permanent full-time employees (average of the period)
Age	Age of the firm (in years)
Export	Dummy variable equal to 1 if 10% or more of sales are exported
Subsidiary	Dummy variable equal to 1 if the firm is part of larger firm
Manag Exp	Experience that the top manager has in this sector (in years)
Foreign-owned	Dummy variable equal to 1 if 50% or more of the firm is owned by a foreign organization
State-owned	Dummy variable equal to 1 if 50% or more of the firm is owned by the government
Privately-held	Dummy variable equal to 1 if the firm is a limited liability company
Sole proprietorship	Dummy variable equal to 1 if the firm is a sole proprietorship
FIN1	Dummy variable equal to 1 if a firm declared that access to financing is not an obstacle or a minor obstacle to its current operations
FIN2	Dummy variable equal to 1 if a firm has a loan or an overdraft
FIN3	Dummy variable equal to 1 if a firm that desired bank loan had access to credit and 0 if a firm that desired bank loan refused to apply for a loan or applied but was turned down.

Table A3.3: Firm access to credit, by firm size category

	FIN1	FIN2	FIN3
Small	41.91	26.08	12.16
Medium	49.85	49.46	28.43
Large	55.46	69.35	50.74
All	45.55	37.33	19.61

We report the percentage of firms having access to credit by category and indicator

Figure A3.1: Firm size distribution (excluding firms with over 100 employees)

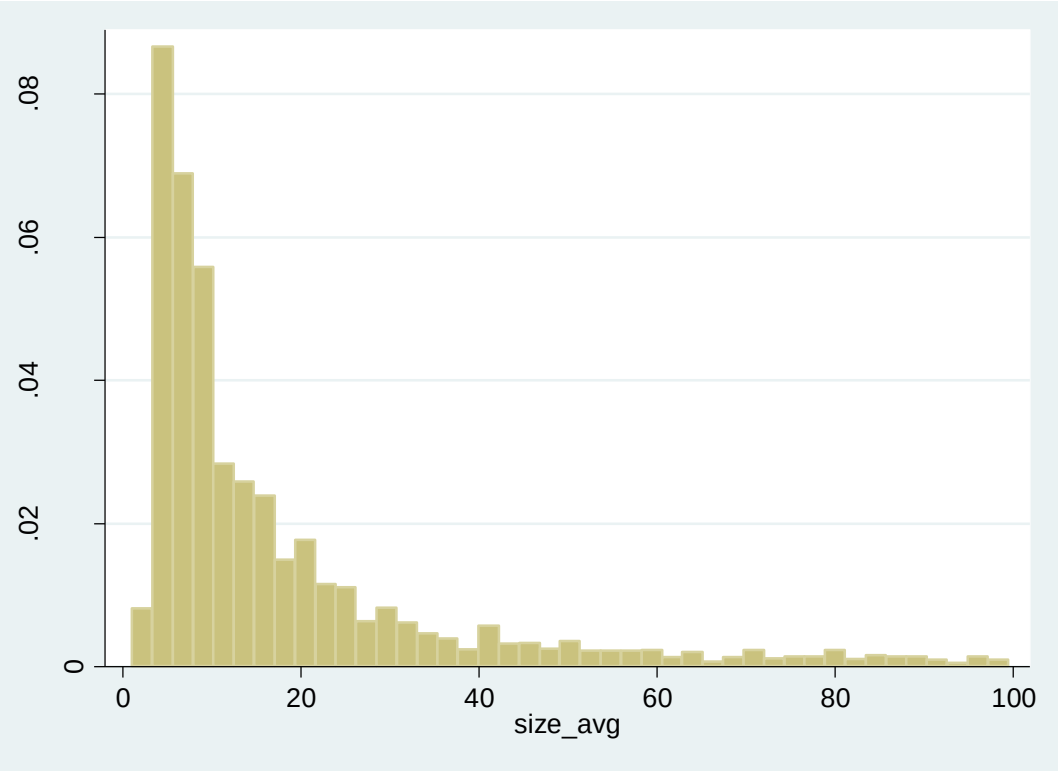
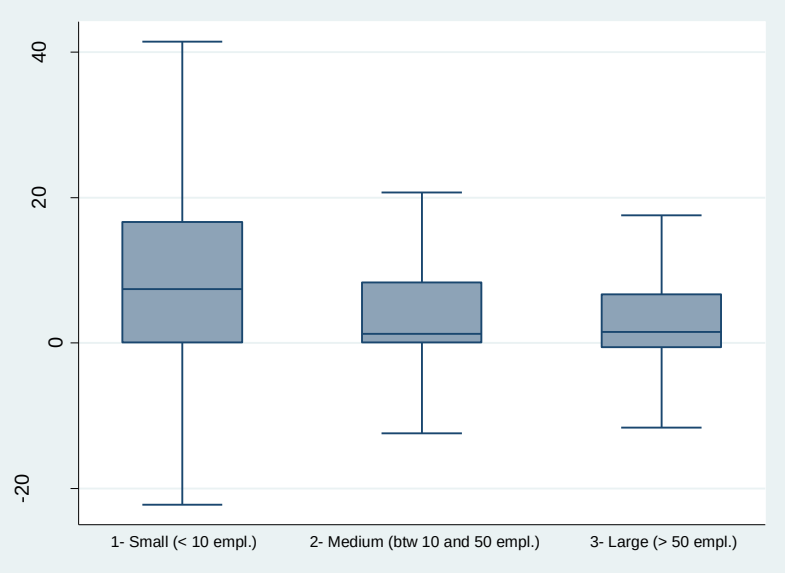
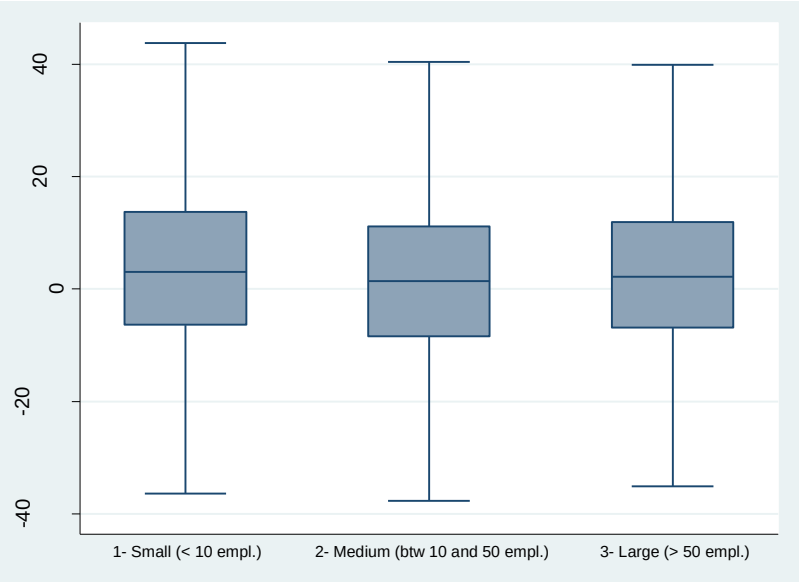


Figure A3.2: Relationship between firm size and firm growth

(a) Growth of employment



(b) Growth of sales



CHAPTER 4

The importance of information on enrollment in a health insurance system: An employee survey in Senegal

4.1. Introduction

Governments around the world have set the goal of achieving universal access to health insurance by 2030 (Sustainable Development Goal 3.8). Indeed, the importance of health in economic development is no longer in question. Health shocks cause not only direct losses (health expenditure costs) but also indirect losses (income losses due to a shorter labor supply and lower productivity). In the absence of government-provided health insurance, a significant part of health expenditure is borne by households. Each year, nearly 100 million people fall into poverty due to health problems. Financial constraints are often considered as significant barriers to accessing care in developing countries (Xu et al., 2003). With the support of international organizations and donors, many programs have been implemented to reduce these financial barriers and provide more universal access to care. Despite these efforts, insurance enrollment rates remain low in most developing countries, particularly among the most disadvantaged households (Acharya et al., 2013).

