

Essais sur les déterminants et les conséquences macroéconomiques du développement du secteur d'assurance dans les pays en développement

Relwende Sawadogo

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Unité de Formation et de Recherches en Sciences Economique et de Gestion
Ecole doctorale Droit, Sciences Economiques et de Gestion

Essais sur les déterminants et les conséquences macroéconomiques de développement du secteur d'assurance dans les pays en développement

Essays on the macroeconomic determinants and consequences of the development of insurance sector in developing countries

Thèse Nouveau Régime

Présentée et soutenue publiquement le 06 septembre 2016

Pour l'obtention du titre de Docteur ès Sciences Économiques

Par

Relwendé SAWADOGO

Sous la direction de

M. Samuel GUERINEAU et M. Idrissa M. OUEDRAOGO

Membre du Jury:

Présidente	Mme Mathilde MAUREL,	Directrice de recherche CNRS, Université de Paris 1 Panthéon-Sorbonne
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La faculté n’entend donner aucune approbation ou improbation aux opinions émises dans cette thèse. Ces opinions doivent être considérées comme propres à leur auteur.

À ma famille et à mes amis, dont prières et bénédictions m’ont toujours accompagné

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Chapitre 1: Introduction Générale

Ce chapitre introductif vise à mettre en évidence les objectifs, les motivations et les contributions de cette thèse. À cette fin, le chapitre présente une synthèse théorique sur le rôle de l'assurance dans le développement économique (section 1.1) et des faits stylisés sur le développement du secteur de l'assurance[1] dans les pays en développement (section 1.2). Les objectifs et les motivations de la thèse sont décrits dans la section 1.3. Les contributions et les principaux résultats de la thèse sont prévues respectivement aux sections 1.4 et 1.5.

1.1. Le rôle de l'assurance dans l'économie

Le rôle du secteur des assurances dans l'économie peut être analysé à trois niveaux : d'abord, les compagnies d'assurance fournissent des services financiers à l'économie ; ensuite, ces services permettent de remplir des fonctions économiques et enfin, en remplissant ces fonctions, les compagnies d'assurance contribuent au développement économique des pays.

Le secteur de l'assurance étant un segment essentiel du système financier au même titre que les banques et les marchés financiers, il propose des services d'intermédiation financière aux entreprises et aux ménages. Ces services contribuent de manière générale aux opérations de création de richesses et de consommation et plus spécifiquement, au commerce international, aux opérations de paiement et de crédit. Le secteur de l'assurance se distingue en deux activités, l'assurance-vie et l'assurance non-vie. Traditionnellement, les activités d'assurance-vie sont destinées à fournir une couverture d'assurance pure contre le risque de décès prématuré. Dans ce cas, l'assuré verse régulièrement des primes d'assurance en échange d'une indemnité à verser aux bénéficiaires (personnes à charge) de son choix en cas de son décès prématuré. Les services d'assurance-vie offrent également des rentes qui fournissent une couverture pour le souscripteur d'assurance contre le risque de longévité (vieillesse ou retraite par exemple). Ainsi, l'assuré verse des primes à l'assureur durant sa vie active et touche des indemnités lors de sa retraite. Le dernier type d'assurance-vie concerne l'invalidité dont l'assuré verse une prime régulière qui lui garantit la prise en charge de son invalidité si elle survient. En revanche, l'assurance non-vie comprend tous les autres types d'assurance et fournit à ses clients une protection contre le risque assurable qui varie d'une zone géographique à l'autre. Selon la classification de *sigma world insurance database*, les services d'assurance non-vie comprennent entre autre l'assurance maladie, l'assurance automobile, l'assurance de propriété ou de logement et l'assurance pour

[1] Le développement du marché d'assurance fait référence à un processus qui marque l'amélioration de la quantité, la qualité et l'efficacité du secteur de l'assurance.

couvrir les responsabilités professionnelles et d'affaires, l'assurance maritime, etc. En résumé, on peut noter que l'assurance-vie sert de produit d'épargne alors que l'assurance non-vie protège essentiellement les biens et l'activité.

Le secteur de l'assurance peut également être analysé à travers ses deux fonctions essentielles, à savoir la gestion des risques et le financement de l'économie. La fonction première de l'assurance est de gérer les risques auxquels sont exposés les agents économiques. En effet, le but de l'assurance est de protéger les agents économiques contre le risque aléatoire qui pèse sur leur personne comme sur leurs biens et leur donne ainsi une confiance dans l'avenir. Ainsi, au niveau individuel, l'assurance a une valeur indéniable, c'est un acte de prévoyance donnant à son auteur conscience de ses responsabilités, lui permettant d'accroitre son indépendance et sa liberté et d'accomplir parfois un devoir moral envers autrui (assurance décès par exemple). En outre, du point de vue individuel, l'assurance permet également un soutien médical aux agents économiques. L'assurance santé est considérée comme essentielle dans la gestion des risques en matière de santé (Fernandez, 2004). En effet, tout agent économique peut être victime d'une maladie grave inattendue et l'assurance santé est l'une des polices d'assurance qui répondent à ce type de risques de santé. L'assuré reçoit ainsi, un soutien médical dans le cas de la politique d'assurance maladie. Au niveau collectif, l'assurance permet la mutualisation des risques. En effet, l'assurance diminue les pertes supportées par les entrepreneurs au moyen de procédures d'indemnisation et de mutualisation. La loi des grands nombres permet aux assureurs de transformer les risques individuels aléatoires en des demandes fixes et prévisibles (CNUCED, 2006). De ce fait, lorsqu'une perte se produit, elle est compensée par des fonds de l'assureur. Les services d'assurance bien développés contribuent ainsi à optimiser l'allocation des ressources rares et de «*prise de risque*» tout en renforçant les activités innovantes et à forte rentabilité. Enfin, au niveau de l'Etat, le secteur de l'assurance permet la réduction des risques couverts par les administrations publiques. En effet, en souscrivant à l'assurance, les individus se protègent contre le risque de vie quotidienne, dont les conséquences auraient été prises en charge par l'Etat. Ainsi, à travers le principe de solidarité ou de responsabilité, l'Etat ne peut pas refuser d'aider ses citoyens dans l'adversité mais qui n'ont pas toujours les moyens. Ceux-ci pourraient être des citoyens souffrant d'un mauvais état de santé, de vieillesse (retraite) et du chômage causé par des accidents ou être victimes de dommages causés par la négligence étatique (par exemple un défaut de fonctionnement d'un service efficace d'incendie public). Un autre exemple est l'inondation, où le gouvernement fournit généralement un soutien financier dont l'existence de l'assurance permet de réduire le soutien de l'Etat. Ainsi, les produits

d'assurance tels que l'assurance-vie, santé et protection sociale, peuvent se substituer aux programmes de sécurité sociale du gouvernement.

La deuxième fonction de l'assurance est de faciliter les opérations de financement. De ce fait, premièrement, **l'assurance** renforce l'accès au **crédit** car elle permet à l'assuré d'obtenir du crédit en renforçant les garanties qu'il offre à ses créanciers. Par exemple, l'assuré assurera contre l'incendie d'immeuble hypothéqué ou souscrira à une assurance en cas de décès pour une somme égale à la valeur du prêt. Ensuite, l'assureur permet à l'assuré de consentir lui-même du crédit à ses clients, c'est l'assurance-crédit qui garantit au créancier le paiement en cas d'insolvabilité du débiteur et favorise la conclusion de nouveaux marchés. L'assurance remplit même une fonction de crédit au profit de l'économie générale car les réserves que les compagnies d'assurances sont obligées de constituer contribuent à soutenir le crédit général du pays. Deuxièmement, **l'assurance permet de stimuler la mobilisation de l'épargne domestique**. L'assurance ne protège pas seulement contre les risques et les incertitudes, mais constitue également un canal de mobilisation d'épargne (Dickson, 2000). En effet, l'accumulation des primes des assurés permet la constitution de capitaux importants surtout dans les assurances sur la vie car les prestations d'assureurs s'exécutent sur une échéance lointaine. Ainsi, l'assurance apparait comme une méthode particulière de formation d'épargne en raison du paiement régulier des primes. De cette façon, les compagnies d'assurance-vie développent une habitude d'épargne en acquittant des primes. Troisièmement, le développement du secteur de **l'assurance permet de proposer des financements à long terme** à travers le drainage d'une partie de l'épargne nationale. En effet, l'assurance génère des fonds en collectant des primes versées par des agents économiques en début de période alors que les pertes se produisent avec un certain décalage qui peut atteindre 20 ans et plus dans le cas de l'assurance-vie. Les fonds stables de long terme (primes d'assurance-vie) mobilisés par les sociétés d'assurance sont généralement investis dans des titres gouvernementaux et privés pour générer davantage de ressources et les utiliser pour le développement économique (Dickson, 2001). Ainsi, les activités d'investissement des compagnies d'assurance complètent les activités d'intermédiation du système bancaire, puisque les banques fournissent essentiellement un financement à court terme à l'industrie manufacturière et à d'autres entreprises, du fait de la nature court termiste de leurs dépôts.

Le développement financier est un facteur essentiel de l'amélioration de la croissance et du développement économique. Les travaux sur ce sujet sont structurés autour de deux hypothèses partiellement concurrentes. D'une part, le développement financier est crucial pour stimuler la

croissance économique:"*Supply leading*"(Goldsmith, 1969; King et Levine, 1993a, 1993b; et Levine et Zervos, 1998, etc.) et d'autre part l'hypothèse dite "*Demand following*" où le développement financier est une conséquence de la croissance a été également soutenue dans la littérature (Robinson, 1952). Ainsi, le secteur d'assurance étant un segment important du système financier, peut contribuer positivement à la croissance économique des pays de même que le développement économique peut encourager celui de l'assurance. En effet, les compagnies d'assurance canalisent l'épargne cumulée vers les investissements productifs et de ce fait, le développement du secteur d'assurance peut avoir des effets positifs sur la croissance économique. De plus, l'assurance permet de limiter les pertes, la stabilité financière et la promotion des activités commerciales et du commerce; ce qui contribue à stimuler la croissance et le développement économique (Skipper, 1997). De ce fait, l'assurance joue un rôle crucial dans la croissance durable de l'économie. En revanche, l'assurance peut être une conséquence du développement économique du fait que l'assurance-vie apparait comme un bien de luxe dans les pays en développement (Ward et Zurbruegg, 2002).

De ce qui suit, le développement de l'assurance apparait comme un élément essentiel du développement économique et ceci appelle à une analyse plus poussée des forces motrices du développement du secteur d'assurance et leurs conséquences macroéconomiques potentielles sur les économies en développement. En effet, au-delà de leurs avantages directs sur les assurés et les bénéficiaires, le secteur d'assurance représente une source importante de financement à long terme des économies en développement. Ainsi, les sections suivantes présentent brièvement quelques faits stylisés sur le développement du secteur d'assurance, les motivations, les contributions et les principaux résultats de cette thèse.

1.2. Faits stylisés sur le développement de l'assurance dans les pays en développement

Le secteur de l'assurance dans le monde en développement.

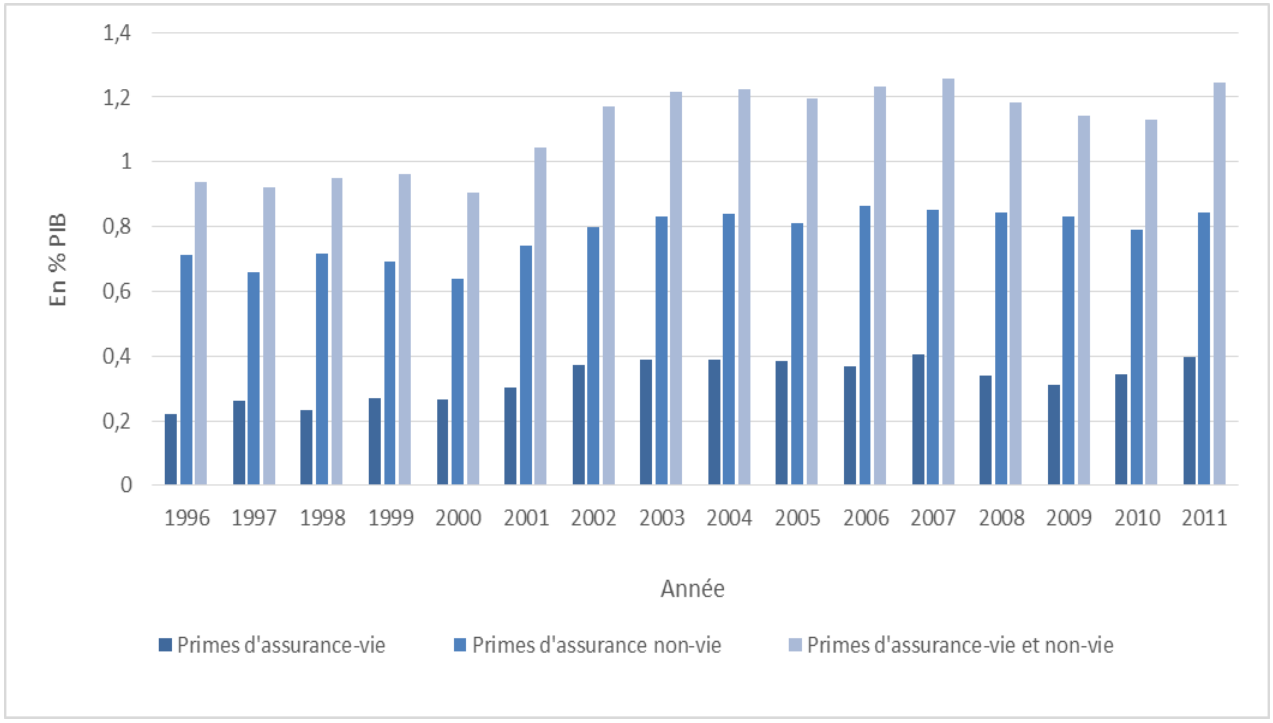
L'importance économique de l'industrie d'assurance est généralement évaluée au moyen du rapport entre les primes intérieures brutes et le produit intérieur brut (PIB). Bien que cette mesure ne donne pas une image totale du produit d'assurance en raison de la variation considérable des taux de primes entre les différents pays, il a l'avantage de ne pas être influencée par des facteurs monétaires (Outreville, 1990). Ainsi, depuis la première conférence de la CNUCED en 1964 où le développement de l'assurance a été reconnu comme un aspect essentiel du développement économique, le secteur de l'assurance dans le monde est devenu une partie importante du secteur des services financiers. Selon Chen et al. (2012), le secteur d'assurance a augmenté à un taux de plus de 10% par an depuis 1950 et dépasse de loin celui du développement économique à l'échelle mondiale (Dowling, 1982; Swiss Re, 2010; UNCTAD, 1972, 1991). De plus, au cours de la même période avec des sources différentes, des auteurs comme Browne et Kim (1993) ont précisé que, le secteur d'assurance-vie a augmenté à un taux d'environ 30% par an, tandis que celui de l'assurance non-vie a augmenté à un taux de 19% par an. Ainsi, les marchés d'assurance-vie ont fourni une large gamme de services financiers pour les consommateurs et sont devenus une source importante de capital d'investissement (Beck et Webb, 2003). Au niveau mondial, le volume des primes d'assurance a été doublé au cours de la période 1996-2011, passant de 2125 milliards de dollars américains ($US) à environ 4600 milliards $US (Sigma world insurance database, 2015). La pénétration des services d'assurance (primes d'assurance rapportées au PIB) est passée de 6,7% du PIB en 1996 pour atteindre 7,2% en 2005 avant de connaitre une baisse à 6,1% en 2011 au niveau mondial, suite à la crise financière et économique mondiale de 2007. Quant à la consommation d'assurance, au cours de la période 1996-2011, les dépenses moyennes en assurance par habitant (densité d'assurance) sont passées de 361 $US à 635 $US.

Dans le monde en développement (sans les pays émergents), au cours de ces dernières années le niveau de vie des habitants s'est amélioré de manière considérable; le revenu réel par tête moyen est passé d'environ 2143 $US en 1996 à environ 3431,5 $US en 2011(WDI, 2015). L'amélioration des conditions de vie des habitants a favorisé le besoin de se couvrir contre certains risques à travers la consommation d'assurance. Ainsi, au niveau des pays en développement (sans les pays émergents), le volume des primes d'assurance a été quintuplé au cours de la période 1996-2011, passant d'environ 9,4 milliards de $US en 1996 à 54,1 milliards

en 2011. Toutefois, même si le volume des primes d'assurance connait une évolution appréciable dans le monde en développement, on note qu'il ne représente que moins de 2% du chiffre d'affaire mondial des compagnies d'assurance en 2011. En outre, la densité d'assurance du monde en développement est restée largement inférieure à la moyenne mondiale même si elle connait également une augmentation au cours de la période 1996-2011, passant de 14$US par habitant à environ 65$US.

Les figures 1.1 et 1.2 ci-dessous illustrent la pénétration d'assurance (rapport des primes brutes directes sur le PIB) dans l'ensemble des pays en développement et dans les différentes régions en développement. La figure 1.1 indique que la part du secteur de l'assurance totale (assurance-vie plus assurance non-vie) dans le PIB des pays en développement connait des fluctuations modérées et est restée à un niveau inférieur à 1,4% au cours de la période 1996-2011. Au cours de cet épisode, on constate, une part plus importante de l'assurance non-vie dans les économies en développement (en moyenne 0,8% du PIB). Cependant, même si la pénétration d'assurance-vie est relativement faible (inférieur à 0,4% du PIB), on note une tendance croissante de cette dernière au cours de la période 1996-2011, malgré la crise financière et économique de 2007. Cela signifie que l'assurance constitue un potentiel dans le monde en développement qu'il faut promouvoir.