While studies have focused mainly on price elasticity (Cole et al., 2013; Cohen and Dupas, 2010; Kremer and Miguel, 2007), it seems clear that financial constraints are not the only reason for the low demand for health insurance since even free access does not lead to a 100% enrollment rate. Through an employee survey, the originality of our study is to show that Senegalese employees have a strong preference for short-term over long-term gain and a low aversion to loss, which is in contrast to the mechanism of health insurance. Employees may prefer to use current income to cover future health expenses. Individual characteristics, such as gender, age and education, do not have a significant influence on preferences for the present and loss aversion. On the other hand, our study shows the essential role information plays on perceptions of health insurance and on individuals' willingness to

join. While 12% of employees who received no information about health insurance would not want to be insured if they could choose, this proportion dropped to 2% among employees who received positive information about health insurance.

This is one of the few studies providing evidence on health insurance in a developing country. Thornton et al. (2010) studies in Nicaragua and King et al. (2009) in Mexico are among the only studies that have focused on health insurance in developing countries, but more on price elasticity and the impact of subsidies on take-up rates. To our knowledge, one of the only studies that comes close to ours is that of Asuming (2013). Through an experiment conducted in Ghana, he shows that an awareness and information campaign can significantly increase the rate of participation in a health insurance system. Our conclusions contribute to these results and confirm the importance of the role of information in the implementation of a health coverage system. To our knowledge, our study is the first to focus on the case of a French-speaking country in sub-Saharan Africa. The situation in Senegal is perfectly adapted to this question since only 14% of employees are covered by health insurance in Senegal (see Appendix 4.1 for more information on the Senegalese context).

Another contribution we make to the literature is to carry out the survey directly on the target population, namely employees. In the economic literature, surveys are often conducted on students. However, in a survey exploring risk aversion, Haigh and List (2002) have shown that loss aversion is higher among traders than students. Surveying the target population rather than students thus strengthens the interest of the results.

This paper is organized as follows. Section 2 presents a review of the existing literature. Section 3 describes the data and methodology used to administer the survey. Section 4 displays the results, showing the importance of the role of information and people's perceptions of a health insurance system. The final section concludes.

4.2. Literature review

The existing literature in developing countries has often focused on the impacts and benefits of health insurance. Finkelstein and Taubman (2012) show that health insurance increases the use of health centers, provides better health indicators and reduces the share of health expenditures borne by Ghanaian households. Asuming (2013) shows that health insurance reduces the number of days a person is sick by 42%. Health insurance also provides protection against what Flores (2008) calls "transient" poverty, that is to say, when households are forced to sacrifice part of their basic consumption in order to finance health care expenditures. Woode (2016) shows that health insurance significantly improves the children's attendance at school in Rwanda. During a major health shock,

children are generally used as a substitute to compensate for the reduced labor supply and lower productivity, serving as a safety net to compensate for loss of income. Health insurance will then allow the children to continue their education. This positive role of health insurance in education has been proven by several studies (Liu, 2016; Edmonds, 2006).

However, demand for health insurance products is particularly low in developing countries. An experiment by Banerjee, Duflo and Hornbeck (2014) showed that, when microfinance clients are required to take out health insurance in order to subscribe to a new loan, a large percentage of them prefer to forego the loan in order to avoid having to take out health insurance. Many researchers have tried to explain this lack of willingness to join a health insurance system, focusing mainly on price elasticity (Cole et al., 2013).

However, price does not appear to be the only barrier to enrollment in health insurance coverage. A study by Chemin (2017) shows that a significant subsidy can significantly increase insurance coverage. Nevertheless, a 100% subsidy will only have generated a 45% subscription rate! In other words, even when access to health insurance is free, 55% of individuals still refuse health insurance. The reasons given by participants were lack of trust and knowledge of these financial products. A similar study in India also shows that even free access to health insurance would not lead to a 100% enrollment rate due to a lack of trust (Cole et al., 2013). Berhane et al. (2015) reach the same conclusion when studying the case of Kenya. The low demand for health insurance therefore does not appear to be solely related to financial constraints, hence subsidy programs alone will not achieve universal access to health insurance.

The interest of our study is therefore to extend these reflections to better understand the role of individual preferences, such as risk aversion and preference for the present, in the choice to enroll (or not) in a health insurance program. In this paper, we show that Senegalese employees have a very strong preference for the present and a low aversion to loss, which could encourage them not to take out insurance. While many studies have shown that the choice to take out health insurance is influenced by socio-demographic characteristics, such as age, gender or income (Nandakumar et al., 2000; Deb et al., 2006), we show that these factors do not significantly change our results. In other words, individual characteristics do not affect the choice to take out (or not) health insurance. In this context, one may wonder how to increase enrollment rates. To go further, we demonstrate the importance of information in the choice of whether or not to become insured. Reminding people of the protective role of health insurance and its benefits significantly increases the willingness to participate in a health insurance system.

4.3. Data and Methodology

4.3.1. Data

The survey we administered in Senegal was embedded in a study carried out between August and September 2018. It was designed to assess individual preferences regarding health insurance in order to better understand why some people prefer to be insured while others do not. To explore this subject further, we had subjects take part in a survey that consisted of two parts: (i) background questions, including socio-economic characteristics such as age, education and job occupation; and (ii) three surveys to test their time preferences, risk aversion and the role information plays in the decision of whether or not to become insured.

The order in which the surveys were conducted was deliberate. We began with the survey on time preferences, then the one on risk aversion and finally the survey on the role of information. Following Holt et Laury's (2005) method, the idea was to start with the most abstract survey, which did not directly refer to the insurance system so that participants could answer without having any preconceptions and without any positive or negative connotations related to the term "insurance". The information survey by definition consists of providing information on health insurance, so it was placed at the end.

We surveyed 204 employees in Senegal within 6 partner companies of *Investisseurs & Partenaires* (I&P), a family of impact funds fully dedicated to the African continent. I&P is a pioneer in the impact investing sector in Africa and strives to maximize the economic, social and environmental impacts of its partners and to actively contribute to African development. The partnership with I&P provided access to their partner companies and allowed us to directly survey their employees. In a country where private employment is not well developed, it was quite a rare opportunity to have access to employees in order to better understand how they view employment-related health insurance.

Senegal was chosen because of the diversity of I&P's partner companies there, which allowed us to have a diversified sample. Employees came from several sectors such as agribusiness, health, energy and services, were at different hierarchical levels and had different types of contracts. This gave us a diverse sample that included employees with an employment contract and those without, as well as workers in intermediate situations of semi-informality (or semi-formality), such as workers with service contracts, for example.

4.3.2. Time preferences

The first survey focused on time preferences. Since an insurance system aims to provide security against possible future risk, the more a person values the present, the less they may want insurance. People

could prefer to benefit from their immediate income rather than contributing to cover themselves against possible future expenses. Thus, we gave participants a choice between two theoretical options:

> *Option A) receive CFAF 5,000 today;*
>
> *Option B) receive CFAF 20,000 in a number of months.*
>
> *The question was repeated several times with different durations: one month, three months, six months and a year.*

In any case, it was made clear that the gains would be certain, whether they chose option A or B. The employees surveyed had to choose between a lesser immediate gain and a larger future gain. The money proposed was hypothetical: regardless of the person's choice, they did not receive any money. Some authors feel it is necessary to remunerate subjects in order to ensure that they project themselves into a hypothetical situation and answer what they would really have done in the face of such a choice. However, remuneration introduces another factor into the survey, namely the perceived credibility of the researcher. The very nature of the first survey involves finding out whether participants preferred to wait for a payment if they chose option B. It would no longer be clear whether option B was chosen because of a participant's preference for delayed gratification or simply because of mistrust of the investigator. We therefore chose to avoid using remuneration. In an attempt to help make the hypothetical question seem as realistic as possible to participants, real banknotes were shown to the employees during the interviews. They could therefore visualize the immediate gain of CFAF 5,000 on the one hand and on the other hand the future gain of CFAF 20,000.

4.3.3. Risk aversion

The second survey was designed to test participants' risk aversion. Several studies have addressed risk aversion issues. However, these studies have generally focused on gains in investment choices which is a different context than that of health insurance since the choice to become insured does not correspond to a gain situation but rather a loss situation. Participants were given a choice between one of the following two scenarios: the individual decides to take out insurance and loses a certain amount of money in contributions (Lottery A) or the individual does not wish to be covered. If he is does not get sick, he has lost nothing since he has not paid any contributions or health expenses; however, if he does get sick, he will have to pay for his health expenses alone (Lottery B). It is clear that risk aversion is not the same when it comes to gains or losses, hence the interest in testing loss aversion to determine whether it is an important element in the decision to take out insurance or not.

> *"Imagine having a choice between these two options. Which option would you choose?*
>
> *Lottery A: certain loss of CFAF 5,000*
>
> *Lottery B: one chance in two to lose either CFAF 0 or CFAF 20,000"*

Lottery amounts have been determined to reflect this choice as accurately as possible, without individuals being able to directly know that they have to choose between taking out insurance or not. In the case of Lottery A, the certain loss corresponds to the average amount of social contributions for a person earning around the minimum wage (CFAF 5,000). In the case of Lottery B, if he does not become ill, the individual has no loss (CFAF 0). On the other hand, if he does become ill, the loss corresponds to the average health expenditure observed in Africa (CFAF 20,000). As with time preference, the scenarios in the questions were fictitious and no money was really at stake, especially since these were losses.

The main challenge of this type of experiment is to ensure that the survey is well understood by the participants. To this end, the protocol was enhanced by two important elements. Firstly, a poster was created to visualize the choices and the amounts (see Appendix 4.3). We considered that it could be difficult to remember the choice and amounts if they were only mentioned orally. Understanding probabilities, in our case a 50:50 chance, is also often difficult for people with little education. An image of both sides of a coin was therefore added to the poster to illustrate the concept of one chance in two. Secondly, a test was set up to ensure that the survey was well understood (see Appendix 4.2). Individuals who did not understand the instructions or the concept of probabilities could be encouraged to choose Lottery A, which is easier to understand. We therefore asked participants to first choose between a guaranteed winning of CFAF 5,000 (Lottery A) or one chance in two to win either CFAF 5,000 or CFAF 20,000 (Lottery B). Since Lottery B winnings are always higher than Lottery A winnings, all participants should answer Lottery B. In practice, some participants chose Lottery A because they did not understand the concept of probability. We would then repeat the explanations until the choice was understood and the right answer was given. The implementation of a test to ensure that the choice was understood was therefore essential to increasing the reliability.

4.3.4. Information

The third survey seeks to assess the role information plays in the decision of whether or not to become insured. The choice of whether or not to be insured may depend on one's understanding and perceptions of the health insurance system. During our interviews, it became quite clear that the insurance system was not always understood by all participants. The idea of making a monthly contribution to be covered against certain risks was not always understood, especially since many drugs are not reimbursed in practice and several health care centers are not included in the scope of the insurance. Thus, people in Africa do not always see the benefits of the insurance coverage they have access to. Whether or not they want to be insured may therefore change depending on the information and perceptions they have about health insurance. The surveys we adapted were initially developed to

determine the propensity of people to pay for certain food items and the role information played on this level of propensity (Noussair, 2014). On the other hand, these surveys have rarely been adapted for health insurance. The researchers assume that health insurance is always perceived as a positive social benefit that everyone would want to benefit from. We will see in the rest of this study that this is not always the case and that a significant percentage of employees would prefer not to be insured.

A survey to test the role of information consists in our case of disclosing to a random group certain information related to health insurance. In other words, a text was read to some employees and not to others. We then asked the employee if he had a choice, would he prefer to contribute to health insurance or not be insured. The objective was to compare the responses between a treated group (employees who received positive information about health insurance) and a control group (who received no information about health insurance). The choice of who has the text read was decided randomly over a series of ten interviews. A function in Excel gave five numbers randomly drawn to designate the five employees who would have the text read to them. This same approach was then extended as necessary depending on the number of people surveyed.

	Text read
Employee #1	No
Employee #2	No
Employee #3	No
Employee #4	Yes
Employee #5	Yes
Employee #6	No
Employee #7	Yes
Employee #8	No
Employee #9	Yes
Employee #10	Yes

The main question when building a survey on the role of information is to determine what type of information to give to participants. We included statistical information as well as information with moral considerations referring to the importance of contributing to a health insurance system. The information provided was intended to provide a positive and useful vision of health insurance to determine whether awareness and communication campaigns can increase the uptake of health insurance. In order to ensure that the information provided was well understood, the text was read in French or Wolof according to the respondent's linguistic preferences (see Appendix 4.4 for the Wolof version). The question asked was whether or not people would prefer to contribute to health insurance if they had a choice. They were therefore asked to put themselves in a hypothetical situation where contributions were not necessarily linked to the employment contract but could be refused.

"Health care costs can be very high, especially during hospitalization. One in three individuals must borrow or sell items to finance their health expenses. Each year, this leads 100 million people to fall into extreme poverty. However, many studies have shown that health insurance can provide coverage against these risks and limit high emergency expenses. Health insurance thus represents an effective solution to fight poverty and improve health."

Question asked: "If you had a choice between contributing to health insurance or not having insurance, what would you choose?"

4.4. Results

4.4.1. Time preferences

We found that time preferences play an important role in the decision to become insured. Choosing to become insured entails an immediate expense in order to benefit from health coverage that will reduce health expenses in the future. When an individual has a strong preference for the present, he may prefers not to become insured in order to fully enjoy their immediate income. Health expenses covered by health insurance may ultimately be higher but they occur in the future. When employees had to choose between a smaller but immediate gain or a larger future gain, they overwhelmingly preferred the immediate gain since three-quarters of respondents chose Lottery A.

This preference for the present may vary according to individual characteristics. We looked at time preferences according to a number of individual characteristics, such as gender, age and education (Table 4.1). None of these factors appears to influence individuals' time preferences. More surprisingly, while the existing literature tends to show that the poorest people prefer immediate gratification over delayed gratification than wealthier ones (Barr and Packard, 2000), we show that income level has little influence since employees with higher incomes had an equally strong preference for a present gain. Correlation coefficients are not significant and confirm these descriptive statistics (Table 4.2, column 1). Econometric results are also coherent since a simple OLS regression also shows that there is no significant impact of these different individual characteristics on the preference for the present (Table 4.3, column 1). Results are robust to different time durations since all these results are similar whatever the time duration (one month, three months, six months or a year). In other words, Senegalese employees have a very significant preference for the present, regardless of individual characteristics and the specific situation of each individual. It would then not be surprising if some individuals chose not to become insured against future risks and preferred to keep their salary rather than pay social contributions. However, time preferences are not the only parameter that can influence the choice of whether or not to become insured. Risk aversion also plays an essential role in the decision to hedge against risks.

Table 4.1: Descriptive statistics, Choice of time preferences, 6 months, by individual characteristics

		Option A (Present)	Option B (Future)
Gender	Men	78%	22%
	Women	74%	26%
Age	Young (under 25)	77%	23%
	Over 25 years old	75%	25%
Family with child	No child	72%	28%
	Have a child	77%	23%
Education	Primary school or no education	78%	22%
	Middle school or high school	77%	23%
Unemployment	Already experienced unemployment	76%	24%
	Never experienced unemployment	75%	25%
Employment contract	Formal	75%	25%
	Informal	75%	25%
Income	Under median income	80%	20%
	Above median income	73%	27%
	FULL SAMPLE	*75%*	*25%*

Table 4.2: Coefficient correlation between the result of a survey and individual characteristics

	(1) **Time preferences** *y = present*	**(2)** **Risk aversion** *y = lottery A*	**(3)** **Information** *y = to be insured*
Gender	-0.036	-0.009	0.062
Age	-0.042	-0.044	0.024
Children	0.029	0.062	-0.087
Education	-0.019	-0.042	0.069
Unemployment	0.018	-0.154**	-0.110
Informal	-0.008	-0.125*	-0.113
Wage	-0.084	0.077	-0.039
Information			0.180***

Notes: The result of the survey is to prefer the present (1), to choose Lottery A, corresponding to the choice to become insured (2) and to choose to become insured (3). *, **, *** indicate significance at 10%, 5%, and 1%, respectively.