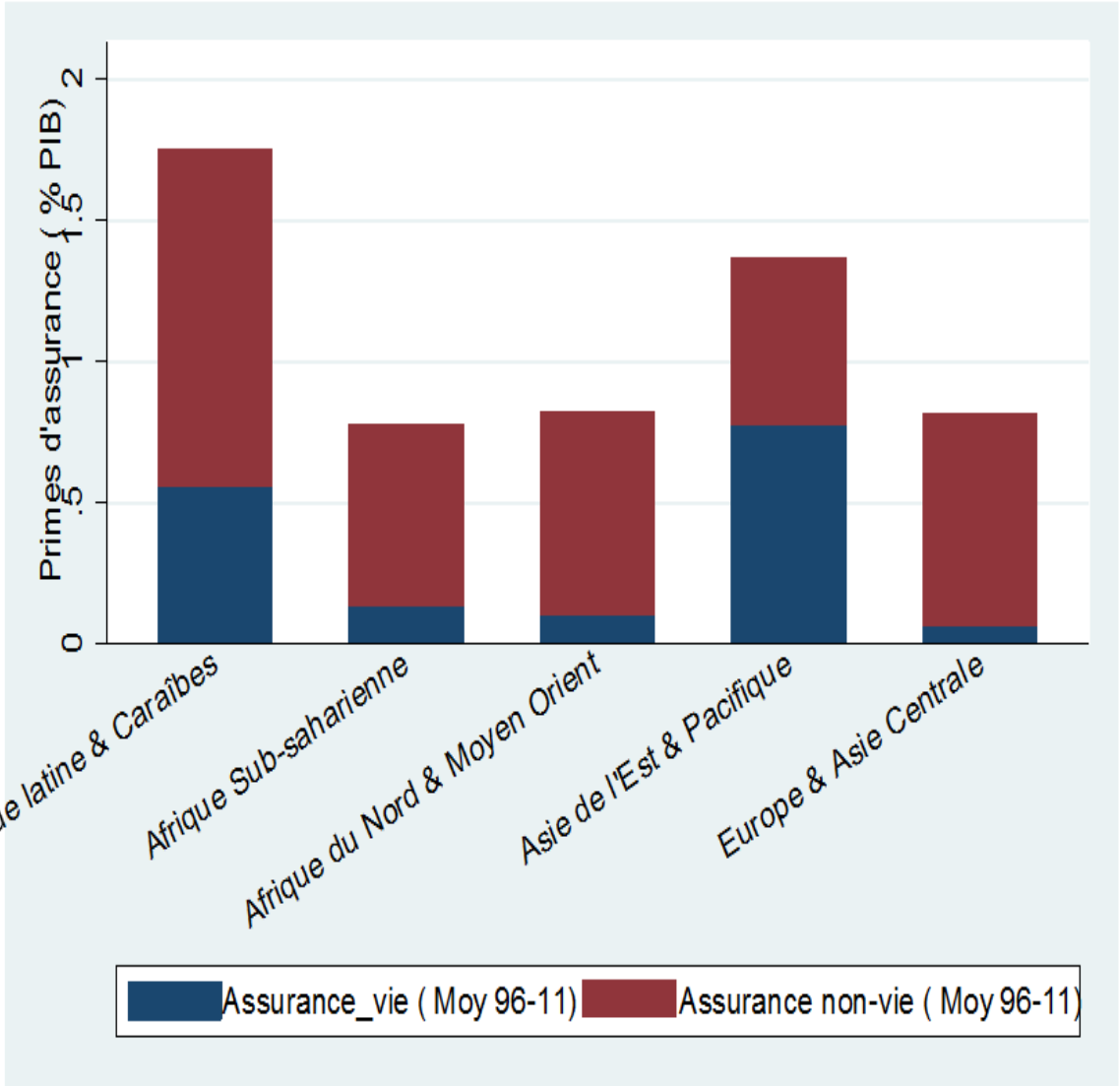
Figure 1.1: Pénétration d'assurance (primes en % du PIB) dans les pays en développement



Source: Global Financial Development (GFDD)

En ce qui concerne la pénétration d'assurance dans les différentes régions en développement (Figure 1. 2), on constate qu'elle est plus importante dans les régions Amérique latine et Caraïbes et Asie de l'Est et Pacifique (Pénétration d'assurance supérieure à 1%). En revanche, le secteur de l'assurance est moins développé dans les régions les plus pauvres à savoir Afrique Subsaharienne, Afrique du Nord et Moyen Orient et Europe (uniquement les pays en développement) et Asie Centrale dont la pénétration d'assurance est inférieure à 1% du PIB. En outre, au niveau des différentes activités d'assurance, on remarque qu'à l'exception des régions Amérique Latine et Caraïbes et Asie de Est et Pacifique, en moyenne l'assurance non-vie est plus développée que l'assurance-vie dans les autres régions.

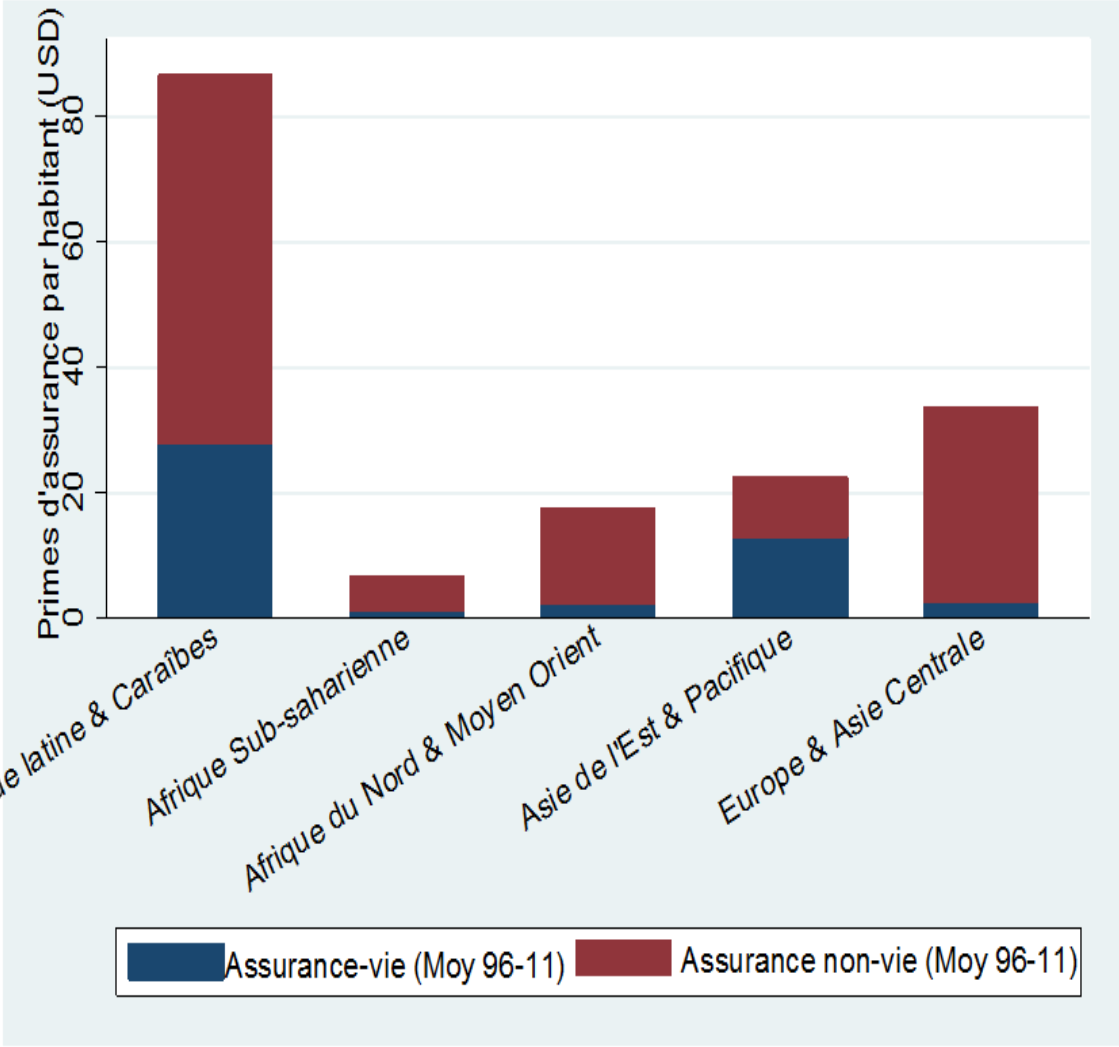
Figure 1.2: Pénétration d'assurance dans les régions en développement (moyenne de la période 1996-2011)



Source: Global Financial Development (GFDD) et calculs de l'auteur

La figure 1.3 ci-dessous présente la consommation moyenne d'assurance-vie et non-vie par habitant dans les différentes régions en développement. On remarque une confirmation des tendances sur la pénétration d'assurance (figure 1.2). Ainsi, on note que dans toutes les régions en développement (exception faite de la région Asie de Est et Pacifique), les habitants dépensent en moyenne plus d'argent dans la consommation d'assurance non-vie que dans l'assurance-vie. En effet, la région Amérique latine et Caraïbes est la région dont la densité d'assurance (vie et non-vie) est plus élevée (plus de 80$ par habitant) et sont suivies des régions Europe et Asie centrale et Asie de Est et Pacifique. En revanche, dans les régions Afrique Sub-Saharienne et Afrique du Nord et Moyen Orient, les agents économiques ont dépensé au cours de la période 1996-2011, moins de 20 $US par habitant dans la consommation d'assurance.

Figure 1.3: Densité d'assurance (primes par habitant, en $US) dans les régions en développement (moyenne de la période 1996-2011).



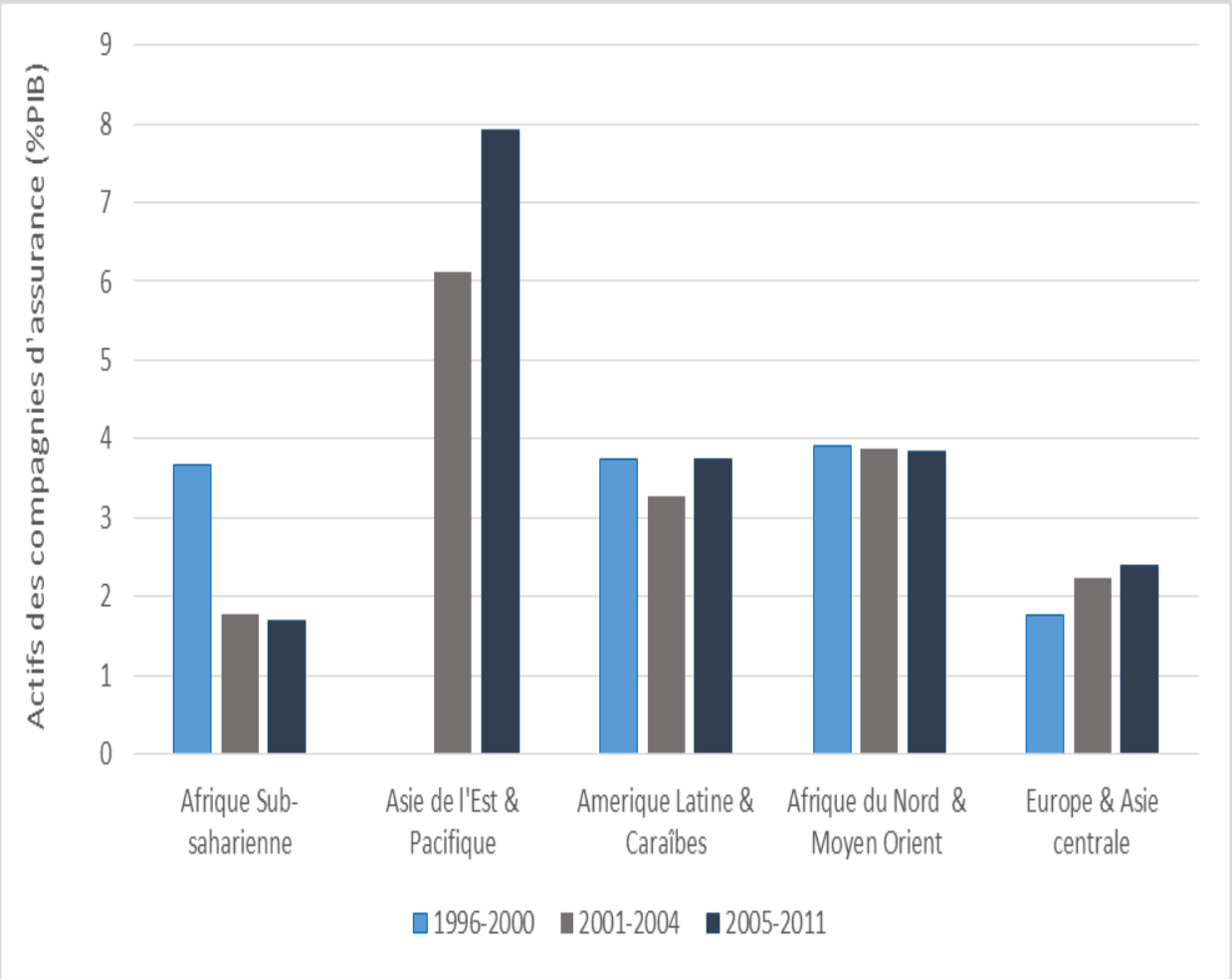
Source: Global Financial Development (GFDD)

Avec le développement des produits d'assurance, les fonds d'assurance (particulièrement sa branche vie) sont des sources de financement à long terme et les entreprises d'assurance constituent les principaux investisseurs institutionnels dans les marchés financiers (Catalan et al., 2000 et Impavido et al., 2003). Ainsi, les compagnies d'assurances placent leurs réserves techniques et provisions (actifs) sur les marchés financiers afin de faire face aux indemnisations futures. La figure 1.4 illustre l'évolution du ratio des actifs des compagnies d'assurance dans les différentes régions en développement au cours des périodes 1996-2000, 2001-2004 et 2005-2011. En effet, le ratio des placements financiers des compagnies d'assurance reflète la taille des secteurs d'assurance-vie et non-vie, mais particulièrement l'assurance-vie qui opère avec des contrats à long terme et qui ont besoin d'accumuler un plus grand volume d'actifs financiers pour honorer les décaissements futurs. Au niveau de l'Afrique subsaharienne, les entreprises d'assurance de la région ont moins investi dans les titres financiers et cela s'explique par le faible développement du secteur surtout sa branche vie comparativement aux autres régions économiques (Figure 1.4 ci-dessous). On note également que les titres financiers détenus par les compagnies d'assurance de la région ont connu une diminution considérable sur la moyenne 1996-2000 à 2001-2004 et après restée presque stable (figure 1.4). La baisse considérable des placements financiers dans la région peut s'expliquer par l'entrée en vigueur du traité et du Code CIMA[2] en 1995 dans les pays d'Afrique subsaharienne Francophone dont la règlementation interdit les compagnies d'assurance à délocaliser leurs placements financiers (Kamega, 2010). Etant donné, le faible développement des marchés financiers dans la région, l'interdiction de délocalisation des placements limite les opportunités de rendement des assureurs; ce qui est illustré par la réduction de leur placement financier au cours de la période 1996-2000 à 2001-2004 et à la suite resté stable en moyenne des périodes de 2001-2004 à 2005-2011. En revanche, dans les régions Asie de l'Est et pacifiques et Europe et Asie centrale, les actifs financiers des compagnies d'assurance ont connu une augmentation de la moyenne des périodes 1995-2000, 2001-2004 et 2005-2011. Enfin, dans les régions Amérique latine et Caraïbes et Afrique du Nord et Moyen Orient, les placements financiers des compagnies sont restés presque stables et inférieur à 4% du PIB sur l'ensemble de la période 1996-2011. On peut noter également que dans l'ensemble des régions, les placements financiers des compagnies

[2] CIMA: Conférence Interafricaine sur les Marchés de l'Assurance (CIMA) dont les pays membres sont à ce jour le Bénin, le Burkina Faso, le Cameroun, le Congo, la Côte d'Ivoire, le Gabon, la Guinée Bissau, la Guinée Équatoriale, le Mali, le Niger, la République Centrafricaine, le Sénégal, le Tchad et le Togo, a été créée le 12 juillet 1992 à Yaoundé au Cameroun, pour succéder à la Conférence Internationale de Contrôle des Assurances (CICA).

d'assurance n'ont pas connu une baisse durant la période de la crise financière (2005-2011); ce qui illustre bien la solidité du secteur.

Figure 1.4: Actifs financiers des compagnies d'assurance (% PIB) dans les régions en développement



Source: Global Financial Development (GFDD).

Le secteur du marché d'assurance en Afrique subsaharienne francophone[3]

Le marché de l'assurance en Afrique représente environ 2% du marché mondial d'assurance dont 80% des primes du continent sont concentrées sur le marché Sud-Africain et 10% celui du Maghreb (principalement le Maroc); ce qui ne laisse que 10% de l'activité d'assurance pour le reste du continent (*sigma world insurance database*, 2012). Cependant, le secteur de l'assurance connait une évolution appréciable en Afrique dont le chiffre d'affaire des sociétés d'assurances (y compris l'Afrique du Sud) est passé de 25 milliards de $ US en 1996 à environ 69 milliards en 2011 et la branche vie est passée d'environ 18 milliards à 47 milliards au cours de la même période (*sigma world insurance database*, 2012).

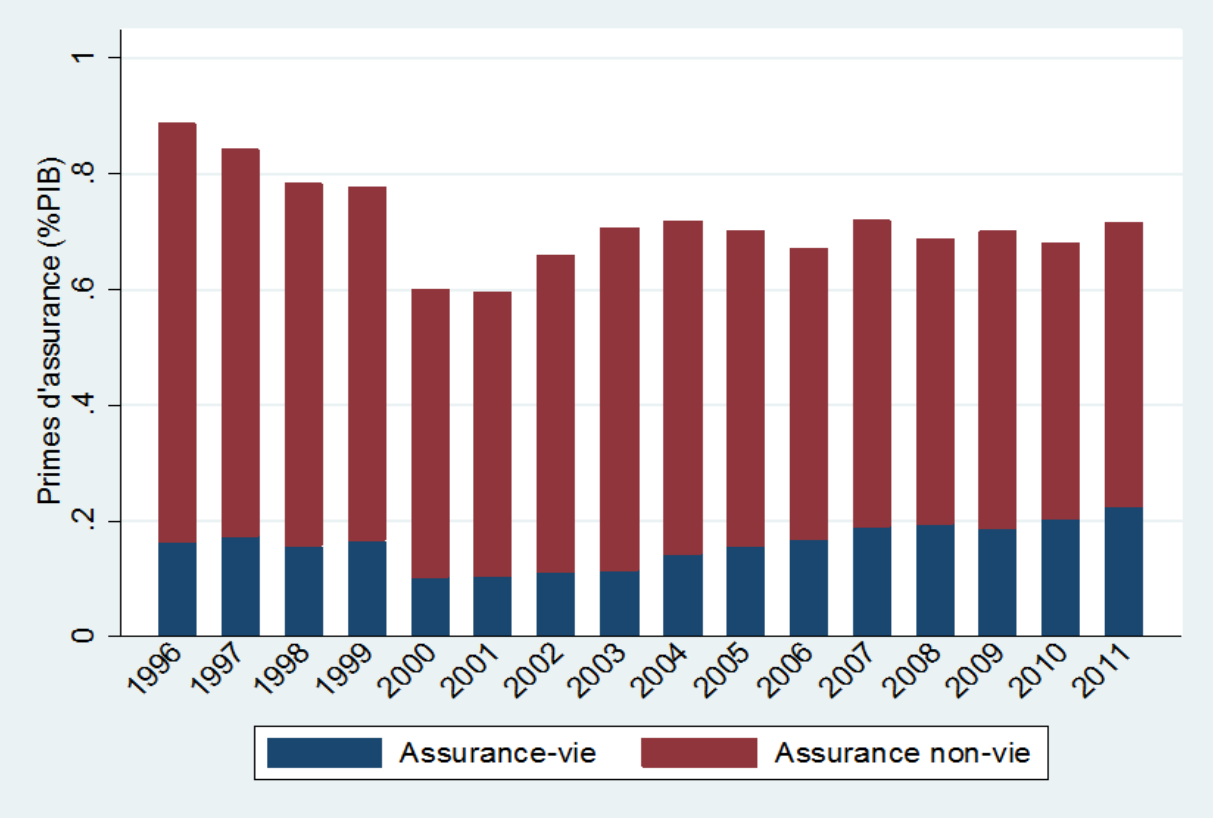
S'agissant du cas spécifique de l'Afrique subsaharienne francophone, en 2011, 16 pays de la région Cima/Fanaf[4] représentaient un peu moins de 5% du marché total africain (Fanaf, 2013). La figure 1.5 ci-dessous montre la pénétration du marché de l'assurance-vie et non-vie dans l'économie nationale de 16 pays d'Afrique subsaharienne francophone[5] au cours de la période 1996-2011. On remarque que la pénétration du marché de l'assurance (assurance-vie et assurance non-vie) est très faible et inférieure à 1%. De plus, le niveau du développement de l'assurance-vie de la zone est largement en dessous de celui de l'assurance non-vie (figure 1.5). En effet, au niveau de la région Cima/Fanaf, l'évolution de la contribution de l'assurance-vie dans l'économie est restée presque stable et inférieure à 0,2% en moyenne au cours de la période. En revanche, la pénétration d'assurance non-vie a une tendance un peu décroissante à partir de l'année 2000 mais constitue toujours la principale part du secteur dans l'économie de la région (plus de 50% des cotisations du secteur).

[3] Une version de cette partie a été publiée dans *Techniques Financières et Développemen*t, n°122 Mars 2016 avec co-auteur, Samuel Guérineau et intitulé «L'assurance-vie en Afrique subsaharienne francophone: état de développement et défis à relever».

[4] Zone couvrant les pays membres de la CIMA (Conférence Interafricaine des Marchés d'Assurance, créée le 12 juillet 1992 à Yaoundé) et représentés par des sociétés d'assurance ou de réassurance de la FANAF (Fédération des sociétés d'Assurances de droit National Africaines) à savoir: Bénin, Burkina Faso, Burundi, Cameroun, République Centrafricaine, Congo Brazzaville, Côte d'Ivoire, Gabon, Guinée Conakry, Mali, Madagascar, Niger, Rwanda, Sénégal, Tchad, Togo.

[5] On peut également voir au chapitre 2 pour les graphiques par pays.

Figure 1.5: Pénétration d'assurance (vie et non-vie) dans la zone Afrique Francophone Sub-saharienne.



Source: Global Financial Development (GFDD)

Le faible développement du secteur d'assurance, particulièrement sa branche vie dans la région zone Cima/Fanaf s'explique par plusieurs facteurs qui peuvent être résumés comme suit.

La première série de contraintes au développement du secteur concerne **la faiblesse des pouvoirs d'achat des populations locales et leur manque de culture d'assurance** (Kamega, 2010). Ainsi, on remarque bien le rôle du niveau de revenu dans le cas de la Côte d'Ivoire, pays à revenu intermédiaire dont la population dispose de plus d'opportunités, qui détient la plus grande part du marché d'assurance-vie dans la région Fanaf (22%). La faiblesse et l'instabilité des revenus des populations[6] limitent structurellement la demande des produits d'assurance-vie à une très faible fraction d'agents économiques. A cela s'ajoute le manque de produits adaptés aux contextes locaux (milieu rural et informel). Par ailleurs, l'assurance-vie peut venir à l'encontre du contexte socio-culturel (Kamega et Planchet, 2012) et des pratiques de solidarité

[6]Plus de deux tiers de la population active est dans le secteur primaire et dans l'emploi informel en Afrique subsaharienne.

sociale existantes (par exemple la prise en charge des vieux inactifs par les jeunes actifs), ou plus généralement à la couverture du risque de dépendance par la solidarité familiale ou communautaire. Ainsi, l'assurance-vie doit convaincre qu'elle offre un avantage qui mérite de se tourner vers des méthodes inhabituelles.

La micro-assurance, qui pourrait s'appuyer sur les institutions de microfinance existantes, peut favoriser la transition en offrant de nouveaux services, monétarisés, au sein d'une structure déjà intégrée dans les pratiques traditionnelles/culturelles/habituelles (Kamega, 2010).

Le deuxième groupe de contraintes au développement de l'assurance-vie est liée au **contexte fiscal et financier,** qui limite le rendement net des produits d'assurance-vie. Le manque d'incitations fiscales sur le revenu d'assurance-vie n'encourage pas les agents économiques à constituer une épargne longue. Les impôts directs et indirects et les taxes parafiscales ou taxes d'enregistrements sur les contrats d'assurance-vie sont élevés, entrainant des coûts importants sur les primes d'assurance-vie (Ziguélé, 2008). Par ailleurs, le manque d'efficacité des sociétés d'assurance-vie et des intermédiaires se traduit par des coûts de gestion élevés et qui se répercutent sur les commissions. Par exemple, en 2011, le taux des frais généraux par rapport aux primes émises vie dans les seize pays de la région Fanaf s'élevait à 19,2% et le taux des commissions à 5,6% contre moins de 14,3% et 1,87% respectivement pour la France. Enfin, il faut souligner le manque d'opportunités de placements sur les marchés financiers dans la région. En effet, l'insuffisance et la faiblesse des marchés financiers locaux de même que l'absence de délocalisation de placement des capitaux hors de la région (Réglementation des placements en matière d'assurance par l'autorité de contrôle CIMA), conduisent à une surreprésentation des liquidités bancaires (plus de 39% des placements en 2011) dans les placements des assureurs-vie de la région (Kamega, 2010). Cette situation limite les taux de rendement attractifs et entrave la mise en place de couvertures adaptées aux engagements. En outre, il y a également la délocalisation de contrats hors zone Cima par la population la plus aisée et le personnel cadre de certains grands groupes industriels.

La dernière catégorie de contraintes au développement de l'assurance-vie est liée **au manque de ressources humaines qualifiées et de données de qualité sur le risque**. La zone Cima manque manifestement d'actuaires[7], alors même que ces techniciens sont indispensables pour toute création de solutions d'assurance innovantes (Kamega et Planchet, 2012). Par ailleurs, les

[7] On estime à quelques dizaines le nombre d'actuaires exerçant en assurance-vie dans la zone CIMA

données statistiques sont insuffisantes, en nombre et en fiabilité pour les incorporer dans des modèles statistiques. Ces insuffisances se traduisent par un manque d'innovation dans la mise en place de nouveaux produits, de cadres règlementaires incitatifs, et de politiques d'assainissement du secteur.

Les conséquences de toutes ces difficultés du marché d'assurance-vie en Afrique subsaharienne francophone sont notamment un déficit de confiance entre les assureurs-vie (et leurs partenaires) et les assurés[8] (et/ou prospects), l'inadaptation de l'offre, et l'existence d'une importante population non couverte dans la région.

1.3. Objectifs et motivations de la thèse

L'augmentation des volumes des primes d'assurance et de l'importance des activités du secteur dans l'économie des pays en développement, couplé avec leur répartition inégale entre les pays et des régions soulèvent un certain nombre de questions auxquelles cette thèse vise à fournir des éléments de réponse. Ainsi, cette thèse cherche à répondre aux questions suivantes: Pourquoi certains pays en développement réussissent mieux que d'autres à développer leur secteur d'assurance? Quelles sont les conséquences potentielles du développement du secteur d'assurance sur l'économie des pays en développement? Quelles sont les caractéristiques structurelles des pays qui conditionnent l'effet du développement de l'assurance sur la croissance? Cette thèse a pour objectif d'examiner empiriquement les différentes questions abordées. Ainsi, la première partie a pour objectif d'analyser les déterminants macroéconomiques du développement des activités du secteur d'assurance dans les pays en développement. La deuxième partie examine les conséquences macroéconomiques du développement de l'assurance sur le développement des marchés boursiers, du commerce international et de la croissance économique.

Les motivations de cette thèse se situent à plusieurs niveaux. Dans un contexte de baisse de l'aide au développement par rapport aux besoins, la principale motivation de cette thèse est d'étudier le secteur des investisseurs institutionnels particulièrement le secteur d'assurance qui constitue une source locale novatrice de mobilisation de ressources locales. Ensuite, à la

[8] Bon nombre d'assurés (et/ou de prospects) ne sont pas convaincus de la bonne foi des assureurs en ce qui concerne leur promesse de payer les sinistres en échange des cotisations qu'ils exigent. Dans les faits effectivement, on observe historiquement dans les pays en développement de nombreux retards importants dans le paiement des prestations dues aux bénéficiaires, ce qui a affecté gravement la crédibilité des opérations d'assurance-vie.

différence des études antérieures qui se sont plus focalisées sur les pays développés où le secteur de l'assurance est bien développé, nous nous limitons au pays en développement dont le secteur n'est pas encore développé et dont l'étude va permettre d'identifier des facteurs qui influencent son développement. Enfin, le choix d'étudier le secteur de l'assurance est motivé par le fait que malgré la crise financière de 2007-2008, les perspectives de croissance pour les investisseurs institutionnels en particulier le secteur d'assurance ne fléchissent pas, particulièrement dans les pays en développement. Dans cette perspective, le secteur de l'assurance pourrait offrir une source potentielle et diversifiée de financement à long terme pour répondre aux besoins d'investissement dans les pays en développement.

Pour ce faire, la thèse s'inscrit dans la littérature sur l'accès aux services financiers dans les pays en développement. En effet, selon une étude de la Banque Mondiale (2008), dans nombreux pays en développement, moins de la moitié de la population utilise les services financiers formels et en Afrique moins d'un ménage sur cinq a accès aux services financiers formels. Dans ce contexte, de très nombreuses études ont analysé les déterminants et les conséquences de l'accès aux services financiers formels dans les pays en développement (voir Claessens, 2006; Banque Mondiale, 2008; Beck, Demirgüç-Kunt et Honohan, 2009, etc.). Cependant, la plupart des recherches ont porté sur l'accès aux services bancaires et ont ignoré les services d'assurances qui constituent un segment important du secteur financier. De plus, le rôle des compagnies d'assurance comme les autres investisseurs institutionnels (fonds de pension, fonds communs de placement) dans la mobilisation de l'épargne et dans le financement des économies est devenu de plus en plus important surtout dans les pays développés. Ainsi, cette thèse vise à combler ce vide en analysant les déterminants et les conséquences de l'accès aux services d'assurance dans les pays en développement.

1.4. Les contributions de l'étude

Cette thèse contribue à la littérature sur l'économie de l'assurance à deux niveaux. Premièrement, elle contribue à la littérature en apportant des preuves empiriques sur les facteurs qui expliquent le développement de l'assurance et les caractéristiques structurelles qui expliquent l'hétérogénéité du développement du secteur d'assurance-vie et non-vie dans les pays en développement. Ainsi, contrairement à la littérature antérieure (Ward et Zurbruegg, 2002; Beck et Webb, 2003; Feyen et al, 2011; Lee et Chiu, 2012; Chang et Lee, 2012; etc.), nous analysons d'une part le rôle de la qualité des institutions sur la relation entre l'assurance-

vie et le niveau de revenu en Afrique Sub-Saharienne et d'autre part, l'effet direct et indirect des flux d'investissement direct étrangers sur le développement de l'assurance non-vie dans les pays en développement. De plus, nous examinons l'impact du crédit bancaire au secteur privé sur les activités d'assurance (assurance-vie et non-vie) et le sens de causalité entre ces services financiers (banques et assurances) pour les pays d'Afrique Sub-Saharienne.

Deuxièmement, nous contribuons à la littérature empirique en examinant les conséquences économiques du développement de l'assurance dans les pays en développement. De ce fait, la thèse a examiné d'abord l'impact de l'assurance-vie sur la croissance économique et également l'hétérogénéité de l'effet de l'assurance-vie dans les pays en développement. Ensuite, pour affiner nos analyses et évaluer la validité de la littérature théorique sur l'importance du développement de l'assurance, nous avons testé empiriquement si le développement de l'assurance affecte positivement le développement du marché boursier. Enfin, nous avons cherché à montrer si le développement du secteur d'assurance non-vie constitue un avantage comparatif au commerce international des pays. Pour ce faire, l'effet à long terme du développement des activités de l'assurance non-vie sur l'ouverture commerciale dans les pays en développement et spécifiquement dans les pays à faible revenu et revenu intermédiaire a été examiné.

1.5. Résumé de la thèse et principaux résultats

La première partie de la thèse est consacrée à l'analyse des facteurs du développement du secteur d'assurance dans les pays en développement. Pour ce faire, le chapitre 2 a examiné la relation entre le développement de l'assurance-vie et le revenu par habitant, et ses déterminants dans un échantillon de 20 pays d'Afrique Sub-saharienne (ASS). Dans ce chapitre il a été également question d'analyser l'hétérogénéité de l'impact marginal du niveau de revenu sur le développement de l'assurance-vie en fonction de la qualité des institutions. Ainsi, en contrôlant la présence de biais d'endogénéité par l'utilisation de la technique des variables instrumentales, nous trouvons des preuves que l'augmentation du revenu par habitant conduit à une augmentation des primes d'assurance-vie et que l'assurance-vie est un bien de luxe en ASS. En outre, nous avons trouvé que l'impact marginal du revenu par habitant sur le développement de l'assurance-vie dépend de la qualité de l'environnement juridique et politique. Enfin, l'effet marginal du niveau de développement économique sur l'assurance-vie est faible pour les pays dont le système légal est de tradition française par rapport à ceux non français.

Le chapitre 3 qui constitue une suite du chapitre 2, cherche à tester l'hypothèse selon laquelle les flux entrants d'investissements direct étrangers (IDE) améliorent le développement de l'assurance non-vie dans 76 pays en développement. A l'aide également de la méthode des variables instrumentales, nous avons montré que les flux d'IDE constituent un facteur clé dans le développement de l'assurance non-vie à la fois dans les pays d'Afrique Subsaharienne et dans les autres pays en développement de notre échantillon. Toutefois, les résultats montrent que l'effet marginal de l'IDE sur la pénétration d'assurance non-vie est faible pour les pays d'Afrique Sub-saharienne par rapport aux autres pays en développement.

Le chapitre 4 poursuit dans la même direction des déterminants du développement du secteur de l'assurance et analyse l'effet du crédit bancaire au secteur privé sur le développement de l'activité du secteur d'assurance (assurance vie, non-vie et assurance totale). Plus spécifiquement, ce chapitre a posé la question de savoir si le développement des activités bancaires sont complémentaires (ou substituables) à celles des compagnies d'assurance et a déterminé le sens de causalité entre les activités de ces intermédiaires financiers pour 20 pays d'Afrique Subsaharienne. Premièrement, les résultats de l'estimateur MG (Mean Group) de Pesaran et Smith (1995) indiquent que les activités d'assurance-vie et bancaire sont substituables car le crédit bancaire au secteur privé influence négativement la densité d'assurance-vie dans notre échantillon de panel de pays. Deuxièmement, le test de causalité en panel hétérogène en utilisant la méthode développé par Emirmahmutoglu et Kose (2011), indique une causalité unidirectionnelle allant du crédit bancaire au secteur privé vers la densité d'assurance-vie pour l'ensemble des pays de l'échantillon.

Pour résumer, notons que la première partie de la thèse a mis en évidence les facteurs économiques, financiers, démographiques et institutionnels qui expliquent l'hétérogénéité du développement du secteur d'assurance entre les pays et les différentes régions en développement.

La deuxième partie de la thèse se tourne vers l'analyse de l'effet du développement du secteur d'assurance sur les économies en développement. Trois chapitres constituent cette partie.

Le chapitre 5 analyse l'effet du développement de l'assurance-vie sur la croissance et de l'hétérogénéité de l'impact de l'assurance-vie sur un échantillon de 86 pays en développement au cours de la période 1996-2011. Les résultats économétriques montrent d'une part que le développement de l'assurance-vie a un effet positif sur la croissance économique et d'autre part, que cet effet varie selon les caractéristiques structurelles des pays. Ainsi, l'impact positif

marginal du développement de l'assurance-vie diminue avec les niveaux du taux d'intérêt des dépôts bancaires, du crédit bancaire et de la valeur des titres échangés sur le marché boursier tandis que l'effet est plus important dans les pays avec des institutions de haute qualité. Enfin, l'effet de l'assurance-vie sur la croissance est faible pour les pays de la région Afrique Subsaharienne et les pays dont le système légal est d'origine britannique par rapport aux autres pays. A la suite du chapitre 5, les chapitres 6 et 7 cherchent à identifier les canaux de transmission de l'effet du développement de l'assurance sur la croissance économique.

Le chapitre 6 teste l'hypothèse selon laquelle le développement des activités d'assurance améliore les activités du marché boursier. Pour tester l'existence de cet effet accélérateur induit par le secteur de l'assurance, un échantillon de 37 pays en développement et l'estimateur de données de panel dynamique sont utilisés. Les résultats montrent que la pénétration d'assurance augmente de façon significative la valeur des titres négociés sur le marché financier aussi bien avant et après la crise financière et économique de 2007. Par ailleurs, nous avons montré que le résultat est robuste à l'utilisation d'une mesure alternative de développement du marché boursier et au contrôle de la qualité du système politique et juridique.

Après avoir analysé les conséquences du développement du secteur d'assurance-vie sur la croissance (chapitre 5) et de l'assurance sur le marché financier (chapitre 6), le chapitre 7 explore la question du rôle à long terme de l'assurance non-vie sur le développement du commerce international. Pour ce faire, le chapitre a testé l'existence d'une relation de long terme entre le développement de l'assurance non-vie et l'ouverture commerciale dans 52 pays en développement au cours de la période 1990-2011, en utilisant l'estimateur PMG (Pooled Mean Group) développé par Pesaran et al. (1999). Les résultats indiquent un impact positif du développement de l'assurance non-vie sur l'ouverture au commerce international à long terme pour notre échantillon de pays en développement. Nous trouvons également l'effet positif et significatif à long terme de l'assurance non-vie sur l'ouverture commerciale dans le cas spécifique des pays à faible et moyen revenu.

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Part I:

Factors of Insurance Development

Chapter 2:
Economic Development and Life insurance Development in Sub-Saharan Africa: the Role of Institutions*.

Abstract

This paper analyzes the determinants of life insurance development on a panel of 20 countries of Sub-Saharan Africa over the period 1996-2011. Controlling for presence of a possible endogeneity bias using the instrumental variable technique, we find evidence that increased of income leads to an increase in life insurance premiums. The demographic variables such as life expectancy and young dependency ratios negatively influence the development of life insurance while old dependency ratio has a positive effect. We also find that the protection of property rights and government stability are positively associated to life insurance. Furthermore, the marginal impact of the income on life insurance varies according to the quality of legal and political environment. Finally, the marginal effect of the economic development on life insurance is less for french legal system countries compared to non-french legal system countries.

Keywords: Life insurance; economic development; institutional quality; instrumental variable, Sub-Saharan Africa.

JEL Classification: G220, O110, L60, C26.

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1. Introduction

Deepening the financial system requires not only an increase in the quantity of the services provided, but also an improvement in the "quality" of services offered, in order to better meet the different needs of economic agents. This is at a time to extend the duration of credits, to improve access for households and medium and small enterprises (financial inclusion) and diversify the supply of financial services, including insurance services. The development of insurance services contributes to stimulate the growth in developing countries (Arena, 2008). In this context, life insurance plays a special role because it allows at a time the supply of insurance service and long-term saving mobilization.

Life insurance is the one that covers the risks relating to the length of human life. There are two categories of life insurance products: *the insurance against the premature death of the insured and the rent contract (old-age insurance) which provides for the periodic payment of income to the insured for a specified period of time or more often during the life of the insured (Vaughan and Vaughan, 2003).* While the most important function of life insurance is to provide financial assistance to beneficiaries in case of premature death of the insured, the aim of the rent is to assure the continuity of incomes for the insured during the period of inactivity (retirement). Thus, life insurance plays an important role in the financial planning of individuals because it can be used as a hedge against the financial uncertainty resulting from the mortality risks incurred

Life insurance is also an important means by which the individuals with relatively low incomes can save and invest efficiently in the long run. Indeed, life insurance is a saving contract relatively simple that can be freely bought and regularly by small amounts. With the regular character or contractual of premiums payment by the policyholders, life insurance companies are able to mobilize the significant saving and stable compared to other financial systems. Thus, in pooling the saving of small and large investors, life insurance companies accumulate stable resources that can be used for heavy and risky investments that are beneficial to the economy (Dickinson, 2000). In this way, life insurance is an important instrument for economic development.

Life insurance companies activities have known experienced an important development over the recent years. Indeed, life insurance penetration (life insurance premiums as a percentage of GDP) at global level rose from 3.8% in 1996 to 4.6 % in 2000 and decreases to 3.6% in 2011 following at financial crisis. According to life insurance density (life insurance premiums per

capita), it increased from 207$ US per capita in 1996 to about 367$ US in 2011 (Swiss Re, 2013). In Sub-Saharan Africa, life insurance sector is not yet well developed as in the others areas economics. Indeed, in 2011, the share of Africa in world market of life insurance was only 1.79% against 35.9% in Europe, 35.28% in Asia, 22.75% in North America and 2.49% in Latin America and Caribbean. Moreover, we note that, the countries of OECD detain approximately 83.24% of the market in 2011 and 13.97% for emerging countries and 2.79% for the rest of developing countries. However, despite the marginal share of Africa in global life insurance market, we observe an important evolution of the sector. Direct life insurance premiums in Africa (including South Africa) increased from 16.444 billion $US in 1996 to 46. 261 billion $US in 2011, which shows that the turnover of life insurance companies has been doubled in less than twenty years. In Sub-Saharan Africa, life insurance penetration rose from 0.1505% in 1996 to 0.252% in 2011, whether a growth of life insurance premiums of about 67.44% over the period. Concerning life insurance density, it rose from 0.856 $US per capita to 4.092 $US over the same period. This shows that life insurance sector is increasing in the financial sphere and constitute an important potential source of mobilization of long-term resources and financing of enterprises. Thus, it appears therefore necessary to identify the factors likely to influence the development of life insurance sector in the Sub-Saharan Africa countries.