Table 4.3: OLS estimation between the result of a survey and individual characteristics

	(1) **Time preferences** *y = present*	(2) **Risk aversion** *y = Lottery A*	(3) **Information** *y = to be insured*
Gender	-0.330 (-0.44)	0.020 (0.25)	-0.017 (-0.39)
Age	-0.000 (-0.02)	0.000 (0.05)	0.003 (1.48)
Children	0.051 (0.60)	0.084 (0.89)	-0.038 (-0.74)
Education	-0.171 (-0.22)	-0.131 (-1.50)	0.051 (1.08)
Unemployment	0.025 (0.37)	-0.181** (-2.38)	-0.071* (-1.74)
Informal	-0.022 (-0.22)	-0.192* (-1.69)	0.075 (1.22)
Wage	-0.062 (-0.92)	0.118 (1.57)	0.000 (0.01)
Information			0.093*** (2.44)
Obs.	204	204	204
R^2	0.02	0.09	0.08

Notes: The dependent variable is to prefer the present (1), to choose Lottery A, corresponding to the choice to become insured (2) and to choose to become insured (3). T-statistics are reported in parentheses. *, **, *** indicate significance at 10%, 5%, and 1%, respectively.

4.4.2. Risk aversion

To test risk aversion, employees had to choose between Lottery A (reflecting the choice to become insured) or Lottery B (reflecting the refusal to become insured). Across the entire sample, nearly 54% of employees preferred Lottery B. In other words, a majority of individuals have low risk aversion to loss. These results can be interpreted as the fact that they would prefer to take the risk of not being covered and having to pay health expenses if they fall ill (larger but uncertain losses), rather than pay monthly contributions (certain losses). As seen in the previous survey, employees have a significant preference for the present. It is therefore not surprising that they prefer to postpone spending in a more or less near future, even if it means that these expenses can represent larger amounts. Paying a monthly health insurance premium, while the potential benefits are uncertain and in the future, is therefore not preferred by many employees surveyed.

However, it is questionable whether this low loss aversion varies according to the characteristics of individuals. The existing literature usually shows that individual characteristics significantly influence risk aversion. Hartog et al. (2002) show that women are more risk adverse than men and Harbaugh et al. (2002) show that younger people prefer less risky lotteries than older people. If we simply look at the descriptive statistics (Table 4.4), we have not found any differences between men and women, nor any different behaviors according to age. While one would expect differences according to income level, the results are ultimately quite similar, just as the level of education has only a marginal influence on outcomes. On the other hand, other characteristics seem to lead to more marked differences. Having a family seems to change employee preferences: people without children are even less prone to loss and even more likely to choose Lottery B corresponding to the preference to not becoming insured. When an individual has a child, he or she will then favor less risky options. Informal employees are much less averse to loss and more strongly prefer Lottery B (not to get insurance). The precariousness of their status probably leads them to becoming used to these uncertainties and to accepting the risks that this entails. This view is also true for people who have already experienced unemployment since they are less risk averse and prefer the riskier Lottery B, while people who have never experienced unemployment will prefer Lottery A, which appears more secure.

Beyond these descriptive statistics, it is important to consider whether these factors have a significant influence on risk aversion choices in a more rigorous way. Correlation coefficients display similar results (Table 4.2, column 2). An OLS regression is then used to verify the influence of these factors in an econometric way (Table 4.3, column 3). As might be expected from the small differences in descriptive statistics, most individual characteristics (gender, age, income) do not have a significant impact on a participant lottery choice. Only having already been unemployed or working informally seems to have a significant impact on lottery choices.

Whether in terms of time preferences or risk aversion, individual characteristics play a small role in behavior. When individuals are confronted with experiences that simulate the decision to take out insurance, a majority prefers the option of not becoming insured, regardless of the of the individual's characteristics. The choice to become insured and join a social security system therefore does not seem to be based mainly on individual preferences, but rather will be linked to the information available to individuals and their perception of health insurance, as shown by the latest experiment.

Table 4.4: Descriptive statistics, Lottery responses on risk aversion, by individual characteristics

		Lottery A (be insured)	Lottery B (uninsured)
Gender	Men	46%	54%
	Women	45%	55%
Age	Young (under 25)	45%	55%
	Over 25 years old	46%	54%
Family with child	No child	39%	61%
	Has a child	47%	53%
Education	Primary school or no education	49%	51%
	Middle school or high school	39%	61%
Unemployment	Already experienced unemployment	41%	59%
	Never experienced unemployment	57%	43%
Employment contract	Formal	49%	51%
	Informal	27%	73%
Income	Under median income	43%	57%
	Above median income	50%	50%
	FULL SAMPLE	***46%***	***54%***

4.4.3. Information

The last survey was designed to test the role of information: are employees more likely to get insured when they have positive information about health insurance? Since individual characteristics seem to play a minor role in the various preferences and the choice to take out insurance, it is necessary to check whether or not the choice to get insured is a result of individuals' perceptions of health insurance. These perceptions may vary depending on the information to which individuals have access. In our case, we read a text explaining the benefits and interests of health insurance to half of the Senegalese employees surveyed in order to compare their answers with the other half who had not received any specific information. While 12% of employees who received no information about health insurance would not want to be insured if they could choose, this percentage dropped to 2% among employees who received positive information about health insurance (Table 4.5). It therefore appears that access to information can change people's perception of health insurance and their willingness to pay for it.

These results are confirmed both through correlation coefficients (Table 4.2, column 3) and through an OLS estimation (Table 4.3, column 3). When controlling for other factors, such as gender, age or education level, econometric results confirm the importance of access to information. Indeed, individual characteristics do not have a significant impact on the choice of whether or not to become insured. On the other hand, hearing the text and obtaining positive information about health insurance had a significantly positive impact on the willingness to get health insurance.

Table 4.5: Descriptive statistics, survey on the role of information

	Text read	Text unread
Be insured	98%	88%
Uninsured	2%	12%
	100%	100%

4.5. Conclusions

Thanks to an original database of more than 200 Senegalese employees, our study shows that Senegalese employees have a very strong preference for the present. This may lead them to prefer immediate income over making contributions to cover future health expenses. Employees also have low loss aversion, which means they are willing to take the risk of not being covered and having to bear the full cost of health care in the event of illness. This preference for the present and low risk aversion does not depend on individual characteristics since gender, age and education do not have a significant influence on the outcome of our surveys. One may wonder what might motivate employees to take out health insurance. Our study shows that information plays a key role in the willingness to join a health insurance system. While 12% of employees who received no information about health insurance would not want to be insured if they could choose, this figure dropped to 2% among employees who received positive information about health insurance.

Our study makes an important contribution to the existing literature, which has focused mainly on price elasticity issues. While the majority of studies have shown that large subsidies significantly increase the rate of health insurance subscriptions, these studies do not explain why, in the case of 100% subsidies, some refuse to subscribe to free health insurance. Price is therefore not the only factor influencing the decision to become insured. Our study recalls the important role of information and perception in the willingness to join a health insurance system.

Our study has important implications for public authorities in Africa. The willingness of governments to provide universal access to health insurance as stipulated in the Sustainable Development Goals cannot be achieved simply by setting up subsidy programs. Raising awareness and running information campaigns on the role and benefits of health insurance are essential to changing people's perceptions and understanding of the benefits of health insurance in order to increase their willingness to participate.