These figures highlight the importance of analyzing factors that influence the demand for life insurance and insurance development in economy. While some existing empirical research focuses on income per capita (Beenstock et al, 1988; Outreville, 1990; Enz, 2000), others emphasize, among other factors, on institutional quality (Ward and Zurbruegg, 2002; Beck and Webb, 2003; Esho et al; 2004; Chang and Lee,2012; and Dragos and Dragos, 2013) to explain the development of life insurance in countries. However, most of previous research (Beck and Webb, 2003; Feyen et al, 2011; Lee and Chiu, 2012; Chang and Lee, 2012) were more focused in developed and emerging countries and there have been a few studies that have examined factors that determine the development of life insurance sector in Sub-Saharan African countries. Furthermore, most of the empirical researches have less examined the effects of institutional factors that influence the demand and supply for life insurance. Our study therefore seeks to identify the determinants of life insurance development on the one hand and on the other hand to analyze the role of the institutions quality on effect of income per capita on life insurance activity in Sub-Saharan Africa.

We contribute to the literature on several levels. First, at best of our knowledge, this study represents one of the first to analyze the determinants of life insurance sector, taking into account the role of institutional factors in a sample of 20 countries in sub-Saharan Africa[9]. Thus, we examine the heterogeneity in economic development effect according to the institutions quality. Second, the chapter takes advantage of a recently released database that allow taking into account both demand and supply factors of life insurance over the period from 1996 to 2011. Thirdly, contrary to previous studies (Outreville, 1996; Beck and Webb, 2003; Feyen et al, 2011), this study estimates the fixed effect panel model with the heteroskedastic-efficient two-step generalized method of moments (IV-GMM) estimator which generates efficient coefficients as well as consistent standard errors estimates.

The rest of the chapter is organized as follows: The next section highlights the literature on economic, demographic and institutional determinants of life insurance development; the third section presents the variables and the stylized facts in Sub-Saharan Africa, econometric methodology and estimation technique are discussed in section fourth; the empirical results and the discussions following in section five and a conclusion is presented in the last section

2. Determinants of life insurance consumption: Literature review.

Theoretical models on life insurance consumption were mainly developed by Yaari (1965), Hakansson (1969), Fisher (1973) and Lewis (1989). Indeed, Yaari (1965) has developed a theoretical model to study the problem of the uncertain life time. In this context, life insurance demand is attributed to a person's desire to bequeath funds to his dependents and provide income for retirement. It is derived from the maximization of an individual utility function (Beck and Webb, 2003). Thus, this model assumes that the demand for life insurance is a function of wealth, expected income over an individual's lifetime, the level of interest rates, the cost of life insurance policies (administrative costs), assumed subjective discount rate for current and future consumption (Beck and Webb, 2003).

Lewis (1989) extends the model developed by Yaari by explicitly incorporating the preferences of other family member’s dependents and beneficiaries. Specifically, he derives the demand for life insurance, which depends on the probability of the breadwinner's death, the present value of the consumption of each offspring from the current period until the age he/she leaves the household, and of the spouse over her/his remaining life span, given that the breadwinner

[9] We were excluded South Africa from our study because its insurance sector is well developed as some developed countries and represents more than 80% market share of the Sub-Saharan region.

survives, the family's wealth, risk aversion, and the policy loading charge. Thus, using a one period life cycle model and assuming an iso-elastic utility function, the same degree of relative risk aversion for each household member, Lewis shows that the total of life insurance demand can be written as follows:

$$(1 - lp)F = Max\left\{[(1 - lp)/l(1 - p)]^{1/\delta}TC - W, 0\right\}$$

Where l is the policy loading factor (ratio of the life insurance costs its actuarial value), p the probability of the primary wage earner's death, F the face value of all life insurance written on the primary wage earner's life, δ a measure of the beneficiaries' relative risk aversion, TC the present value of consumption of each offspring until he/she leaves the household and of the spouse over his/her predicted remaining life time and W the household's net wealth (Beck and Webb, 2003). However, Lewis noted that the life insurance consumption is not only motived by consumer's demand. The price is probably the decisive factor in the life insurance consumption. Several important factors such as the urbanization level, the monetary stability, the bureaucratic quality, the rule of law, the control of corruption and banking sector development all impact the insurer's ability to provide cost-effective insurance. In the model of Lewis, described above, these factors can be represented by the policy loading factors.

In summary, the theoretical analyses identify variables such as income, interest rate, current consumption and wealth as variables that influence life insurance consumption. Demographic and social variables were also included in the theoretical models and their potential impact on individuals decision to use life insurance has been investigated. Thus, life insurance consumption increases with the probability of death of the main breadwinner in the family like the head of the family, the level of current consumption of the family and the degree of risk aversion. However, there is no presentation of the mechanisms by which other economic and non-economic variables affect life insurance activities.

In what follows, we highlight the results of some studies on the effects of macroeconomic, demographic and institutional factors on the development of life insurance.

Concerning the macroeconomic determinants of the life insurance premiums, most of the previous studies showed that income per capita measuring the economic development level is the main determinant. The income is an essential variable in life insurance consumption and this is justified by the necessity to maintain an income level to his descendants in the case of premature death. Another argument is that life insurance is a savings, so it is expected not only

that the insurance increases with income, but faster than income (i.e. ratio of insurance to GDP increases)

The studies by Fortune (1973), Beenstock et al. (1986), Browne and Kim (1993) and Outreville (1996) have shown that life insurance development is positively influenced by the income.

However, many of those studies have shown that the effect of income on life insurance depends on the level of economic development. Indeed, Truett and Truett (1990) have compared life insurance demand in Mexico and the United States during the period 1964-1984. They found that the income elasticity of life insurance consumption is higher in Mexico than in the US and conclude that life insurance is a good of necessity. Then, Enz (2000) has developed a logistic model to identify the factors of supply and demand that are likely to influence life insurance penetration (90 countries) over the period 1970-1998. He showed that the income elasticities of life insurance penetration are not constant and that the relationship between life insurance penetration and real GDP per capita has a "S" form called "*S-curve Model*». Thus, the income elasticity of life insurance penetration is near unity both for the high and low levels of income, but very high for middle-income level. Feyen et al. (2011) also found that life insurance consumption generally varies with income. They showed that the very wealthy groups of individuals may not need life insurance because they have excess financial assets while those very poor have not the means to purchase the life insurance products. In addition, they find that life insurance is a luxury commodity for poor families. Lee and Chiu (2012) used a PSTR (Panel Smooth Threshold Regression) model to examine the nonlinear relationship between life insurance penetration and income. Firstly, they found that there is a nonlinear relationship between life insurance premiums and income per capita and this relationship following a "*J*" curve model. Then, the income elasticities of life insurance premiums is inferior to unity. This means that life insurance is a good of necessity. Finally, they found that the income elasticities of life insurance premiums vary according to country and that is due to the heterogeneity of economic development of different countries in their sample.

Although, income is the main determinant of life insurance consumption, the literature has also analyzed the role of the quality of institutions. Life insurance is being primarily a contract linking the insurer and the policyholder and constituting one of the great investment on the stock markets, the quality of the institutional environment appears as an important variable in the promotion of life insurance activity (Lee and Chang, 2012). For example, an inability to appeal the violation of life insurance contracts by insurers reduced the value of these contracts for consumers and can deter them to subscribe of important sums for life insurance products

(Beck and Webb, 2003). Thus, the lack of property protection and contract enforcement impedes life insurers' ability to invest efficiently and control the price of their products. Knack and Keefer (1995 and 2002) have shown that, the strengthening of property rights can generate a motivation to subscribe to a life insurance. This is justified by the fact that the effective enforcement of legal rules relating to property rights helps to protect life insurance policyholders against the losses or the damages. Esho et al. (2004) also showed that a favorable legal environment and protection of property rights favor life insurance market development by reducing the risk in transfer transaction costs. Avram et al. (2010) found that the quality of the legal system and the protection of property rights exert a significant effect on life insurance development.

Furthermore, the lack of political stability can shorten the economic horizon for potential purchasers and suppliers of life insurance products and thus may discourage the development of life insurance market (Beck and Webb, 2003). Ward and Zurbruegg (2002) have shown that the political stability has a positive effect on the development of life insurance business in the developed and developing economies. Moreover, Dragos and Dragos (2013) analyzed the role of institutional factors in the promotion of life insurance activity on a sample of 31 European countries. According to them, to allow life insurance sector to emerge, it is necessary to have a favorable legal environment. Then, the results show that, the entrepreneurial freedom influences positively life insurance density, tax burden facilitation stimulates life insurance penetration and finally, a low level of corruption increases life insurance density.

Following the studies on the effects of economic development on life insurance sector development, Chang and Lee (2012)[10] have analyzed the role of institutional factors on the relationship between income and life insurance development from a dynamic panel threshold effect (PTR). They show that the income per capita influences positively the life insurance activities and the effect is more important in high-income countries than in low-income countries. They also find that the legal and political indicators have a positive effect on life insurance in low-income countries, but the effect is marginal in high-income countries. Which means that the role of institutions on life insurance development decreases with the level of economic development.

[10] However, their sample takes into account only three countries in Sub-Saharan Africa that are South Africa, Côte d'Ivoire and Zimbabwe.

In addition to indicators of economic and institutional development, literature has also identified other factors that influence the development of life insurance. Outreville (1996), Beck and Webb (2003) found that in addition to income, the level of financial development positively affects the consumption of life insurance while inflation negatively influences this one in developed and developing countries. Regarding the socio-demographic determinants, the variables such as the school enrollment, life expectancy at birth, young and old dependency ratios, size of social security system and share of public health expenditure were used in the literature as determinants of life insurance development. Indeed, Browne and Kim (1993) found that the life expectancy is not an important factor of life insurance consumption. However, some of the previous studies have shown that life expectancy positively affects life insurance penetration (Beenstock et al.; 1986, Outreville; 1996). Truett and Truett (1990) and Browne and Kim (1993) found a positive relationship between life insurance consumption and level of schooling. They explain this result by the fact that a higher level of education increases the ability of agents to understand the benefits in risk management and long-term saving (life insurance). However, Beck and Webb (2003) showed that the school enrollment rate, life expectancy, young dependency ratio and size of the social security system have not strong link with the consumption of life insurance in 68 countries from 1960 to 2000. Table A-2.1 in appendix summarizes the potential determinants of life insurance and their expected sign.

However, despite that, these studies showed that the economic and institutional factors influence the life insurance sector development, they are not exempt of some shortcomings. Indeed, the most previous studies have not analyzed the effect of the quality of institutions both on the life insurance penetration and density particularly in low-income countries. Moreover, they have focused on the developed and emerging countries and did not took into account the Sub-Saharan Africa countries, where the legal environment is less solid. In this context, our study tries to fill this gap and contributes to the previous literature by identifying the impact of income per capita on the development of life insurance sector and its determinants on the one hand and on the other hand, by analyzing the role of the quality of institutions on relationship between economic development and life insurance development. In this way, we highlight the heterogeneity of the effect of the economic development level on life insurance according to the quality of the legal and political environment.

3 Variables and stylized facts

3.1. Variables and their sources

According to literature (Beck and Webb; 2003, Arena; 2008, Avram et al, 2010, etc.), two indicators usually used to measure the development of life insurance are life insurance penetration and life insurance density. Life insurance penetration is defined as the ratio of premium volume to GDP. It measures the relative importance of insurance activity compared to the size of the economy. As for life insurance density is measured by premiums per capita, expressed in US dollars. This measure shows how much each inhabitant of the country spends on average on life insurance (Beck and Webb, 2003). Unlike previous studies which have used one or the other of these indicators in their analyzes (Arena; 2008, Haiss and Sümegi; 2008, Han et al., 2010, etc.), we employ two measures (insurance penetration and insurance density) of the development of life insurance activity. Indeed, the use of these two indicators is justified by several, reasons. Insurance penetration associates the scale of the insurance market with that of the economy, which is related to the overall demand for insurance within the economy. Insurance density, defined as the premium per capita, on the other hand, takes population into consideration, which is related to individual demand for insurance. Therefore, penetration is more closely related to the overall economic conditions than is density. Thus, the results with life insurance density may not be as uniformly as those of life insurance penetration. Life insurance penetration and density[11] are obtained from *Financial Structure and Economic Development Database of Beck and Al-Hussainy Ed (2013).*

The indicators related to the quality of institutions come from diverse sources. These variables were mainly used in the previous empirical studies on life insurance sector. First, we selected two indicators from the database of *Economic Freedom Heritage Foundation (2014)*. Thus, we have *Property_Rights* that is an assessment of the ability of individuals to accumulate private property, secured by clear laws that are fully enforced by the state. They also measure the quality of the legal system of the country to protect individuals and their financial assets. The second indicators is *Fiscal* (called fiscal freedom) which measures the tax burden imposed by Government. It includes both the direct tax burden in terms of the tax rates on individual and corporate incomes and the overall amount of tax revenue as a percentage of GDP. In scoring fiscal freedom, the underlined numerical variables are weighted equally as one-third of the

[11]Density was calculated from indicators of life insurance penetration , the total population and GDP

component. We anticipate that an increase in the burden of the tax has a negative effect on the premiums and the benefits of life insurance companies, so a reduction of life insurance sector development. The last two indicators of the quality of institutions come from the *International Country Risk Guide (ICRG) database*. *LawOrder* that measures the strength and independence of the judicial system, the degree to which citizens of a country are able to use the legal systems to solve disputes and enforce contracts. Thus, with the improvement of the rule of law in a country, we expect that the protection and enforcement of property rights derive facilitate the transaction of life insurance. The last is *Government_stability.* It measures the ability of governments to realize the programs they have planned and to remain in place. Thus, the lack of political stability shortens the economic horizon of potential purchasers and suppliers of life insurance and reduce life insurance market development. Before submitting our indicators of the quality of institutions in the econometric estimations, we normalize them by the following formula:

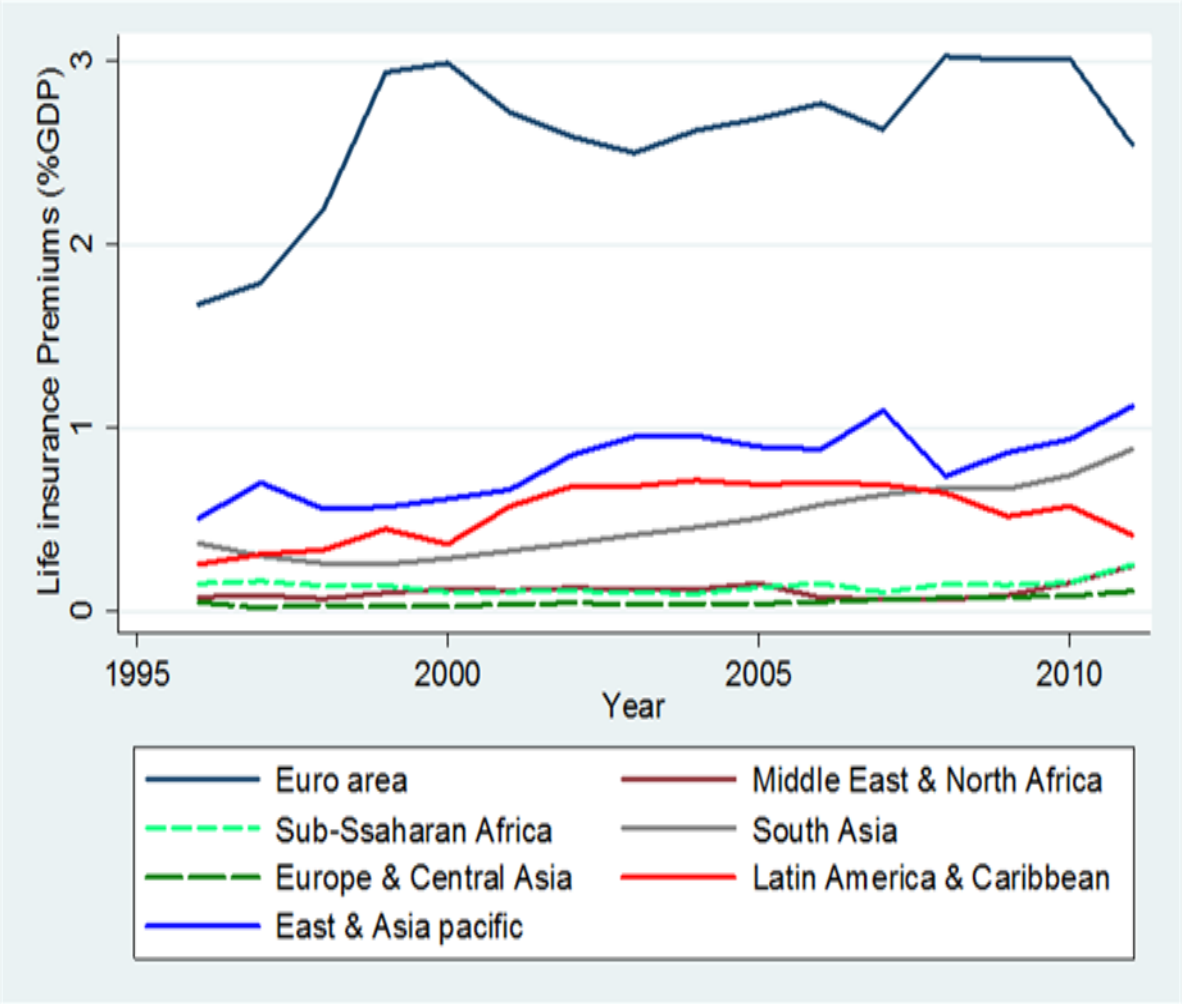
$\mathrm{INST_i} = \frac{\mathrm{Max\ (INST) - INST_i}}{\mathrm{Max(INST) - Min(INST)}}$, where $\mathrm{Max\,(INST)}$and $\mathrm{Min(INST)}$ represent maximum and minimum of each indicator of the quality of institutions. This transformation permits to have a range between 0 and 1. The higher values indicating better quality of institutions. Thus, the standardization facilitates direct comparison across different equations.

The different variables used are those analyzed in the theoretical literature as potential determinants of life insurance activities development. Thus, we have the economic development level, measured by the real GDP per capita. In addition to the income per capita, one have identified two economic and financial indicators that include, real interest rate and index of financial development measured by the liquidity ratio in the economy. Regarding the demographic factors we have retained, life expectancy at birth, young dependency ratio (ratio of the population under age 15 to the population ages 15-65) and old dependency ratio (ratio of the population over age 65 to the population ages 15-65). As mentioned in the empirical literature, this study also divides the dependency ratio into young and old dependency because life insurance products provide indemnity for two risks: mortality and longevity risk (Chang and Lee, 2012). This leaves consider that the different age groups demand different types of indemnities, where the divergent effects of demographic factors on life insurance development. All these variables are extracted in the database of *World Development Indicators (WDI, 2014)*. Table A-2.2 in the appendix shows the list of Sub-Saharan African countries selected.

3.2. Stylized facts

Figure 2.1 shows the evolution of life insurance penetration in the different economic regions over the period 1996 to 2011. We remark out in the Euro zone, life insurance penetration in the other regions is inferior to 1% of GDP. Indeed, life insurance contribute weakly to domestic income in developing countries (Sub-Saharan Africa, Middle East and North Africa, Europe and Central Asia)[12]. The development of life insurance seems to be related the economic development level and this is confirmed by the curve of the Euro zone and the East Asia and Pacific.

Figure 2.1: **Life insurance penetration in the economic regions, 1996-2011**



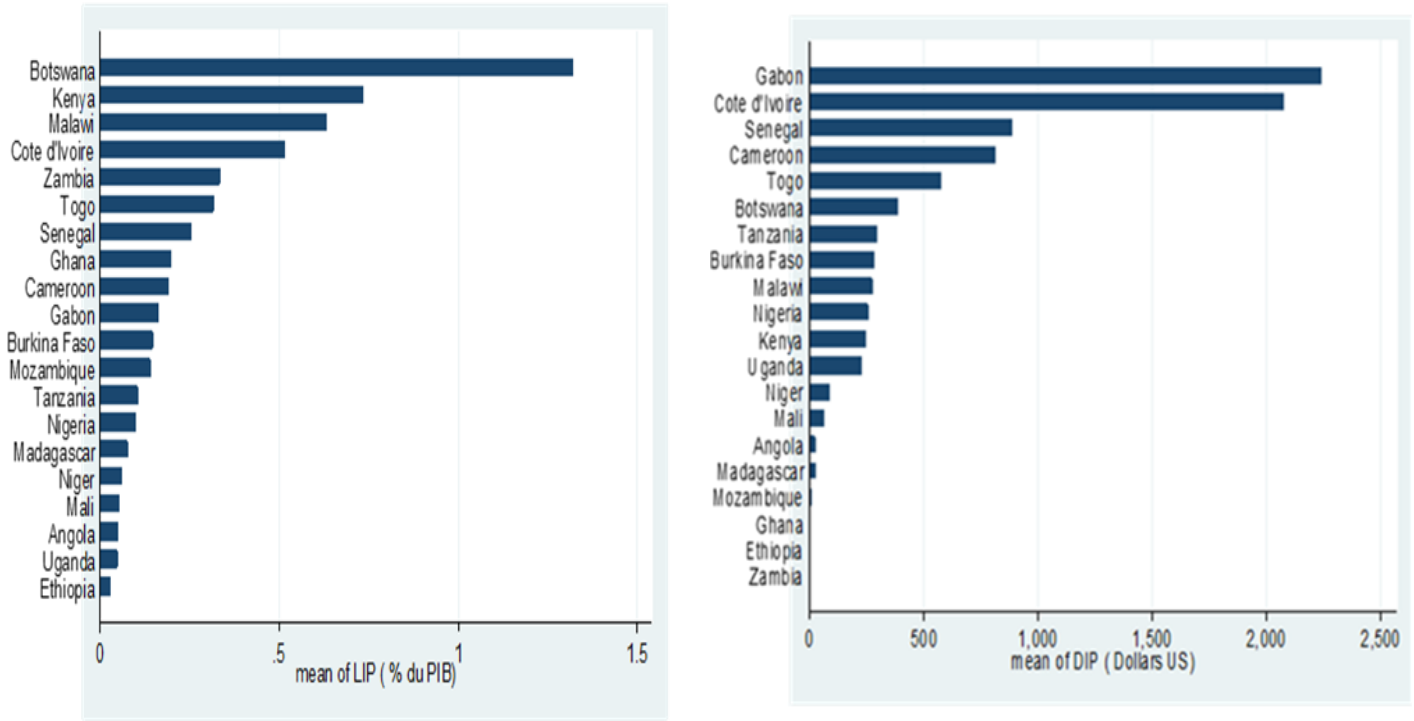
Source: Beck T. and Al-Hussainy Ed. (2013)

[12] Data on North America are not available.

Figure 2.2 shows a ranking of life insurance penetration and density in 20 countries in Sub-Saharan Africa. As we can see, life insurance development has very little to do with the size of a country. Nigeria which has the largest economy by far among these countries of the sample, has a smaller life insurance penetration and density countries than Botswana, Kenya, Malawi, and Cote d'Ivoire. Indeed, if we consider life insurance penetration (Figure 2.2a), the countries whose life insurance sector is more developed are Botswana, Malawi and Kenya. In return, for life insurance density (Figure 2.2b) are Gabon, Cote d'Ivoire and Senegal registering a more developed of life insurance. Moreover, we see that the countries like Ghana and Zambia occupy the last place in terms of density while they are well classified at the life insurance penetration.

Figure 2.2: **Ranking of countries according to the life insurance penetration (a) and density (b) on the average for the period 1996-2011**

(a) (b)



Source: Beck T. and Al-Hussainy Ed. (2013) and author's calculations

If we use the Table 2.1 below, we note that on the average, Gabon is the country that spends much money per capita (2239.516 $US) for life insurance consumption during the period 1996-2011, it is followed by Cote d'Ivoire (2071.566 $US) and Senegal (886.572 $US). However, Zambia is the country that spends less than 1 $US per capita for life insurance consumption. She is preceded by Ethiopia and Ghana whose life insurance density is to 1.035 $US and 1.616

$US respectively. In summary, the statistical analyses show that the measure of the development of life insurance varies according to the indicator used; hence the need to take into account the two measures in our econometric analysis, to identify the factors that influence the life insurance premiums development.

Table 2.1: Life insurance penetration and density (average the period 1996-2011)

Countries	Life insurance penetration	Life insurance density	Countries	Life insurance penetration	Life insurance density
Angola	0.049	23.143	Malawi	0.631	272.335
Botswana	1.319	386.079	Mali	0.052	59.613
Burkina	0.146	279.208	Mozambique	0.138	8.282
Cameroon	0.189	811.644	Niger	0.058	82.926
Cote d'Ivoire	0.515	2071.566	Nigeria	0.098	253.840
Ethiopia	0.028	1.035	Senegal	0.251	886.572
Gabon	0.160	2239.516	Tanzania	0.103	294.175
Ghana	0.195	1.616	Togo	0.314	573.184
Kenya	0.732	243.720	Uganda	0.045	227.432
Madagascar	0.075	21.853	Zambia	0.332	0.9160

Source: Beck, T. and Al-Hussainy, Ed. (2013) and author's calculations

4. Econometric Methodology

The definition of a structural model for the development of life insurance is not easy. Beck and Webb (2003) have indicated that life insurance premium reflects both the demand and supply and highlighted the difficulties to distinguish between supply and demand for life insurance. Nevertheless, we can follow Outreville (1996), who defines a reduced model of life insurance two models of life insurance demand and supply. Indeed, according to Outreville, life insurance demand is a function of the competitive structure of the domestic market and of the country's level of financial development and supply is also related to the commercial price of insurance, interest rates and other factors relating to market structure (Outreville, 1996). Thus, as life insurance premiums bought at the market is equal to the average price of one unit of insurance coverage (PI) multiplied by the quantity of insurance protection needed in life (Q), the reduced-form can be defined by:

$$\text{Premiums income} = PI * Q$$
$$= F(D, E, I)^{13} \quad (2.1)$$

Where D is a vector of demographic variables, E represents the vector of macroeconomic and financial variables and I vector of indicators of the institutions quality that can to influence life insurance demand and supply. After transformation, the linear model of the development life insurance can be written again in the following form:

$$y_{it} = \alpha + \beta_1 * D_{it} + \beta_2 * E_{it} + \beta_3 * I_{it} + \gamma_t + \varepsilon_{it} \quad (2.2)$$

Where y_{it}measures the indicator of the development of life insurance sector (Life insurance penetration or density), D_{it} vector of the demographic variables (Life expectancy, Young and old dependency ratios), E_{it} is a vector of economic and financial variables (GDP per capita, real interest rate and financial development) and I_{it} vector of indicators of the institutions quality (Property Rights, Fiscal Freedom, Law order and Government stability) for the country i in period t. α, β_1, β_2 and β_3 are unknown parameters to be estimated. γ and ε time fixed effects, and the idiosyncratic error term, respectively.

The estimation of factors that influence life insurance premiums (equation 1. 2) raises a number of issues that the endogeneity bias is most important problem. This problem may originate form a number of sources. Firstly, the endogeneity bias can arise from measurement errors in the regressor variables. Secondly, our measure of income per capita for example, could be correlated with other relevant determinants of life insurance premiums omitted. Finally, the most important problem, especially in this case may come mainly from the reverse causality between income per capita and life insurance premiums. Indeed, the literature has shown that there is a double causality between life insurance development and real income per capita (Ward and Zurbruegg, 2000). Then, other studies have shown that life insurance premiums have a positive effect on GDP per capita (Arena; 2008, Avram et al.; 2010, Lee et al.; 2013, etc.).

These problems above could lead to a statistical bias in the estimated on regressors, with Ordinary Least Squares (OLS), estimates exaggerating its impact of GDP per capita for example. In order to control this eventual simultaneity bias, we estimate equation (1.2) with the heteroskedastic-efficient two-step generalized method of moments (IV-GMM) estimator which generates efficient coefficients as well as consistent standard errors estimates. Indeed, the

[13]We tried to modify the basic model of Outreville (1996), for example, we have replaced the market structure in the supply level by the quality of institutions.

efficiency gains of this estimator relative to the traditional IV-2SLS estimator derive from the use of the optimal weighting matrix, the over-identifying restrictions of the model, and the relaxation of the independently and identically distributed (i.i.d.) assumption. For an exactly-identified model, the efficient IV-GMM and traditional IV-2SLS estimators coincide, and under the assumptions of conditional homoskedasticity and independence, the efficient IV-GMM estimator is the traditional IV-2SLS estimator (Baum et al. 2007). This technique requires the identification of variables that best explain the proxy of economic development (real GDP per capita) and which have not of the direct impact on life insurance premiums. Thus, in our econometric estimates, we choose the logarithm of the rainfall[14] lagged one year as an instrument of income per capita. Indeed, the rainfall has been used by Brückner (2011) as an instrument of income per capita to analyze the impact of economic growth and the size of the agricultural sector on urbanization rate. In addition to rainfall, we use the income per capita lagged two years as an instrument of income per capita. The underlying assumption is that these instruments do not have direct impact on life insurance premiums, their only impact being indirect through the channel of income per capita.

[14]The data on year-to-year variations in rainfall are from the National Aeronautics and Space Administration (NASA) Global Precipitation Climatology Project (GPCP), version 2.1 (Adler et al., 2003). These data are available from 1979 and to 2009. The rainfall data come at a high resolution (0.5 x0.5 latitude-longitude grid) and each rainfall observation in a given grid is constructed by interpolation of rainfall observed by all stations operating in that grid. Rainfall data are then aggregated to the country level by assigning grids to the geographic borders of countries (Bruckner, 2011).

5. Results

5.1. Baseline estimate results

Tables 2.2 and 2.3 show the results of econometric estimates of the determinants of life insurance penetration and density over the period from 1996 to 2011[15]. As we treat the endogeneity problem, the validity of our results depends on the quality of the instruments which are submitted to diagnostic tests that are the over-identification test of Hansen and the weak instruments of Cragg-Donald. The first stage estimation results of all the regressions show that our instruments are valid and this is confirmed by the statistics of the over-identification test of Hansen that is robust to heteroscedasticity and whose probability not allow to reject the hypothesis that the instruments are exogenous. Moreover, the comparison of Cragg-Donald statistics to critical values calculated by Stock and Yogo (2005) indicates the absence of the weak instruments problem because the Cragg-Donald statistics are higher.

Column (1) of table 2. 2 takes into account the income per capita and demographic indicators only. The results show that income per capita is a significant determinant of life insurance penetration. For example, an increase by one standard deviation of GDP per capita leads to an increase life insurance penetration of 37.716% (column 1). Life insurance penetration increases with the economic development level in the Sub-Saharan African (SSA). Life expectancy and young dependency ratio have a negative effect while old dependency ratio positively influences life insurance penetration. This result is robust when other variables are included in the regression (column 2 to 6). The positive effect of income in the SSA region is identical of previous studies with different samples and also shows that as income increases, life insurance penetration also increases (Fortune; 1973, Beenstock et al.; 1986, Browne and Kim; 1993, Outreville; 1996 and Beck and Webb; 2003). The negative effect of life expectancy is explained by the decrease of the mortality risk following the increase of life expectancy driving to reducing of the consumption of life insurance. As for the negative effect of young dependency ratio, it is explained by the fact that with a young dependency ratio high in a context of low income (ASS), the households are not able to meet their current needs for think about old-age insurance subscription and this leads to a decrease of the consumption of life insurance. Indeed, Chang and Lee (2012) showed that life expectancy and young dependency ratio have negative

[15] We do not test the stationarity of variables because the time dimension is small (16 years) and according to Hurlin and Mignon (2006) for that the problematic of stationarity presents an interest, the time dimension of the panel must exceed 20 years.

effects on life insurance penetration in countries where the income level is low, which is true with our results. Then, Beck and Webb (2003) and Feyen et al. (2011) also found a negative relationship between young dependency ratio and life insurance penetration. However, the positive effect of the old dependency ratio on life insurance penetration indicates that the demand for life insurance products increases with the aging population; which is verified by the development of life insurance in developed countries. Furthermore, the different effects of young and old dependency ratios reinforce our choice to use them separately in our estimates. As for the other economic variables namely the real interest rate and financial development, they have no significant effect on life insurance penetration in our sample.

The third group of results (column 3-6 of Table 2. 2) that is to say with the legal and political variables also confirm that real income per capita and demographic variables are significantly correlated with life insurance penetration. The quality of the judicial system (LawOrder) and political stability (Government_stability) have not significant effect on life insurance penetration. In contrast, property rights (Property_Rights) positively influence life insurance penetration at 10% level of significativity and fiscal is a measure of the tax burden imposed by Government is proved to be negatively significant for life insurance penetration. Thus, life insurance penetration is higher if the government relaxes the taxes for this sector. This result corroborates the work of Dragos and Dragos (2013) in a sample of 31 European countries.

Table 2.2: The determinants of life insurance penetration, in a Panel 1996-2011

	Insurance premiums (%GDP): IV/GMM-FE					
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
GDP per capita	0.2257***	0.224***	0.223***	0.225***	0.252***	0.225***
	(0.07570)	(0.0777)	(0.0800)	(0.0799)	(0.0792)	(0.0769)
Life expectancy	-0.0313***	-0.0315***	-0.0368***	-0.0318***	-0.0327***	-0.0316***
	(0.007462)	(0.00941)	(0.0103)	(0.00968)	(0.00949)	(0.00936)
Young Dependency	-0.0160***	-0.0174***	-0.0175***	-0.0173***	-0.0154***	-0.0174***
	(0.004222)	(0.00487)	(0.00507)	(0.00496)	(0.00517)	(0.00489)
Old Dependency	0.10031***	0.115***	0.134***	0.113***	0.101***	0.113***
	(0 .02978)	(0.0347)	(0.0420)	(0.0355)	(0.0314)	(0.0364)
Real Interest rate		-0.000757	-0.000998	-0.000787	-0.000943	-0.000764
		(0.000610)	(0.000792)	(0.000645)	(0.000716)	(0.000600)
Financial_depth		-0.00131	-0.000683	-0.00138	-0.00127	-0.00124
		(0.00380)	(0.00390)	(0.00407)	(0.00406)	(0.00387)
Property_Rights			0.156*			
			(0.0904)			
LawOrder				-0.0758		
				(0.162)		
Fiscal					-0.123*	
					(0.0674)	
Government_stability						0.0202
						(0.0789)
	First stage estimation					
Log (Rainfall) lagged one year	-0.10639*	-0.09585*	-0.09601*	-0.09513*	-0.09561	-0.09668*
	(0.0562)	(0.0548)	(0.05589)	(0.05729)	(0.0588)	(0.0557)
Real per capita GDP lagged two years	0.74773***	0.76625***	0.76687***	0.7668***	0.73529***	0.7669***
	(0.09410)	(0.09188)	(0.09139)	(0.09139)	(0.0928)	(0.09281)
Year dummies	Yes	yes	yes	yes	yes	yes
Observations	257	246	240	246	240	246
Centered R2	0.457	0.467	0.490	0.469	0.487	0.467
Number of id	20	20	20	20	20	20
Hansen J-OID test p-value	0.2838	0.3043	0.3025	0.2837	0.3095	0.3085
Cragg-Donald Wald F statistic	212.511	225.041	195.287	221.777	223.538	223.66
Kleibergen-Paap rk Wald F stat.	32.615	36.732	28.925	37.068	32.557	35.80
Critical value of Stock and Yogo (10%)	19.93	19.93	19.93	19.93	19.93	19.93

Robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1. To correct the effects of scale, we have divided GDP per capita by 1000. For the first stage estimation results, we have presented only the coefficients of the instruments, but all the exogenous variables are included in the regressions.

The estimations on life insurance penetration are replicated with the logarithm of life insurance density and are reported in Table 2.3. The results indicate that the income level in logarithm explains the increase in life insurance density in all the regressions. We observe that the income elasticities of life insurance demand is approximately unity: which mean that a variation of income per capita leads to a greater variation of life insurance density (column 1, 3, and 5). Thus, the results show that life insurance is a luxury commodity in our sample of SSA countries. This result was also found by Ward and Zurbruegg (2002) indicating that the estimated effect of income on the development of life insurance is higher for developing economies in Asia than for developed countries in OECD. The effect of life expectancy remains negative while the

effect of young dependency ratio becomes positive with life insurance density. Thus, we can say that the impact of demographic factors on life insurance depends on the measure of life insurance. As for old age dependency ratio, its effect on life insurance density is not significant but remains positive sign.

Table 2.3: The determinants of life insurance density in a Panel 1996-2011

	Log (Insurance premiums per capita) : IV/GMM-FE					
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
Log (GDP per capita)	1.023**	0.835*	1.162**	0.866**	1.037**	0.804*
	(0.445)	(0.439)	(0.503)	(0.436)	(0.465)	(0.452)
Life expectancy	-0.088***	-0.0807***	-0.0823***	-0.0834***	-0.0858***	-0.0794***
	(0.0203)	(0.0258)	(0.0252)	(0.0261)	(0.0253)	(0.0262)
Young Dependency	0.0355**	0.0328*	0.0352*	0.0337*	0.0314*	0.0328*
	(0.0152)	(0.0183)	(0.0186)	(0.0185)	(0.0178)	(0.0183)
Old Dependency	0.159	0.136	0.0681	0.130	0.113	0.155
	(0.115)	(0.126)	(0.151)	(0.127)	(0.128)	(0.138)
Real interest rate		0.00315	0.00237	0.00301	0.00158	0.00324
		(0.00257)	(0.00254)	(0.00259)	(0.00246)	(0.00260)
Financial_depth		0.00287	0.00299	0.00196	0.00457	0.00224
		(0.00617)	(0.00614)	(0.00609)	(0.00643)	(0.00608)
Property_Rights			0.533*			
			(0.295)			
LawOrder				-0.263		
				(0.373)		
Fiscal					-0.407**	
					(0.202)	
Government_stability						0.313*
						(0.175)
	First stage estimation					
Log (Rainfall) lagged one year	-0.07796*	-0.0602	0.05538	-0.05655	-0.0539	-0.05402
	(0.04025)	(0.03981)	(0.0396)	(0.03991)	(0.04133)	(0.03812)
Real per capita GDP lagged two years	0.2252***	0.2388***	0.2078***	0.24194***	0.21798***	0.23383***
	(0.0368)	(0.0374)	(0.03772)	(0.0371)	(0.0338)	(0.0363)
Year dummies	yes	Yes	Yes	Yes	Yes	Yes
Observations	257	246	240	246	240	246
Centered R2	0.527	0.520	0.557	0.522	0.563	0.521
Number of id	20	20	20	20	20	20
Hansen J-OID test p-value	0.9175	0.9613	0.9223	0.9975	0.9346	0.9784
Cragg-Donald Wald F stat.	44.33	44.30	31.90	44.889	38.700	44.458
Kleibergen-Paap rk Wald F stat.	22.32	23.62	17.77	24.380	23.959	22.890
Critical value of Stock and Yogo (10%)	19.93	19.93	19.93	19.93	19.93	19.93

Robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1. For the first stage estimation results, we have presented only the coefficients of the instruments, but all the exogenous variables are included in the regressions.