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Appendices to chapter 4

Appendix 4.1: Health insurance system in Senegal

The *Caisse de sécurité sociale du Sénégal* (CSS) provides family benefits (prenatal, maternity family and maternity leave allowances, etc.), health benefits in the event of accidents at work and occupational diseases, and provident benefits (compensation in the event of work stoppage, death benefits).

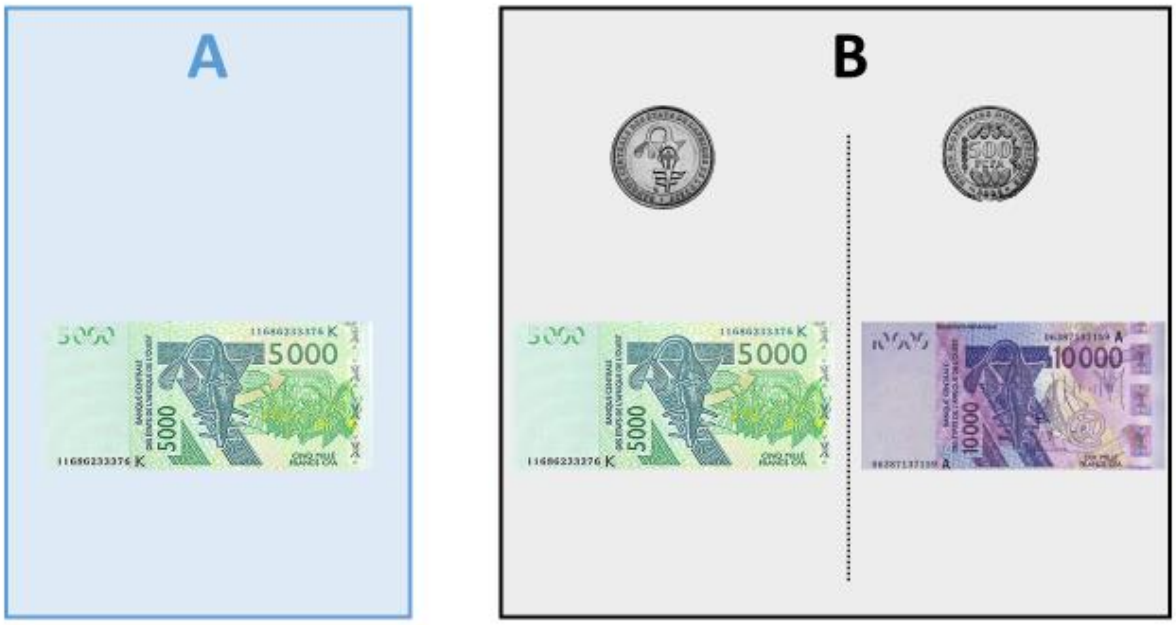
The CSS does not cover health care outside of work. Health insurance in Senegal is managed by other organizations, segmented according to each category of the population:

- Employees of private companies are covered by a company health insurance scheme (*instituts de prévoyance maladie* - IPM), of which employers must be members. The creation of an IPM is mandatory for any company with at least 100 employees. If this number is not reached, the obligation is to join an existing IPM or an inter-company IPM. Once created, the IPM provides partial coverage for the costs incurred by the non-occupational illness of the worker and members of his family. The financing of the IPM is essentially ensured by a monthly employer and employee contribution of 6% applied to a base of CFAF 60,000 maximum.
- Civil servants and their spouses/children: four-fifths of the medical costs are borne by the State. The remaining 20% is at the employee's expense.
- Persons over 60 years of age and children under five years of age are cared for free of charge by a public medical assistance scheme.
- Self-employed workers, as well as other categories of the population (informal sector), are insured through mutual health insurance.

Until recently, membership of a mutual health insurance company was voluntary. Since persons affiliated by a mutual company and the state are in the minority, a large majority of the population was not covered at all. In 2013, Senegal implemented the reform of compulsory health insurance (AMO), introducing universal health coverage, with the objective of covering 75% of the population. This measure mainly targets people in rural areas and the informal sector.

However, despite the stated intentions and the obligation for companies to subscribe to an IPM, only 14% of private employees are covered by health insurance (ANSD, 2015). Indeed, the extent of informality in Senegal, where nearly 98% of the economic units surveyed are considered informal, makes it very difficult to apply the law and to control whether employees are well covered.

Appendix 4.2: Risk aversion - test



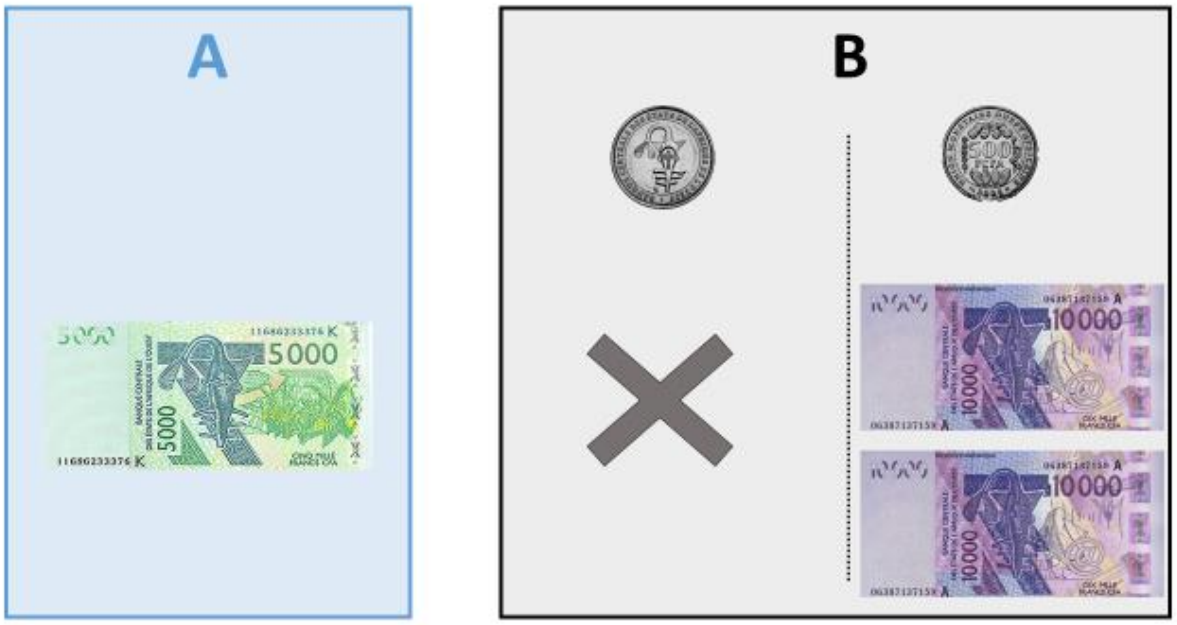
"Imagine having a choice between these two options. Which option would you choose?

Lottery A: certain gain of CFAF 5,000

Lottery B: one chance in two to gain either CFAF 5,000 or CFAF 20,000"

The test was used to ensure that the choice was well understood. Lottery B necessarily brings a win at least equal or even higher and should therefore necessarily be chosen. Unless the employee does not understand the principle of probability and gambling, he will then favor the Lottery A which he understands. In this case, we will repeat the explanations until the choice is understood.

Appendix 4.3: Risk aversion - loss aversion



"Imagine having a choice between these two options. Which option would you choose?

Lottery A: certain loss of CFAF 5,000

Lottery B: one chance in two to lose either CFAF 0 or CFAF 20,000"

Appendix 4.4: Information, text read in Wolof

"Setlou négn ni xaliss bouy dougou si waloum wérgoum yaram beuri na rawatina si hospitalisation. Sunu dieulé niéti niite, kéne ki dafay diay loumou yorr wala mou lép guir meuneu fadiou. Ateu mou nékeu lou tol ni témeri millions si ayy niite dégni démeu ba doleu. Def négn ay diangate youy wané ni assurance santé meneu nala arr ci lolou bolé si meneu na wagni liguay dépensé si wérgoum yaram. Assurance santé guénél leu si wagni doleu ak yokou té wergoum yaram".