The effect of financial development and real interest on life insurance density remains not significant. Furthermore, the effect of the quality of judicial system (LawOrder) on life insurance density remains insignificant as in the case of life insurance penetration while the property rights (Property_Rights) is also significant. This result confirms that of Avram et al. (2010) which showed that the property rights influence positively life insurance density.

Finally, political stability has a positive effect on life insurance density. Thus, we confirm the results of Ward and Zurbruegg (2002) which showed that political stability exerts a significant impact on life insurance demand both in developed and developing countries. As for fiscal, its sign remains negative and significant on life insurance density as above with life insurance penetration.

5.2. Robustness checks

In this subsection, we conducted additional analyzes to confirm the robustness of our findings above. We add the variables identified in the literature likely to affect life insurance premiums. These additional variables are enrollment rate at the secondary (Education), Foreign Direct Investment inflows (FDI), remittances inflows and mandatory contribution rate for social security (Social_Security) as a proxy for the size of social security. We replace young and old dependency ratios by dependency ratio (ratio of people younger than 15 or older than 64 to population ages 15-64) in order to capture the overall effect as it has been done in one of the previous studies (Chang and Lee, 2012). These variables are also from the database of the *World Bank database*. The results of estimation to instrumental variable (IV-GMM) with heteroscedasticity correction are reported in Tables 2. 4 and 2. 5. The diagnostic statistics are favorable because the over-identification test of Hansen and the weak instruments of Cragg-Donald show that all our instruments are valid.

The results are qualitatively the same; which confirms the robustness of our results. The income per capita remains a significant determinant of life insurance penetration, as well as demographic factors preserve their signs (Table 2.4). The size of social security negatively influences life insurance penetration (column 2), while FDI exert a positive effect. The negative impact of social security suggests that a social security system well-developed reduces incentives and the need to buy pension products of the life insurance sector. The work of Ward and Zurbruegg (2002) and Feyen et al (2011) also found a negative effect of social security on life insurance consumption which reinforces our results. The positive effect of FDI was also found by Carson et al (2014). The remittances reduce the insurance penetration (column 1) and that is justified to the extent that the funds received from migrants constitute a sort of life insurance for other family members stayed in the country. According to the institutional indicators, they retain all their sign but only the governmental stability has a significant positive effect on life insurance penetration.

Table 2.4: Additional variables on the determinants of life insurance penetration

	Insurance premiums (%GDP): IV/GMM-FE							
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
GDP per capita	0.45477***	0.36813***	0.42598***	0.448***	0.4424***	0.460***	0.4304***	0.437***
	(0.1212)	(0.0914)	(0.1309)	(0.134)	(0.12705)	(0.138)	(0.1479)	(0.122)
Life expectancy	0.002193	-0.00209	0.01227	0.00159	0.002129	0.00403	0.01187	-0.00419
	(0.00619)	(0.0088)	(0.01591)	(0.0152)	(0.0133)	(0.0136)	(0.01708)	(0.0142)
Dependency_age	-0.0226**	-0.02812**	-0.0289***	-0.019***	-0.019***	-0.019***	-0.0288**	-0.0176**
	(0.00463)	(0.00533)	(0.0101)	(0.00691)	(0.00683)	(0.00692)	(0.01121)	(0.0069)
Real interest rate	0.00092	-0.00063	-0.00015	0.000630	0.000725	0.000601	-0.00036	0.0005
	(0.00132)	(0.0013)	(0.00228)	(0.00154)	(0.001392)	(0.00148)	(0.00250)	(0.0013)
Financial_depth	0.00576	0.00562	0.00096	-0.0011	-0.00166	-0.00125	0.00144	-0.0018
	(0.0036)	(0.00366)	(0.00662)	(0.00542)	(0.00499)	(0.00532)	(0.0069)	(0.005)
Social_Security		-0.00389*	-0.00145				-0.0015	
		(0.00197)	(0.00189)				(0.0022)	
FDI (% GDP)		0.00952***	0.01470***	0.0141***	0.01426***	0.0139***	0.01457***	0.0133***
		(0.0031)	(0.0041)	(0.0033)	(0.00356)	(0.0034)	(0.0044)	(0.003)
Remittance (%GDP)	-0.0115***							
	(0.00436)							
Education			-0.00410	-0.00246	-0.002080	-0.00245	-0.00426	-0.0014
			(0.00511)	(0.00424)	(0.00407)	(0.0042)	(0.00514)	(0.004)
Property_Rights				0.0504				
				(0.107)				
LawOrder					0.079747			
					(0.13072)			
Fiscal						0.0265	-0.02204	
						(0.0806)	(0.15982)	
Government_stability								0.198***
								(0.0682)
	First stage estimation							
Log (Rainfall) lagged one year	-0.09268*	-0.13584*	-0.07050	-0.04815	-0.04951	-0.04748	-0.08235	-0.04552
	(0.0493)	(0.06905)	(0.06086)	(0.0461)	(0.04667)	(0.04668)	(0.06423)	(0.04657)
Real per capita GDP lagged two years	0.6914***	0.73335***	0.8969***	0.90613***	0.91833	0.90614***	0.85695***	0.9223***
	(0.10346)	(0.10630)	(0.0829)	(0.0809)	(0.07920)	(0.07882)	(0.080347)	(0.07961)
Year dummies	No	No	No	No	No	No	No	No
Observations	222	147	112	159	161	159	110	161
Centered R2	0.4397	0.4406	0.4216	0.409	0.4015	0.406	0.4290	0.417
Number of id	20	12	12	17	17	17	12	17
Hansen J-OID test p-value	0.3360	0.3311	0.3172	0.2801	0.3094	0.2879	0.2990	0.2573
Cragg-Donald Wald F stat.	194.811	124.695	225.657	345.400	369.933	346.529	188.362	371.928
Kleibergen-Paap rk Wald F	24.680	30.999	64.658	69.425	74.544	73.737	64.036	74.115
Critical value of Stock and Yogo (10%)	19.93	19.93	19.93	19.93	19.93	19.93	19.93	19.93

Robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1. To correct the effects of scale, we have divided GDP per capita by 1000. For the first stage estimation results, we have presented only the coefficients of the instruments, but all the exogenous variables are included in the regressions.

The results of estimation on life insurance density with added variables (Table 2. 5) also confirm the effects of different variables on life insurance density. Thus, life insurance remains a luxury commodity in SSA because income elasticities are all greater than unity. However, social security, education and remittance have not significant impact on life insurance density. In addition, the institutional variables such as the tax burden (Fiscal) and the governmental stability (Government_stability) have significant effects and retain their sign on life insurance

density. The effect of property rights (Property_Rights) on life insurance density remains also significant while that of the rule of law (LawOrder) is not significant.

Table 2.5: Additional variables on the determinants of life insurance density

	Log (Insurance premiums per capita) : IV/GMM-FE							
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log (GDP per capita)	1.248**	2.0272**	2.369***	1.988***	1.627**	2.543***	2.3538***	2.821***
	(0.576)	(0.5521)	(0.531)	(0.613)	(0.623)	(0.545)	(0.6717)	(0.505)
Life expectancy	-0.076***	-0.050***	0.0018	-0.074*	-0.094**	-0.0296	-0.0164	-0.0308
	(0.0246)	(0.01802)	(0.0354)	(0.0404)	(0.0402)	(0.0281)	(0.0325)	(0.0311)
Dependency_age	0.0439***	-0.00697	0.0186	0.0550**	0.0596**	0.0226	0.0098	0.0290
	(0.0166)	(0.01328)	(0.0319)	(0.0265)	(0.0269)	(0.0222)	(0.0329)	(0.0240)
Real interest rate	0.00478	0.00496	0.00290	0.00192	0.00207	0.00196	0.00109	0.00261
	(0.00353)	(0.00345)	(0.00373)	(0.00291)	(0.0029)	(0.00282)	(0.0042)	(0.0027)
Financial_depth	0.00438	0.0312***	0.024***	0.00502	0.00392	0.0185**	0.0220**	0.017**
	(0.0066)	(0.0084)	(0.00897)	(0.00844)	(0.00755)	(0.00806)	(0.0111)	(0.008)
Social_Security		0.006813	0.00297				-0.00009	
		(0.0074)	(0.00720)				(0.0075)	
FDI (% GDP)		0.0292***	0.030***	0.0165*	0.0134	0.034***	0.0353***	0.029***
		(0.01032)	(0.00887)	(0.00893)	(0.00920)	(0.00797)	(0.0095)	(0.0076)
Remittance (%GDP)	-0.0204							
	(0.0136)							
Education			0.0128	0.00668	0.00433	0.0131	0.011763	0.0124
			(0.0151)	(0.0107)	(0.0112)	(0.0124)	(0.0142)	(0.0130)
Property_Rights				0.702**				
				(0.342)				
LawOrder					0.739*			
					(0.428)			
Fiscal						-0.611**	-0.71694	
						(0.237)	(0.48567)	
Government_stability								0.555***
								(0.177)
	First stage estimation							
Log (Rainfall) lagged one year	-0.06351	-0.08844*	-0.02789	-0.01795	-0.02382	-0.03114	-0.03454	-0.03331
	(0.03992)	(0.05118)	(0.0437)	(0.04328)	(0.04350)	(0.04113)	(0.04334)	(0.039)
Real per capita GDP lagged two years	0.1753***	0.1897***	0.273***	0.2619***	0.268***	0.2764***	0.2566***	0.288***
	(0.02933)	(0.03593)	(0.0381)	(0.04644)	(0.04552)	(0.03631)	(0.0412)	(0.0392)
Year dummies	yes	no	no	yes	yes	no	no	no
Observations	222	147	114	159	161	159	110	161
Centered R2	0.556	0.5398	0.546	0.610	0.620	0.569	0.5653	0.558
Number of id	20	12	12	17	17	17	12	17
Hansen J-OID test p-value	0.7563	0.7319	0.8285	0.5325	0.4474	0.8457	0.9206	0.8807
Cragg-Donald Wald F stat.	23.672	24.508	47.811	26.344	29.887	41.331	28.220	48.121
Kleibergen-Paap rk Wald F	19.987	16.671	27.473	16.203	17.885	30.219	20.241	28.406
Value of Stock and Yogo (10%)	19.93	19.93	19.93	19.93	19.93	19.93	19.93	19.93

Robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1. For the first stage estimation results, we have presented only the coefficients of the instruments, but all the exogenous variables are included in the regressions.

5.3. Exploring of role of the institutions quality in economic development effect

Even though the SSA countries share some common characteristics, there are some differences between them, including, their socio-political and institutional contexts. Furthermore, even though our results above show that income per capita is a significant determinant of life insurance development, we believe that the heterogeneity in terms of the quality of the legal and policy environment can affect life insurance level but also on the impact of the economic development level on life insurance penetration. In this context, we test five possible sources of heterogeneity: property rights, rule of law, tax burden (fiscal), government stability and colonization proxies by legal system. Indeed, literature has shown that financial sector is generally more developed in British legal system countries where the judicial system stresses on the private rights of individuals including their property rights (La Porta et al. 1998). In return, in the legal system of French origin, government plays an important role in financial sector particularly in insurance sector by the presence of social security companies that may be competitors of the life insurance companies.

To capture the role of the quality of the judicial and political system in the relationship between income per capita and life insurance penetration, we define the following equation:

$$y_{it} = \alpha' + \beta'_1 * GDP_{it} + \beta'_2 * I_{it} + \beta'_3 * GDP_{it} * I_{it} + \beta'_4 * X_{it} + \gamma'_t + \varepsilon_{it} \qquad (2.3)$$

Where y_{it} is life insurance penetration and I_{it} represents the institutional indicators that measures the strength of the domestic institutions for the country i in period t. Here, we empirically test that, $\beta'_3 = 0$, coefficient on the interaction term between GDP per capita and institutional variables is statistically significant. The underlying assumption is that the quality of institutions is likely to improve or reduce the impact of income per capita on life insurance premiums. Thus, if $\beta'_3 < 0$, the effect of income per capita on life insurance penetration is weak in countries where high-quality institutions. And, if $\beta'_3 > 0$, the effect of GDP per capita on life insurance penetration increases with the quality of institutions. In summary, the marginal effect of real income on life insurance penetration measured by: $\delta = \beta'_1 + \beta'_3 * I_{it}$ means that the reactivity of the life insurance penetration that result to the variation of income depends on the quality of institutions (I_{it}).

In empirical analysis, we estimate the equation (2.3) by always using the heteroskedastic-efficient two-step generalized method of moments (IV-GMM) estimator developed by Baum et al. (2007). In addition to the instruments used in estimate equation (2.2) above, the variable of

interaction between the institutions quality and rainfall lagged two year is also used as an instrument. The estimation results of the fixed effect panel with instrumental variable are reported in Table 2. 6. The diagnostics tests of the first stage estimation show that our estimates are robust because in all regressions, the over-identification test of Hansen and weak instruments of Cragg-Donald are valid.

In column (1), the estimated coefficient of the interaction between the protection of property rights and real GDP per capita is negative and significantly different from zero. Thus, there is an unfavourable effect of property rights on the impact of GDP per capita on life insurance penetration. Indeed, the impact of economic development is weak in the countries whose private property rights are high. All countries in the sample that are below property rights threshold (1.055), the effect of income on life insurance penetration is weak while it is high for countries at above the threshold. In other words, there is a possibility of insurance development in a context of low income if the institutions are good enough.

Columns (2), (3) and (4) indicate that the quality of the judicial system (rule of law), tax burden (Fiscal) and political stability not significantly influence the impact of income on life insurance penetration because the interaction coefficients are not significant. Furthermore, we observe that the effect of income per capita differs widely between the French and British legal system countries. The coefficient of interaction with the French legal system (column 5) is significantly negative which suggests that the marginal effect of income per capita on life insurance penetration is low for French legal system countries. Specifically, a 1% increase in GDP per capita leads to a 0.5366% increase in life insurance penetration for non-French legal country. This compares with a 0.0071% increase for a country in French legal system ceteris paribus. This situation is explained by the strong presence of the state in the economic system of the French legal system countries through the creation of social security companies for employees of public and private sector.

Table 2.6: Heterogeneity in the economic development effect on life insurance penetration.

	Insurance premiums (%GDP): IV/GMM-FE				
VARIABLES	(1)	(2)	(3)	(4)	(5)
GDP per capita	0.345***	0.627**	0.202**	0.285***	0.53663***
	(0.100)	(0.313)	(0.0923)	(0.0942)	(0.13910)
GDP per capita*Property_Rights	-0.327***				
	(0.119)				
Property_Rights	0.258***				
	(0.0819)				
Life expectancy	-0.0273***	-0.0426***	-0.0407***	-0.00651	-0.0240***
	(0.00968)	(0.0104)	(0.00852)	(0.00487)	(0.00679)
Young Dependency	-0.0152***	-0.0155***	-0.0111**	-0.0296***	-0.0081**
	(0.00464)	(0.00469)	(0.00439)	(0.00530)	(0.00369)
Old Dependency	0.0640	0.121***	0.0758**	0.0965***	0.04904*
	(0.0403)	(0.0347)	(0.0324)	(0.0361)	(0.02549)
Real interest rate	0.000367	-0.000770	-0.000775	-0.000892	0.000392
	(0.000690)	(0.000584)	(0.000724)	(0.000574)	(0.00042)
Financial_depth	-0.000461	-0.00106	-0.00332	0.00548**	-0.003648
	(0.00365)	(0.00363)	(0.00375)	(0.00257)	(0.00326)
GDP per Capita*LawOrder		-0.751			
		(0.517)			
LawOrder		0.406			
		(0.297)			
GDP per capita*Fiscal			0.0777		
			(0.0630)		
Fiscal			0.127		
			(0.0966)		
GDP*Government_stability				-0.116	
				(0.0992)	
Government_stability				0.159**	
				(0.0774)	
GDP per capita*French					-0.5295***
					(0.1400)
	First stage estimation				
Log (Rainfall) lagged one year	-0.10288**	-0.07937*	-0.07957	0.08997**	-0.06361
	(0.05124)	(0.04593)	(0.04868)	(0.03777)	(0.05391)
Rainfall*Institutions indicators lagged two years	0.023407	-0.1220***	-0.14017*	-0.004281	-0.07708
	(0.02871)	(0.04960)	(0.07340)	(0.00396)	(0.08816)
Real per capita GDP lagged two years	0.58626***	0.41410***	0.67453***	0.7350***	0.53198***
	(0.08779)	(0.12589)	(0.09894)	(0.07824)	(0.0886)
Year dummies	yes	yes	yes	no	yes
Observations	236	246	236	246	246
R-squared	0.514	0.491	0.482	0.411	0.506
Number of id	20	20	20	20	20
Hansen J-OID test p-value	0.3827	0.3052	0.0940	0.7137	0.3762
Cragg-Donald Wald F stat.	117.929	47.772	110.430	195.388	80.596
Kleibergen-Paap rk Wald F stat.	18.058	6.986	31.707	48.476	18.908
Critical value of Stock and Yogo (5%)	13.91	13.91	13.91	13.91	13.91

Robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1. To correct the effects of scale, we have divided GDP per capita by 1000. For the first stage estimation results, we have presented only the coefficients of the instruments, but all the exogenous variables are included in the regressions.

6. Conclusions and Policy Implications

In this chapter we explored the main factors that drive the development of life insurance sector and the role of the institutions quality in development economic effect on life insurance penetration in 20 countries of Sub-Saharan Africa from 1996 to 2011. Our work contributes to the empirical literature by using at a time the life insurance penetration and density as a measure of the development of life insurance sector and adding explanatory variables such as the quality of the legal and political system.

The results of life insurance regressions confirm some of the findings of previous empirical research on life insurance and add some additional findings. We find that income per capita is an important determinant of life insurance and that life insurance is a luxury commodity in Sub-Saharan African countries. The impact of economic development on life insurance depends on socio-political and institutional contexts. The demographic factors such as the life expectancy and young dependency ratio have a negative and significant influence on life insurance penetration and insurance density. In return, when the old dependency ratio increases, life insurance penetration increases. Finally, the results show that the quality of legal and political environment improves the emergence of life insurance sector. In addition, an increase in the size of social security system hinders the development of life insurance sector, by partly reducing the need for insurance but also by reducing the level of disposable income net of taxes and contributions.

Generally, these results provide a number of important policy implications. The positive effect of private property rights on life insurance suggests that a better legal system with improved private property rights would facilitate rapid development of life insurance sector. Then, the positive effect of political stability recommends the pursuit of reforms in political environment in order to strengthen investor confidence in insurance sector, particularly life insurance.

However despite the contribution of this work, it has some limits that the future research could take into account the factors that influence the development of insurance sector. For example, the future studies could include the variables such as population density, structure and regulation of life insurance market. In addition the study could be expanded to non-life insurance sector.

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Appendices

Table A-2.1: Determinants of life insurance and their expected sign

Variables	Expected sign	Justifications
Economic variables		
Income	+	The increase in income per capita should lead to an increase in life insurance consumption because individuals will have enough means to subscribe to an insurance with the aim to maintain their income in case of death.
Real interest rate	+/-	The increase in real interest rate increase the profitability of insurer's placements who in turn will provide the strong financial assessment and to attract the potential life insurance applicants (Beck and Webb, 2003). But an increase in interest rate can leads to a substitution of the life insurance to bank deposits
Financial development	+	The financial development contributes to strengthening the confidence of the life insurance consumer's
Social Security	-	The increase in government spending in the social security reduces the need for individuals to acquire a protection through the life insurance
Institutional variables		
Property Rights	+	A strengthening of property rights makes it more favorable legal and regulatory framework for the insurance industry development
Rule of Law	+	An improvement of Rule of Law in a country reinforce the protection and the application of the property right for to facilitate the life insurance transaction
Fiscal Freedom	-	An increase of the tax burden have a negative effect on the premiums and the profits of life insurance companies, thus a reduction of the insurance industry development.
Government stability	+	The political instability shackle the financial development and consequently a stable political environment stimulates the life insurance development.
Demographic variables		
Life expectancy	+/-	A high life expectancy leads to an increase of the savings component through life insurance especially the annuity component and / or decrease the mortality risk component
Young dependency ratio	+/-	Increasing the mortality risk component and/or decreasing the savings component
Old dependency ratio	+/-	Increasing the saving component and/or the mortality risk component

Table A-2.2: List of countries

Angola, Angola, Botswana, Burkina, Cameroon, Côte d'Ivoire, Ethiopia, Gabon, Ghana, Kenya, Madagascar, Malawi, Mali, Mozambique, Niger, Nigeria, Sénégal, Tanzania, Togo, Uganda, Zambia.