CHAPTER 5

The impact of the formal employment contract on credit access in Africa

5.1. Introduction

In the context of the Sustainable Development Goals and the fight against poverty, access to credit is often cited as an effective tool for development (SDG 1.4; World Savings Bank Institute, 2010). The underlying rationale of this is that providing credit, to those in poverty would help them rise above poverty and mitigate shocks, invest, acquire productive assets, increase their skills, open a business, etc.

Given these significant financial and non-financial potential impacts, a better understanding of the determinants that influence access to credit is a necessary prerequisite to facilitating poverty alleviation for the greatest number of people. Our study explores the role job formalization plays in access to credit. Through a survey of more than 200 Senegalese employees of 6 companies, we show that having a formal employment contract increases the probability of obtaining bank loan by 23%. In addition, we seek to understand how the employment contract promotes access to credit. We find that the relationship is largely explained by the banking relationships induced by formalization. Indeed, twice as many formal employees (82%) have a bank account as do informal employees (43%), mainly because of the more frequent use by formal employers of bank transfers to pay wages. The possession of a bank account influences both the supply of and demand for loan since it allows employees to familiarize themselves with the financial services offered by banks on the one hand and, on the other hand, provides banks with a banking relationship and history that reduces information asymmetry and facilitates the extension of credit.

The contributions of our study are numerous. The existing literature has focused mainly on developed countries, as shown by studies by Crook (2001) in the United States, Magri et al. (2011) in Italy and Worthingon (2005) in Australia. However, the barriers to credit access in Africa, disproportionately high compared to other continents, deserve special attention. While some studies have focused on access

to credit in Africa, they have mainly focused on the analysis of credit rationing at the firm level (Bigsten et al., 2003; Fafchamps, 2000) due to the difficulty of accessing household data. Some authors have tried to focus on households but have only looked at small farmers in rural areas (Akpan, 2013; Akudugu, 2012). Our paper contributes to the existing literature by studying both the case of an African country, namely Senegal, as well as an original target population, namely employees of small businesses. This novel sample is made possible by the creation of a new database built from surveys of more than 200 employees of small businesses.

Our study provides an in-depth look at one determinant of access to credit that has been neglected in the literature, namely the role of formalization and the employment contract. Some existing studies have focused on small-scale agricultural producers who are self-employed. The determinants of access to credit mentioned in the literature focus primarily on gender, education level, salary or household composition. Existing household surveys are primarily made up of informal employees which reflect the structure of African economies that are still overwhelmingly informal It is therefore very difficult to study employees and develop an argument on the impacts of having a formal employment contract.

This paper is organized as follows. Section 2 presents a review of the existing literature. Section 3 describes the data and methodology. Section 4 displays the results, showing the importance the role of formalization and the employment contract play in credit access. Section 5 presents robustness checks. The final section concludes.

5.2. Literature review

The economic literature has largely shown the positive impacts of credit on many aspects of people's lives, as summarized by Van Rooyen et al. (2012) in their review of the existing literature on the impacts of credit in Sub-Saharan Africa. To begin with, bank credit significantly improves individual incomes (Barnes et al., 2001; Gubert and Roubaud, 2005). Credit can be used to invest and acquire productive assets that promote income growth. However, credit has impacts beyond the financial. It can also make it easier to adapt to different types of shocks (such as disease, famine, unemployment, etc.) and improve socio-economic conditions. Access to financing can also have a positive impact on non-financial outcomes such as individual health (Lacalle Calderon et al., 2008; Brannen, 2010), household nutrition (Barnes et al., 2001; Brannen, 2010), children's education (Adjei et al., 2009) and housing comfort (Lacalle Calderon et al., 2008). As Seefeldt (2015) summarizes, access to credit can "increase consumption beyond what one's income can support, it can smooth consumption during periods when income falls, and it can represent an investment in the future". The economic emancipation made possible by credit is nevertheless put into perspective by some studies that point out that the poorest individuals are often not reached (Zaman, 2001).

While it is relatively widely accepted that financial services have a positive impact on poverty reduction and economic development, widespread access has not been achieved. Many individuals face financing constraints and are unable to access credit. This is why a body of literature has developed on the determinants of credit access to attempt to better understand the factors that influence the availability of credit. This literature has examined many household characteristics, such as education level, which would have a significantly positive impact on access to credit (Okurut, 2006; Vaessen, 2001; Kedir, 2003) as well as marital status since a couple often has a second source of income (Baffoe and Matsuda, 2015). However, other determinants, such as gender, have not always been found to improve credit access. Some studies have shown that women have less access to credit than men (Lawal and Muyiwa, 2009; Foltz et al., 2000) while other studies have not found significant impacts (D'Espallier and Guérin, 2009). The same is true for the determinant of age, which according to some studies has a positive impact on credit access (Jia et al., 2010; Barslund et al., 2008) but in others has been found to be not significant (Baiyegunhi et al., 2010; Chaudhuri et al., 2011).

Few studies have looked at employment as a significant determinant of access to credit. As studies are based primarily on rural farm households, data on the impact of employment and particularly formal employment, are rarely available. The study closest to our work is that of Biyase and Fisher (2017), who focus on the determinants of access to credit for poor households in South Africa. They show that employment has a significantly positive impact on credit access. However, they do not distinguish the type of employment nor do they specifically focus on the impact of formalization and the employment contract. Our work thus allows us to deepen these explorations.

5.3. Data and Methodology

5.3.1. Data

The survey we administered in Senegal was embedded in a study carried out between August and September 2018. It was designed to assess the impacts of employment contracts in an attempt to better understand the benefits of formalization and why some people might prefer to work in the formal sector while others may not. To explore this question, our survey consisted of two parts: (i) background questions on socio-economic characteristics such as age, education, marital status and; and (ii) questions regarding formalization, such as employment contract status and the perceived benefits of this contract, including a module that focused on credit access.

We surveyed 204 employees in Senegal, within 6 partner companies of *Investisseurs & Partenaires* (I&P), a family of impact investment funds that operates exclusively in Africa. As an impact investor, I&P strives to maximize the economic, social and environmental impacts of its partners and to actively contribute

to sustainable African development. Our partnership with I&P provided access to its investee companies and allowed us to directly survey their employees. In a country where informality is standard, it is quite rare to have access to employees of companies and to get a glimpse of how they view formal jobs.

Senegal was chosen because of the diversity of I&P's partner companies there. Employees worked in several industries, including the agribusiness, health, energy and services sectors, and worked at different hierarchical levels and different types of contracts. This made it possible to obtain a diverse sample covering the many possible situations of employees with and without an employment contract, as well as those considered semi-formal workers with service contracts. In our database, 80% of the employees surveyed had an employment contract (permanent or temporary) and can be classified as formal workers. The other 20% did not have an employment contract or had a service contract (although in reality a full-time employee of the company). We consider them as informal workers.

For I&P companies, the formalization of employees is an important topic during the investment. All companies are required to achieve full formalization by the end of the investment. This process obviously takes time, several months or even years, hence the fact that there are still formal and informal employees among those we surveyed. Employees generally request formal employment contracts and the choice of who is offered one is most often left to the company. In order to be able to support the increase in social security contributions, companies will often choose to gradually formalize their teams, starting with employees in certain categories. It is not necessarily the executives who are formalized first, but rather key staff who can ensure the smooth running of the production process and who require a significant time investment by the company and where the cost of turnover would be the highest.

To make the transition to formalization, many companies begin by providing intermediate forms of contracts, i.e., service contracts, through the use of third-party service providers. Companies use external service providers to comply with current legislation and to move away from complete informality. These service contracts benefit from a social contribution rate that is twice as low as a traditional employment contract. However, individuals are not directly employed by the company and do not have benefits such as paid leave or health insurance. They are considered as external service providers and are subject to significant precariousness, hence our choice to consider them as informal workers as they do not benefit from any of the advantages of a formal employment contract.

5.3.2. Credit constrained

To study the impact of formalization on access to credit, it was necessary to define what we meant by credit access. How to define a household as "credit constrained" has been the subject of much discussion in the economic literature. We retain the two main measures most commonly used.

First, based on the work of Jappelli (1990), a household is considered financially constrained if it does not have a bank loan. Our first credit variable is an objective measure of access to credit that is equal to 1 when the employee has a bank loan and 0 otherwise. This is the most directly observable variable for approximating access to credit.

Second, as developed in the survey by Feder et al. (1989), we asked participants who did not have a loan the reason(s) for not having borrowed. Indeed, the absence of a loan does not necessarily mean that one is credit constrained but as it may be simply be due to a lack of need. Thus, we consider employees who responded that they did not have a loan because of a lack of need not to be credit constrained. On the other hand, employees who had not borrowed because they anticipated a refusal or lacked guarantees or collateral are considered to be credit constrained. In other words, if the absence of credit is due to an inability to obtain credit, we classify them as credit constrained. This second measure is more subjective since it is not directly observable and depends on a respondent's perception. It is possible that some respondents may not necessarily be aware of the constraints imposed on them and may feel that they have chosen their credit situation. Conversely, the fact that a person does not need credit does not necessarily imply that she would have obtained it if she had applied for it. Hence, we choose to test the results on these two measures to strengthen the robustness and reliability of our results.

5.3.3. Methodology

Since our dependent variable takes two possible values (0 or 1), we use a probit model. It is estimated via the maximum likelihood estimator that makes it possible to estimate the probability of observing a sample knowing the model parameters that generated these data. It is a matter of giving a value to the parameters of the model that maximizes the probability of finding our sample. The reading of the results is then different because the estimated coefficient does not directly correspond to the marginal effect and the direct interpretation of the coefficients makes no sense. In the case of binary model, it is then necessary to calculate the marginal effects from the estimated coefficients.

$$Credit_i = \alpha + \beta_1 Gender_i + \beta_2 Age_i + \beta_3 Children_i + \beta_4 Wage_i + \beta_5 Education_i + \beta_6 Married_i + \beta_7 Householdsize_i + \beta_8 Employmentcontract_i + \beta_9 Banking_i + \varepsilon_i$$

where the credit variable can be defined in two ways, as discussed above. The control variables represent the following characteristics, respectively: being a woman, age, having a child, wage level, education level, being married, household size, having a formal employment contract and finally having a bank account (more details on the definition of the variables are given in Annex 5.1).

Our interest coefficient is β_8. A significantly positive marginal coefficient would indicate that the employment contract increases the probability of accessing credit.

5.4. Results

5.4.1. Descriptive statistics

An initial statistical analysis compares the different socio-economic characteristics of borrowers and non-borrowers (Table 5.1). The education level is quite similar in the two categories and does not appear to have a decisive influence on access to credit. Women are less numerous among borrowers (19% vs 35%), which could suggest that they are discriminated against in access to credit. The average salary of borrowers is also higher than that of non-borrowers. Finally, many more borrowers are married than single.

Borrowers are also more likely to have a formal employment contract. This seems to confirm our initial intuition that formalization makes it easier to access credit. To further explore the link between these determinants and access to credit, we check whether or not our findings are consistent with the econometric results.

Table 5.1: Employee characteristics

	Mean	Borrowers	Non-Borrowers	t-test
Gender (% female)	28%	19%	35%	2.58**
Age (years)	34	36	32	-3.17***
Children (% with a child)	82%	90%	77%	-2.52***
Wage (CFAF)	155 740	184 233	132 261	-2.73***
Education (% secondary or higher)	73%	71%	75%	0.58
Married (% married)	54%	74%	39%	-5.38***
Household size (nb of people)	9	10	8	-2.96***
Formal employment contract (%)	80%	91%	72%	-3.47***
Bank account (% yes)	74%	94%	59%	-6.34***

Notes: The t-test is used to test the hypothesis that the mean is equal between borrowers and non-borrowers. *, **, *** indicate significance at 10%, 5%, and 1%, respectively.

Through a simple correlation table (Table 5.2), we find a strong link between our different variables of interest, namely employment contract, bank account and credit. We then empirically test our hypothesis.

Table 5.2: Correlation table

	Employment contract	Bank account	Credit
Employment contract	1.000		
Bank account	0.355***	1.000	
Credit	0.239***	0.410***	1.000

Notes: *, **, *** indicate significance at 10%, 5%, and 1%, respectively.

5.4.2. Econometric results

The marginal coefficients presented in Table 5.3 provide a better understanding of the determinants of access to credit.

Considering our first measure, which takes the value of 1 if the employee has a loan and 0 otherwise (column 1), being a woman does not seem to have a significant impact on access to credit and would indicate that women have the same probability of obtaining credit as men do. Although some studies have shown that women have less access to credit (Lawal and Muyiwa, 2009; Foltz et al., 2000), our result is in line with other studies that have not found significant impacts (Despallier and Guérin, 2009). Age and education level also do not appear to have a significant impact on access to credit.

The same applies to the wage level, where the variable is significant but the marginal coefficient is close to zero. One possible explanation is that we are looking at access to credit without taking into account the amount borrowed. It is possible that income would more significantly influence the amount borrowed than the probability of obtaining a loan, each person borrowing an amount proportionate to their income. We do not have the amount borrowed and are not able to probe this potential explanation further.

On the other hand, marital status has a significantly positive impact on access to credit. Being married increases the probability of accessing credit by 26%. Indeed, while three-quarters of employees with credit are married, half of those without a loan are single. This result could be explained by a demand effect, that is to say financial needs may be greater when one is married. Another explanation might be that the spouse brings a second source of income and offers a greater guarantee to the bank, thus increasing the probability of obtaining a loan. This second explanation does not appear consistent with our descriptive statistics since almost half of those with credit have an unemployed spouse, compared to only a quarter of those without a loan.

This reasoning is probably similar for household size, which also has a significantly positive impact on credit access. Financing needs may increase with the number of people in the household (demand effect). While the average household size is 7.7 people for non-borrowers, household size rises to 10.7 people for borrowers. Yet for employees who have a loan, only 32% of household members work. This

percentage rises to 43% of household members who work if we look at non-borrowers' employees. The additional income provided by other household members is more than twice as high for non-borrowers as for borrowers. In other words, people with credit live in larger households with more dependents, which results in greater financial needs and more frequent use of credit.

Formalization has a significantly positive impact on credit access: an employee who has a formal employment contract has a 23% higher probability of accessing credit. It is therefore a powerful explanatory factor that determines credit access. The role of the employment contract is mainly through the bank account channel. Indeed, 82% of formal employees have a bank account, compared to only 43% of informal employees. The higher bank account penetration rate of formal employees is likely linked to the fact that formal employers often set up bank transfers to disperse payroll in order to avoid the use of banknotes and facilitate payroll accounting. Indeed, 70% of formal employees receive their salary via bank transfer compared to only 3% of informal employees. The bank account has a potential advantage both for employees and for banks. Once a formal employee opens a bank account to receive their paychecks, they begin to build a relationship and history with the bank, which is now able to observe the employee's savings and spending patterns. This banking history reduces information asymmetry and makes it easier for banks to assess risk and lend to employees. For employees, a bank relationship can alleviate concerns they may have about a system they may not always understand. A banked employee can more easily access information about how the banking system works and is arguably in the position to have more confidence to apply for a bank loan if desired. This reasoning is coherent with the results of our econometric model. Having a bank account increases the probability of accessing bank credit by 37% (column 2). The introduction of the bank account variable makes our formalization variable insignificant. This shows that the impact of the employment contract on access to credit is primarily linked to the higher level of banking generated by formalization. This explanation is the subject of further research in the following section on robustness checks. The results obtained are identical for our second measure of access to credit, which takes into account the reasons why the individual does not have a loan in determining whether or not he is credit constrained (columns 3 and 4).