Table A-2.3: Descriptive statistics

Variables	Obs	Mean	Std. Dev.	Min	Max
Life insurance penetration	288	0.2722882	0.3521372	0.011	2.645
Life insurance density	288	456.0538	665.5353	0.427174	2885.916
GDP per capita	320	1082.384	1671.193	129.5231	7628.723
Life expectancy	320	52.64017	5.153914	40.77578	63.7989
Young Dependency Ratio	320	5.836393	1.176905	4.7655	11.24931
Old Dependency Ratio	320	85.32202	9.746554	54.42328	105.1271
Dependency ratio	320	91.15841	9.552795	60.07084	110.5901
Real interest rate	298	8.330733	14.28889	-94.2199	93.91508
Financial development	317	23.66522	8.712524	6.914201	54.03433
Property_Rights	312	0.6209207	0.2276376	0	1
LawOder	300	0.4904445	0.2323199	0	1
Fiscal_Freedom	312	0.4304792	0.2672678	-7.27e-08	1
Government_stability	300	0.3503111	0.195411	-3.98e-07	1
Social Security	189	3.985979	6.855506	0	33.61
FDI	320	3.399121	4.392516	-8.589433	40.16725
Education	196	29.80096	17.37159	5.16489	81.70265
Remittance	285	2.259679	2.855364	0.000197	13.0426
French	320	0.4	0.4906652	0	1

Chapter 3:

Does Foreign Direct Investment Promotes Non-life insurance in Developing countries?*

Abstract

This article investigates the impact of Foreign Direct Investment inflows (FDI) on insurance penetration in 76 developing countries between 1996 and 2011. The econometric estimates use the method of instrumental variable to take into account the potential endogeneity to analyze the effect of FDI. The main results show that an increase of FDI leads to an increase in non-life insurance premiums. In other words, our results suggest that there is another favorable impact of FDI on economic development beyond its positive impact on economic growth, namely its positive effect on the development of non-life insurance. Thus, we identify an additional determinant of the development of non-life insurance activity. This result is robust when using alternative estimation method and additional explanatory variables as well as the comparison between Sub-Saharan Africa and other developing countries. Finally, the marginal effect of FDI on insurance is less for SSA countries compared to non-SSA countries.

Keywords: Insurance Premiums, Foreign Direct Investment, Developing countries.

JEL codes: C33, F40, G22.

*A version of this chapter, co-authored with I. M. Ouédraogo and S. Guérineau, is currently under review in the journal *World Development*.

1. Introduction

Endogenous growth models argue that Foreign Direct Investment positively influences the growth of the receiving country by generating increasing returns in the production through the spillover effects (De Melo, 1997; Ford et al. 2008). According to OECD (2002), several channels may be identified: i) an increase in investment, income and employment, ii) an increase in government tax revenues through taxes collected from companies; iii) facilitation of transfer of technology and know-how in management in the beneficiary countries not only in the subsidiaries, but also in all the companies thanks to spillover effects; iv) a long-term contribution to integration of receiving economy in world economy by an increase of imports and exports, v) an increase of competition between the domestic companies. In addition to the positive externalities, foreign investment inflows also constitute financial asset flows for the existing companies. Since the 1990s, foreign direct investment (FDI) became the largest single source of external finance for many developing countries. FDI inflows to developing countries quadrupled between 1996 and 2011 (from 150 to 724 billion). During the same period, the share of world FDI received by developing countries grew up from 38.3% to about 82.3% (UNCTAD, 2015).

Most studies dedicated to the determinants and consequences of FDI are focused on the primary and manufacturing sectors. These macroeconomics studies have concluded that FDI have a positive effect on economic growth (Carkovic and Levine, 2002; Lipsey, 2002; Alfaro et al., 2004). The impact of FDI in the financial sectors, especially in the insurance sector has received less attention. Indeed, the insurance sector, as other financial services, has experienced a significant internationalization of its activities. Over the last twenty years, we observed an increase in the settlement of subsidiaries of large insurance groups in developing countries. For instance, large insurance groups as AGF, Allianz, Aviva, AXA, ING Group, Lloyd TSB, and the Royal Bank of Scotland Group hold subsidiaries in most developing countries. Moreover, foreign participation also contributes to the development of insurance sector reflected by the increase in turnover of insurance companies and supply of insurance services in developing countries. Indeed, in 2011 approximately 6.3% of world GDP was used to buy insurance products (total volume of direct insurance premiums amounted approximately 4.5 trillion $US)[16]. The value of total direct insurance premiums in Emerging countries and Africa has been multiplied by about six, rising from 129.4 billion $US in 1996 to 687.2 billion in 2011. In

[16] Sigma, World insurance in 2013, Swiss Re sigma No 3/2014

developing countries (Except emerging countries), insurance market is dominated by non-life insurance branch[17], which represents the main part insurance company's activities (Sigma, Swiss Re). During the same period the value of direct premiums of non-life insurance rose from 61.6 billion $US to 411.9 billion $US, i.e. an increase in premiums by more than six times in less than 20 years (Swiss Re sigma No 3/2014). Given its weight and rapid growth, this chapter is focused non-life insurance and because the chapter 2 has analyzed the impact of economic development on life insurance development and its determinants and the role of institutions in Sub-Saharan Africa.

As mentioned earlier, few studies focused on the impact of FDI on insurance sector, in spite of the key role of the latter in the financing of long run investment. Furthermore, especially non-life insurance, is an instrument by which companies protect themselves against risks, incites the latter's to invest in innovation and to participate in global markets. For example, by securing the investments, insurance can encourage multinational companies to invest more in high-risk countries like in developing countries, which can also help to boost non-life insurance consumption. Two channels of FDI effect on non-life insurance may be considered. First, FDI in insurance sector drives a "specific/direct" effect on insurance. Indeed, foreign investment could help to improve the financial conditions of insurance companies in host countries by increasing their capital equity. This specific channel is hardly analyzed since data on bilateral and sectoral FDI is not available for developing countries. Second, overall FDI may provide additional indirect effects. In developing countries, foreign companies not only pay higher salaries than domestic companies but also provide their employees better social services, (OECD, 2008). This may induce an increased demand for non-life insurance services by foreign. This additional demand from multinational firms' ("MF demand effect") may be significant in very small insurance sector. Third, foreign investment is likely to increase insurance demand through an income effect. Indeed, insurance being a luxury commodity in developing countries (Ward and Zurbruegg, 2002), the increase in wages and employment by FDI would lead to more demand for insurance services by MF employees. This study investigates the existence of the last two effects of FDI inflows on non-life insurance sector.

The existing literature on determinants of the insurance sector development (Outreville, 1990; Ward and Zurbruegg, 2002; Beck and Webb, 2003; Feyen et al., 2011 and Chen et al., 2012)

[17] According to sigma world insurance database, life insurance provides for the payment of a sum of money upon the death of the insured, or upon the insured surviving a given number of years while non-life insurance categories include health insurance, automobile insurance, homeowner's or renter's insurance and insurance to cover professional and business liabilities.

has paid little attention to effect of foreign investment on non-life insurance development mainly in developing countries. However, few studies analyzed the determinants of foreign investment attractiveness in insurance sector, but only in context of developed and emerging countries. Indeed, the previous studies (Moshirian, 1997 and 1999; Li and Moshirian, 2004; Outreville, 2008; Njegomir and Stojić, 2012) have showed that factors such as insurance services demand, insurance market size, human capital, good governance and solid economic fundamentals of the receiving country are the major factors which attract FDI in insurance services. Analyzing the investments in insurance sector in the United States, Li and Moshirian (2004) concluded that uncertainty of international exchange market increases investment risk and reduces foreign investors 'willingness to invest. The results of the study also indicate that financial development of the receiving countries contribute to expansion of FDI in insurance services while the relatively higher wages and higher cost of capital in host countries discourage foreign participation in sector. Outreville (2008) also shows that the regulatory barriers and market competitiveness have a significant influence on the choice of the receiving country by transnational insurance companies. At best of our knowledge, no studies have extended this analysis to developing countries; the main reason being the lack of bilateral-sectoral FDI data mentioned earlier.

The goal of chapter is twofold: i) to analyze the impact of foreign investment inflows on non-life insurance development in developing economies and ii) to identify a potential different effect of FDI in Sub-Saharan Africa. This reflection is important for at least two reasons. First, it contributes to literature on non-life insurance sector especially in developing countries where so far there are few empirical studies on the subject. Second, the previous studies have showed that the effect of FDI on growth depends of the quality of some characteristics of the receiving country (Borensztein et al., 1998; Alfaro et al, 2004). Thus, we go beyond the analysis of linear effect of FDI on the development of non-life insurance, by analyzing the conditional effect linked to human capital stock, infrastructure development and political risk profile of foreign investors. Thus, we highlight the heterogeneity of the impact of FDI on the development of non-life insurance sector in developing countries.

The rest of chapter is organized as follows. Section 2 discusses data and methodology used. Section 3 presents and examines the main results, including statistical analysis of our variables of interest. To this end, the regressions are run using by the method of instrumental variable estimation (IV-GMM) with heteroscedasticity correction to palliate at the best endogeneity of some variables on a sample of 76 developing countries during the period 1996-2011. Finally,

section 4 summarizes the main finding and identifies policy implications for the development of non-life insurance.

2. Empirical methodology and data analysis

2.1. Empirical methodology

In line with the existing literature[18], the empirical strategy of the development of non-life insurance can be defined as follows**:**

$$(\text{Premiums/GDP})_{i,t} = \alpha + \beta_1 * (\text{FDI/GDP})_{i,t} + \beta_2 * X_{i,t} + \eta_t + \varepsilon_{it} \quad (3.1)$$

Where $(\text{Premiums/GDP})_{i,t}$indicates the non-life insurance penetration for the country i in period t, $(\text{FDI/GDP})_{i,t}$ the inward foreign investment flows received by country i to GDP in period t and $X_{i,t}$ is a vector of control variables that measure the financial, economic and political characteristics of country i at period t. α, β_1 and β_2 are unknown parameters to be estimated. η and ε are time fixed effects and idiosyncratic error term, respectively. β_1 our coefficient of interest; its sign will allow us to answer the following question: do foreign investment inflows have a positive or negative influence on the development of non-life insurance in the developing countries?

The estimation of the effect of foreign investment inflows on non-life insurance penetration (equation 3.1) raises some issues. The endogeneity bias is first and potentially the most important problem to be dealt with. This problem may originate from a number of sources. Firstly, there is the simultaneity bias, where some regressors as foreign investment are determined simultaneously with the non-life insurance premiums, therefore creating a correlation between foreign investment and residue of our model. Then, omission of the some of relevant determinants of non-life insurance among our explanatory variables could lead to non-robustness of OLS estimator. Nevertheless, introduction of some control variables helps to overcome to the omitted variables problem. Finally, the bias of identification may come from measuring errors of some explanatory variables in our model. In this case, the estimated

[18]Outreville (1990 and 1996) and Beck and Webb (2003) argue that it is difficult to separate the supply and demand of insurance and that insurance penetration is at once both.

coefficient of foreign direct investment with OLS estimator is biased in this sense that effect of foreign investment will be overestimated.

To overcome the problems identified above, we use as instrumental variable, the natural resource income as a percentage of GDP, which is strongly correlated with foreign investment, but not with non- life insurance penetration. Indeed, we rely on the work of Asiedu (2006) and Hailu (2010), who have shown that African countries that are endowed with natural resources attract more FDI. Foreign investment inflows lagged one year are used as a second instrument. We use the heteroskedastic-efficient two-step generalized method of moments (IV-GMM) estimator which generates efficient coefficients as well as consistent standard errors estimates. Indeed, according to Baum et al (2007), the efficiency gains of this estimator relative to traditional IV-2SLS estimator derive from the use of optimal weighting matrix, the over-identifying restrictions of model, and the relaxation of the independently and identically distributed (i.i.d.) assumption. For an exactly-identified model, efficient IV-GMM and traditional IV-2SLS estimators coincide, and under the assumptions of conditional homoskedasticity and independence, the efficient IV-GMM estimator is the traditional IV-2SLS estimator (Baum et al. 2007). Thus, to examine empirically the exogeneity of our instruments we report in the results of our estimates, the *p-values* on the test over-identification of Hansen and statistics test of weak instruments of Cragg-Donald.

2.2. Dataset

In this study, we use a set of annual panel data of 76 developing countries (see Appendix A-3.1) over the period 1996 to 2011. Our dependent variable that measures the development of non-life insurance is defined as the ratio of the total premiums volume for non-life to GDP. The data on non-life insurance premiums are taken from *Financial Development and Structure Dataset database.* The explanatory variable is the ratio of inward foreign direct investments flows to GDP (FDI) in a country and measures the investment flows to acquire a permanent participation in an enterprise operating in an economy other than that of the investor. Data on foreign investment comes from *United Nations Conference on Trade and Development database* (UNCTAD).

As to control variables, we use two financial development indicators the ratio of liquid liabilities to GDP and the ratio of bank credit to private sector to GDP. They are drawn from the *Financial*

Development and Structure Dataset database. In addition to the financial variables, we chose real GDP per capita, urbanization rate, real interest rate, inflation rate, trade openness and Gini index to account income inequality. These indicators are taken from the *World Bank database.* Finally, we include the variables measuring the institutions quality that are drawn from the *Worldwide Governance Indicators (WGI)* database *of the World Bank*. Six dimensions of governance are measured: voice and accountability, political stability and absence of violence, government effectiveness, regulatory quality, rule of law, and control of corruption. These six indicators are defined in the appendix. Using these governance indicators as the determinants of non-life insurance penetration is justified insofar as the decision to purchase insurance depends above all on the people perceptions about the quality of governance in country. Indeed, if the individuals think that their rights are not correctly protected when they subscribe to an insurance due to weakly efficient legal rules, their willingness to conclude an insurance contract can be reduced (Beck and Webb, 2003). Thus, the quality of institutions should strengthen the consumption of non-life insurance. We normalize our indicators on a scale from 0 to 1. The higher values indicate a better quality of governance.

3.3. Results

3.1. Descriptive statistics and figure

Table 3.1 summarizes the descriptive statistics of the main variables of the panel of 76 developing countries over the period 1996-2011. We observe non-life insurance penetration is low compared to the level of FDI inflows, liquid liabilities and Bank credit to Private sector. Moreover, there is considerable variation in share of FDI in GDP across countries, ranging from -14.4%[19] in Azerbaijan (average 1996-2011) to 46.5% in Chad (average 1996-2011). Non-life insurance premiums to GDP also show variation, ranging from 0.124% for Chad to 11.6% for Bulgaria. There are significant changes in inflation, real interest rate, trade openness, urbanization rate and Gini index.

Table 3.1: Descriptive statistics of the main variables

Variables	Obs	Mean	Std. Dev.	Min	Max
Non-life insurance Penetration (NLIP)	1232	1.022	0.714	0.124	11.612
Inward FDI flows	1207	3.794	4.531	-14.369	46.500
Liquid liabilities	1174	3.520	0.658	1.448	5.397
Bank credit to the Private	1167	3.041	0.867	0.048	5.110
Logarithm in GDP per capita	1196	7.266	1.077	4.853	9.353
Inflation	1222	16.108	158.793	-23.845	5399.53
Real interest rate	989	8.318	12.774	-94.219	97.474
Trade Openness	1222	78.288	36.708	14.932	220.407
Urbanization Rate	1232	47.659	20.168	7.412	91.133
Gini index	1017	42.783	9.054	15.370	75.256
Corruption	1000	0.618	0.181	0	1
Rule of Law	1001	0.545	0.197	0	1
Regulatory quality	1001	0.495	0.168	0	1
Gov. Effectiveness	1000	0.543	0.173	0	1
Political stability	1001	0.412	0.194	0	1
Voice and Accountability	1001	0.478	0.221	0	1

Source: WDI and author's calculations

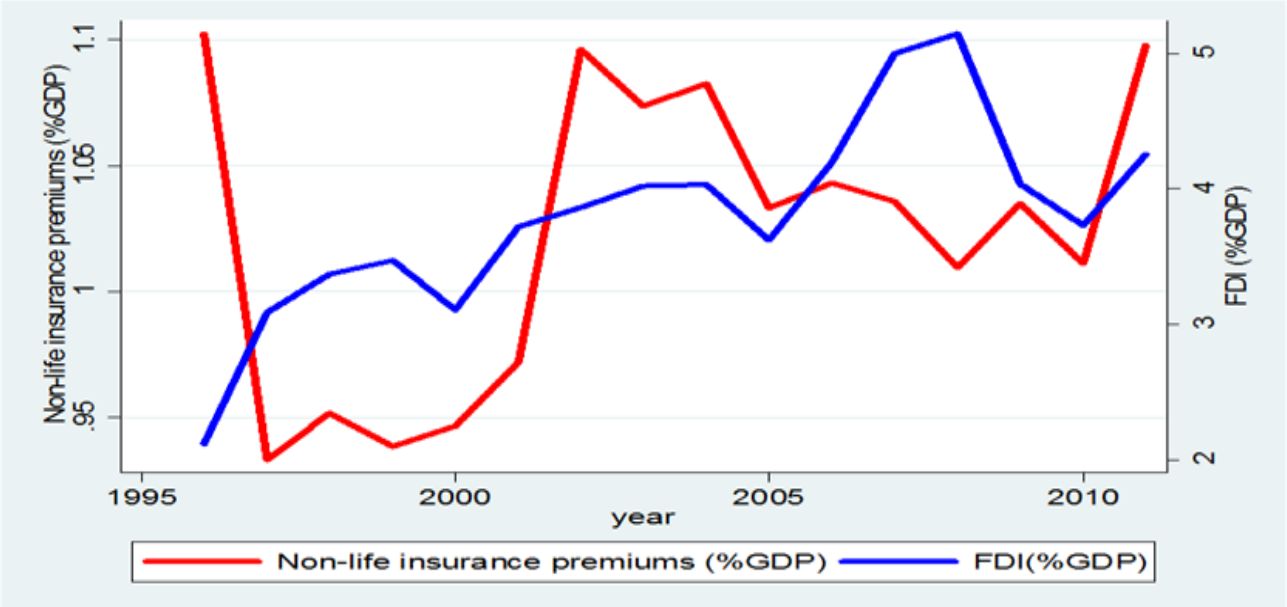
Figure 3.1 shows the evolution of non-life insurance penetration and foreign direct investment inflows in the sample. We observe a serrated evolution of the two curves with upward trends during our study period. Indeed, non-life insurance penetration has experienced a significant increase from the year 2000 before falling at the end of year 2007. The decline of non-life insurance premiums in 2007 is partly explained by the financial crisis of 2007, leading to the

[19] Negative sign of FDI inflows indicates disinvestment in the country.