Table 5.3: Probit estimation - Baseline regression

	Has a loan		Not credit constrained	
	(1)	**(2)**	**(3)**	**(4)**
Gender	-0.072 (-0.95)	-0.075 (-1.08)	0.004 (0.95)	-0.011 (-0.16)
Age	0.005 (1.38)	0.005 (1.47)	-0.003 (-0.98)	-0.003 (-0.86)
Children	0.053 (0.59)	0.091 (1.10)	-0.032 (-0.39)	0.002 (0.03)
Wage	0.000** (2.33)	0.000 (1.21)	0.000*** (2.75)	0.000** (2.00)
Education	1.04 (1.04)	0.067 (0.92)	0.032 (0.43)	0.018 (0.26)
Married	0.259*** (3.99)	0.201*** (3.18)	0.166*** (2.39)	0.125* (1.89)
Household size	0.014*** (2.68)	0.014** (2.25)	0.009* (1.61)	0.005 (1.13)
Employment contract	0.234*** (2.58)	0.107 (1.19)	0.136* (1.69)	0.031 (0.38)
Bank account		0.369*** (5.00)		0.280*** (4.98)
Obs.	199	199	183	183
Pseudo R^2	0.20	0.28	0.15	0.23

Notes: The dependent variable represents the case in which an employee has a loan (column 1 and 2) and is not credit constrained (columns 3 and 4). Coefficients are marginal effects. Z-statistics are reported in parentheses. *, **, *** indicate significance at 10%, 5%, and 1%, respectively.

5.4.3. Robustness checks

One way to test the validity of a probit model is to compare correct predictions to incorrect ones. The contingency table below indicates that the correct response rate is 81%, i.e., our model correctly predicts access to credit for 81% of our sample using the second credit access measure variable that takes into account the reasons for not having a loan (Table 5.4). This high rate confirms the validity of our estimate and the relevance of the model variables. It should be noted that this correct response rate is also very high (73%) for the first measure of access to credit, which is based on objective observations of whether or not to take out a loan (Appendix 5.2).

Table 5.4: Contingency table, not credit constrained

		TRUE	
		Y=1	Y=0
PREDICTED	$\hat{Y}$=1	112	14
	$\hat{Y}$=0	21	36

Notes: The correct answers correspond to the case where the model correctly predicted access to credit, i.e., it correctly predicts that the employee will have a loan (Y= $\hat{Y}$=1) or that the employee will not have a loan (Y= $\hat{Y}$=0). The correct answer rate is the ratio between the number of correct answers predicted and the total number of predictions. In our case, (112+36) / (112+36+14+21) = 81%.

Secondly, one might question whether the main determinant of access to credit is having an employment contract or simply having a bank account. In other words, is the main recommendation of this article to consider that formalization promotes access to credit or is it simply the opening of a bank account that should be promoted? To answer this question, we study in more depth the relationship between an employee's work contract and their bank account to ensure that it is the formalization that triggers the opening of a bank account, which then becomes the channel for accessing credit.

Through a probit model, we show that the employment contract is the main determinant of opening a bank account (Table 5.5). The employment contract increases the probability of having a bank account by 18%. Indeed, 82% of formal employees have a bank account, compared to only 43% of informal employees. Other potential factors, such as gender, age and level of education, do not have a significant impact on bank account ownership. The wage level is very significant but with a marginal coefficient close to 0. These results seem consistent with our initial intuition. Formalization promotes access to a bank account, which in turn promotes access to credit. The trigger for this positive impact would therefore be to obtain a formal employment contract.

Some of the companies in the sample could be driving these results. Indeed, some companies could make it mandatory to open a bank account to pay salaries. The disaggregated descriptive statistics available in Annex 5.3 show that no company appears to have a particular profile that would bias the

results. Indeed, none of these companies has a specific policy on salary payments or requires employees to open a bank account. None of these companies has set up a specific partnership with a bank to promote their employees opening a bank account or to facilitate access to bank credit.

Table 5.5: Probit estimation - The relationship between employment contract and bank account

	Bank account
Gender	0.041 (0.61)
Age	-0.001 (-0.38)
Children	-0.110 (-1.43)
Wage	0.000*** (3.60)
Education	0.025 (0.39)
Married	0.123* (1.96)
Household size	0.008* (1.71)
Employment contract	0.179*** (2.56)
Obs.	199
Pseudo R^2	0.235

Notes: The dependent variable is to have a bank account (1 if yes, 0 otherwise). Coefficients are marginal effects. Z-statistics are reported in parentheses. *, **, *** indicate significance at 10%, 5%, and 1%, respectively.

5.5. Conclusions

While access to credit is often cited as one of the tools for fighting poverty and a means to contribute to achieving the Sustainable Development Goals (SDG 1.4), Africa is far from having democratized access to credit for all. It is therefore important to better understand the determinants that improve access to credit.

Utilizing a new database of more than 200 employees in Senegal, we show the impact that having a formal employment contract has on an employee's access to credit. Through a probit model and by controlling for other socio-economic characteristics (age, gender, education, salary, etc.), we show that a formal employment contract increases an employee's probability of obtaining a loan by 23%. We explain this impact by a higher bank account penetration rate of formal employees since the employment contract increases the probability by 18% of an employee's having a bank account. Having a bank account affects both the supply of and demand for loan. On the one hand, it allows employees to become familiar with the financial services offered by banks and to improve financial literacy. On the other hand, it provides the bank a customer with a banking history that reduces information asymmetry and risk associated with granting credit. These results demonstrate the impact formalization can have on access to credit and highlights the economic development that an increase in formalization could help facilitate.

These results have strong implications for public authorities and companies throughout Africa. We urge all stakeholders to continue the formalization efforts underway in Africa's still predominantly informal economies. We also invite companies to encourage the banking of their employees by paying salaries via bank transfer.

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Appendices to chapter 5

Appendix 5.1: List of variables

Variable name	Type	Description
Dependent variables		
1) Have a credit	Dummy	1 = has a loan; 0 = no loan
2) Not credit constrained	Dummy	1 = has loan or no loan because no need; 0 = no loan because refusal anticipated or lack of collateral.
Explanatory variables		
Gender	Dummy	1 = woman; 0 = man
Age	Continuous	Number of years
Children	Dummy	1 = has a child; 0 = no child
Wage	Continuous	Wage amount in CFAF
Education	Dummy	1 = college or higher; 0 = primary or no education
Marital status	Dummy	1 = married; 0 = single
Household size	Continuous	Number of people living in the household
Employment contract	Dummy	1 = formal contract; 0 = informal
Bank account	Dummy	1 = bank account; 0 = no bank account

Appendix 5.2: Contingency table, credit access

		TRUE	
		Y=1	Y=0
PREDICTED	$\hat{Y}$=1	53	17
	$\hat{Y}$=0	37	92

Notes: The correct answers correspond to the case where the model correctly predicted access to credit, i.e., it correctly predicts that the employee will have a credit (Y= $\hat{Y}$=1) or that the employee will not have a credit (Y= $\hat{Y}$=0). The correct answer rate is the ratio between the number of correct answers predicted and the total number of predictions. In our case, (53+92) / (53+92+17+37) = 73%.

Appendix 5.3: Descriptive statistics

	Number of employees surveyed	Share of formal employees	Share of employees with a bank account	Share of employees with a credit	Share of employees receiving their wage via bank transfer
Company #1	9	89%	67%	11%	0%
Company #2	35	86%	74%	43%	60%
Company #3	99	90%	75%	59%	70%
Company #4	28	79%	82%	32%	64%
Company #5	15	67%	75%	31%	67%
Company #6	14	29%	36%	0%	0%