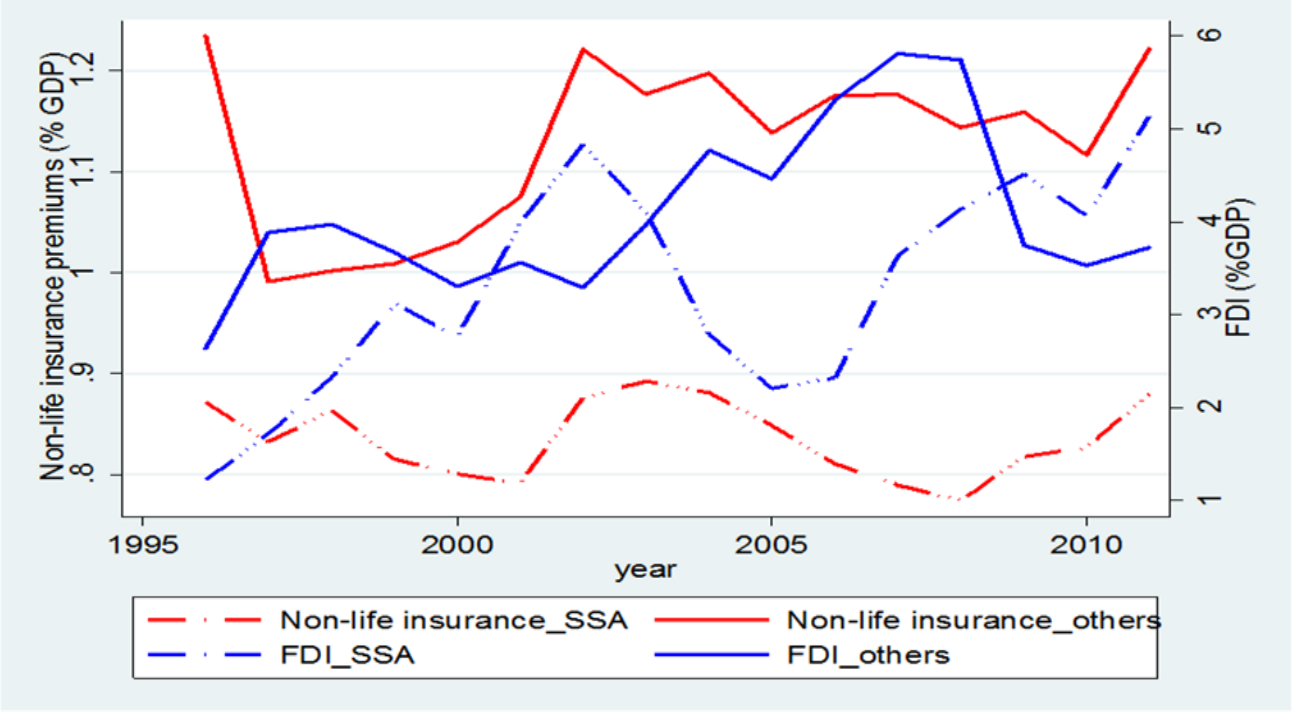
decrease in income and consumption. According to the foreign investment inflows, we observe a strong growth from the years 2005 steadily to a peak in 2007 before knowing a sharp fall until 2010. This FDI dynamic is also due to the financial crisis of 2007 causing a decline in turnover of multinational firms. We note a recovery after 2010. Finally, Sub-Saharan African countries and other developing countries exhibit similar trends than total sample.

Figure 3.1: Non-life insurance penetration and FDI inflows, 1996-2011

All countries (76 countries)



ASS (28 countries) and Other developing countries (48 countries)



Source: WDI and author's calculations

3.2. The preliminary results

The results of the estimates over the period 1996-2011[20] are presented in Table 3.2 with non-life insurance penetration as the dependent variable. In all models, the diagnostic tests associated with instrumental variable estimator are conclusive. Indeed, Hansen and Cragg-Donald tests indicate a weak correlation between the instruments and the error term. Therefore, there is no problem of instrumentation as indicated by Baum et al. (2007). The Hansen J over-identification test (which is robust to heteroscedasticity) is valid in all regressions because the probabilities do not allow to reject the hypothesis that the instruments are exogenous. In addition, the comparison of statistics Cragg-Donald critical values calculated by Stock and Yogo (2005) shows that Cragg-Donald statistics are much higher than those of Stock and Yogo at 10%, confirming the absence of weak instruments problems.

Table 3.2 reports the results of estimation of the impact of foreign investment inflows on non-life insurance penetration by controlling alternately other determinants. We remark that regardless of the specifications, foreign direct investment is always positively and significantly associated with non-life insurance penetration. Indeed, the developing countries with a large flow of foreign direct investment, tend to have a greater non-life insurance penetration, even by controlling the effect of GDP per capita, financial development and institutional quality. In terms of the impact of foreign investment inflows, the coefficient varies between 0.006 and 0.015, depending on the regressions considered (column 1 to 10). Based on the results of model without institutional indicators (column 3), a one standard deviation increase in foreign direct investment inflows would increase non-life insurance penetration by 6.2%. Thus, the results provide additional empirical evidence on FDI in effect by showing that the development of insurance sector is a transmission channel of the impact of FDI on economic development. This result confirms the income effect of FDI on insurance development and purchase non-life insurance by foreign companies.

The indicators of financial development namely the liquid liabilities and bank credit to private sector have a positive impact on non-life insurance activities (column 1 and 2), confirming the results of previous studies (Outreville, 1990 and 1996). As for the others control variables, real income per capita and trade openness rate influence positively non-life insurance, while

[20]We do not test the stationarity of variables because the time dimension is small (16 years) and according to Hurlin and Mignon (2006) for that the problematic of stationarity presents an interest, the time dimension of the panel must exceed 20 years.

inflation and Gini index have a negative impact. However, real interest rate and urbanization rate have not a significant effect on non-life insurance penetration. This can be explained by the sample size that decreases with the introduction of these variables.

Furthermore, taking into account the indicators of quality of governance, only the index of political stability (column 7) has a positive significant effect on non-life insurance penetration in our sample. We cannot identify a significant impact of corruption, government effectiveness, regulatory quality, rule of law and voice and accountability on non-life premiums to GDP. The positive effect of political stability shows that insurance industry just like other financial sectors needs a stable political environment in order to develop. Regarding to effect no significant of other institutional indicators, this can be explained by the existence of non-linear effect of the institutions quality and measurement issues.

Table 3.2 : **Impact of FDI on non-life insurance penetration, 1996-2011**

	Non-life insurance premiums (%GDP): IV/GMM-FE									
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
FDI	0.0087***	0.00639**	0.0135***	0.0151***	0.0119***	0.0125***	0.00964**	0.0134***	0.0117***	0.0119***
	(0.0029)	(0.0027)	(0.0038)	(0.00428	(0.00412)	(0.00423)	(0.00404)	(0.00455)	(0.00416)	(0.00409)
Liquid liabilities	0.0082***		0.00512***	0.0035***	0.00464***	0.00463**	0.00495***	0.00459**	0.00457**	0.00487***
	(0.00178)		(0.0015)	(0.0010)	(0.00179)	(0.00180)	(0.00182)	(0.00182)	(0.00178)	(0.00176)
GDP per capita in logarithm			0.441***	0.553***	0.467***	0.501***	0.511***	0.563***	0.461***	0.462***
			(0.121)	(0.152)	(0.154)	(0.161)	(0.156)	(0.166)	(0.146)	(0.156)
inflation			-0.00065***	-0.0007***	6.44e-05	9.42e-05	-0.000677	-9.74e-05	0.000117	-0.000111
			(0.00021)	(0.000250)	(0.000873)	(0.000885)	(0.000832)	(0.000846)	(0.000868)	(0.000904)
Real interest rate			-0.0022	-0.0022	-0.00116	-0.00106	-0.00177	-0.00108	-0.00104	-0.00158
			(0.00149)	(0.0015)	(0.00241)	(0.00241)	(0.00235)	(0.00239)	(0.00239)	(0.00250)
Trade Openness			0.0020*	0.00147	0.00313**	0.00296**	0.00348**	0.00296*	0.00312**	0.00320**
			(0.0011)	(0.00105)	(0.00149)	(0.00150)	(0.00152)	(0.00151)	(0.00149)	(0.00150)
Urbanization rate			-0.0062	-0.00432	-0.00464	-0.00506	-0.00633	-0.00468	-0.00451	-0.00547
			(0.0088)	(0.0070)	(0.0114)	(0.0112)	(0.0112)	(0.0113)	(0.0116)	(0.0116)
Bank credit to the Private sector		0.0074***								
		(0.00136)								
Gini index				-0.00696*						
				(0.00417)						
Control of Corruption					0.0941					
					(0.186)					
Gov. Effectiveness						0.321				
						(0.343)				
Political Stability							0.712***			
							(0.183)			
Regulatory Quality								0.400		
								(0.265)		
Rule of Law									-0.0300	
									(0.261)	
Voice and Accountability										0.333
										(0.278)
Years dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,078	1,075	838	696	668	668	668	668	668	668
Centered R2	0.069	0.074	0.084	0.158	0.069	0.070	0.087	0.070	0.068	0.071
Number of id	76	76	64	60	64	64	64	64	64	64
Hansen J-OID test p-value	0.5666	0.6343	0.7939	0.2378	0.9151	0.8322	0.9554	0.9588	0.9389	0.8953
Cragg–Donald stat	315.978	309.839	231.954	174.133	212.106	213.672	211.422	203.180	210.850	214.111
Critical value of Stock and Yogo (10%)	19.93	19.93	19.93	19.93	19.93	19.93	19.93	19.93	19.93	19.93

Note: Robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

3.3. Further analyses and robustness checks

In order to verify the stability of our results, we are undertaking several robustness tests. Thus, we initially use an alternative estimation method (system-GMM), which also deals with endogeneity problem and secondly, we increase the number of control variables. The last analysis in this sub-section compares the poorest group of countries (Sub-Saharan Africa) to other developing countries and investigates the heterogeneity in impact of FDI across countries.

i) Alternative estimation method: using the System GMM estimator

The robustness of our results is examined by re-estimating the equation using system GMM estimator that also deals the endogeneity issue. Furthermore, Blundell and Bond (1998) showed through Monte Carlo simulations that System GMM estimator is efficient in samples of relatively small size as in our case[21]. Thus, we use GMM estimator in two stages with correction of Windmeijer (2005) to test the robustness of our results obtained with the instrumental variable estimator of Baum et al (2007).

The estimation results with the alternative method are presented in Table 3.3. In all regressions, the diagnostic tests associated with System GMM estimator are conclusive. Indeed, the second order autocorrelation tests of model residuals in first differences and Hansen over-identification tests validated the estimation procedure. The results of all regressions show that effect of foreign investment inflows on non-life insurance penetration is significant and positive, that confirms the robustness of our previous results. In addition, non-life insurance penetration lagged one year has a significant effect on non-life insurance. However, we note that political stability has not a significant effect on the development of insurance sector.

In addition, inflation has a positive and significant impact on non-life insurance penetration (column 4 to 9) when the effect of the institutions quality is controlled. The positive effect of inflation could be explained by the fact that inflationary asset bubbles boost insurable economic activity, particularly in real estate sector (Feyen et al, 2011).

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[21] Thus, the equations in levels and the equations in first differences are combined in a system and estimated with an extended System-GMM estimator which allows for the use of lagged differences and lagged levels of the explanatory variables as instruments (Blundell and Bond, 1998).

Table 3.3: Testing for alternative estimation method: System GMM

	Non-life insurance premiums (%GDP) : GMM system								
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Non-life insurance premiums (t-1)	0.7616**	0.665***	0.8345***	0.7049***	0.51239***	0.4858***	0.5354***	0.905***	0.8636***
	(0.1065)	(0.081)	(0.0891)	(0.1088)	(0.1238)	(0.1749)	(0.1697)	(0.0357)	(0.0526)
FDI	0.00907**	0.00833**	0.00619**	0.00506*	0.00653**	0.00603**	0.0043**	0.00486*	0.00506*
	(0.0039)	(0.0033)	(0.0025)	(0.0025)	(0.003)	(0.0025)	(0.0021)	(0.0024)	(0.0027)
Liquid liabilities	0.00295**	0.00072	0.00098	-5.99e-06	-0.00151	-7.86e-06	0.00046	0.00041	9.37e-05
	(0.0013)	(0.0014)	(0.0012)	(0.000904)	(0.0019)	(0.002)	(0.00204)	(0.00038)	(0.00073)
GDP per capita in logarithm		-0.0608	-0.191	0.0241	-0.0840	-0.195	-0.285	-0.0269	0.151
		(0.194)	(0.299)	(0.161)	(0.240)	(0.279)	(0.284)	(0.0566)	(0.131)
Inflation		-0.00133***	-0.0018**	0.00355***	0.00377	0.0039*	0.0042**	0.00025	0.0027***
		(0.00047)	(0.00075)	(0.00108)	(0.0023)	(0.0021)	(0.0020)	(0.00068)	(0.0009)
Real interest rate		0.00127	-0.0016	0.0161***	0.0130***	0.0154**	0.0144**	0.0027**	0.0114***
		(0.0013)	(0.0026)	(0.0039)	(0.0047)	(0.0070)	(0.0056)	(0.0013)	(0.0032)
Trade Openness		0.00178	0.0011	0.00247*	0.00125	0.0017	0.00213	0.0006	0.00078
		(0.00133)	(0.00173)	(0.0014)	(0.0030)	(0.0034)	(0.00199)	(0.00083)	(0.00059)
Urbanization rate		0.00747	0.0160*	0.0096	0.0250	0.0349	0.0402*	0.00130	-0.0058
		(0.0090)	(0.0082)	(0.0119)	(0.0194)	(0.0226)	(0.0221)	(0.0021)	(0.0048)
Gini index			0.00158						
			(0.0062)						
Control of Corruption				-0.0358					
				(0.225)					
Gov. Effectiveness					-0.600				
					(0.629)				
Political Stability						-0.411			
						(0.643)			
Regulatory Quality							-0.0945		
							(0.743)		
Rule of Law								-0.0842	
								(0.0797)	
Voice and Accountability									0.0739
									(0.120)
Constant	-0.182**	-0.147	0.360	-1.020	-0.519	-0.423	-0.178	0.0686	-1.081
	(0.0698)	(0.991)	(1.668)	(0.925)	(1.116)	(1.584)	(1.581)	(0.351)	(0.770)
Year dummies	No	No	Yes	No	No	No	No	No	No
Observations	1,078	838	699	668	668	668	668	668	668
Number of id	76	64	63	64	64	64	64	64	64
AR(1):p-value	0.003	0.009	0.003	0.011	0.019	0.023	0.031	0.013	0.013
AR(2):p-value	0.260	0.337	0.267	0.242	0.276	0.214	0.362	0.835	0.417
Hansen OID test: prob	0.065	0.164	0.647	0.594	0.585	0.721	0.623	0.235	0.179
Number of instruments	46	51	52	49	49	34	35	53	37

Robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

ii) Testing for additional control variables on baseline specification

We add control variables in baseline specification in order to take into account the other variables likely to affect non-life insurance premiums to GDP. These additional control variables are the employment rate as a percentage of the total population, index of financial openness (Kaopen) of Chinn and Ito (2008) to measure the integration of the financial markets, the growth rate of total population, population density and the logarithm of the number of passenger cars per 1,000 people (Cars).

The diagnostic tests are valid in all regressions because the tests for over-identification of Hansen and weak instruments of Cragg-Donald are conclusive. We noted that qualitatively, the main results remain stable as in our basic model (table 3.4). Indeed, foreign direct investment inflows remain a robust determinant of non-life insurance penetration in developing countries. This result confirms the robustness of our results above. In addition, the impact of political stability on non-life insurance penetration is also significant (column 4). The democratic character of the institutions also improves non-life insurance activity (column 7). However, contrary to Feyen et al (2011) results, a growth of population is a source of stimulus of non-life insurance premiums in developing countries. In other words, an increase in population leads to an increase of the consumption of goods and services, and through an indirect effect on the demand for insurance to secure some investments principally real estate.

Table 3.4: Testing for additional control variables on baseline specification

	Non-life insurance premiums (%GDP) : FE-IV						
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)
FDI	0.0123**	0.0138***	0.0152***	0.0122***	0.0153***	0.0142***	0.0141***
	(0.00486)	(0.00449)	(0.00460)	(0.00426)	(0.00471)	(0.00443)	(0.00439)
Liquid liabilities	0.00502***	0.00531***	0.00563***	0.00560***	0.00539***	0.00551***	0.00588***
	(0.00188)	(0.00163)	(0.00168)	(0.00169)	(0.00170)	(0.00169)	(0.00168)
GDP per capita in logarithm	0.241*	0.447***	0.521***	0.483***	0.540***	0.468***	0.452***
	(0.143)	(0.161)	(0.172)	(0.162)	(0.168)	(0.157)	(0.166)
Inflation	-0.00103	0.000226	0.000116	-0.000369	-3.96e-05	0.000113	-0.000169
	(0.00146)	(0.000849)	(0.000895)	(0.000856)	(0.000849)	(0.000855)	(0.000898)
Real interest rate	-0.00427	-0.000646	-0.000912	-0.00131	-0.000888	-0.000896	-0.00167
	(0.00298)	(0.00248)	(0.00258)	(0.00253)	(0.00255)	(0.00252)	(0.00264)
Trade Openness	0.00178	0.00145	0.00135	0.00178	0.00142	0.00152	0.00164
	(0.00183)	(0.00135)	(0.00139)	(0.00139)	(0.00140)	(0.00138)	(0.00141)
Urbanization rate	0.00803	-0.00328	-0.00242	-0.00460	-0.00352	-0.00306	-0.00371
	(0.00812)	(0.0123)	(0.0122)	(0.0123)	(0.0122)	(0.0123)	(0.0122)
Employment rate	-0.00287	0.00681	0.00850	0.00760	0.00707	0.00755	0.00817
	(0.00534)	(0.00660)	(0.00671)	(0.00644)	(0.00654)	(0.00658)	(0.00663)
Kaopen		-0.0243	-0.0266	-0.0233	-0.0232	-0.0242	-0.0245
		(0.0254)	(0.0251)	(0.0248)	(0.0244)	(0.0250)	(0.0253)
Population growth	0.110**	0.0657*	0.0669*	0.0626*	0.0603*	0.0644*	0.0719**
	(0.0457)	(0.0361)	(0.0353)	(0.0360)	(0.0348)	(0.0354)	(0.0351)
Population density	-0.000658	0.00462	0.00533	0.00419	0.00467	0.00483	0.00507
	(0.00138)	(0.00560)	(0.00579)	(0.00554)	(0.00559)	(0.00556)	(0.00560)
Control of Corruption		-0.136					
		(0.224)					
Cars	0.000619						
	(0.000869)						
Gov. Effectiveness			0.508				
			(0.353)				
Political Stability				0.499***			
				(0.149)			
Regulatory Quality					0.354		
					(0.228)		
Rule of Law						0.120	
						(0.196)	
Voice and Accountability							0.480*
							(0.249)
Years dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	439	655	655	655	655	655	655
Centered R2	0.149	0.115	0.119	0.125	0.115	0.115	0.121
Number of id	51	63	63	63	63	63	63
Hansen J-OID test p-value	0.7444	0.6552	0.8074	0.6110	0.6437	0.7083	0.7164
Cragg–Donald stat.	106.980	201.940	202.563	200.478	195.108	200.639	203.654
Critical value of Stock and Yogo (10%)	19.93	19.93	19.93	19.93	19.93	19.93	19.93

Robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

iii) Sub-Saharan Africa specificity and other developing countries

As mentioned in the literature review, most analyses on developing countries were focused on emerging countries. The Sub-Saharan Africa (SSA) is both the region where the non-life insurance sector is weakly developed and receiving less foreign investment inflows comparatively with other developing countries. For example, in 2011, Africa accounted for 1.48% of the insurance market against 15.22% for emerging countries and have received that only 2.82% of FDI inflows against 15.22% for the Asia countries and 14.34 for American

countries. We want to identify if the relationship between FDI and insurance is different in Sub-Saharan African countries. The results for SSA countries and other developing countries are reported in Table 3.5 and 3.6 respectively.

Table 3.5: Sub-Saharan Africa specificity

	Non-life insurance premiums (%GDP) : IV/GMM-FE							
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
FDI	0.00856**	0.00646*	0.00901*	0.0112**	0.00952**	0.0103**	0.0108**	0.0101**
	(0.00406)	(0.0039)	(0.00460)	(0.00500)	(0.00470)	(0.00493)	(0.00485)	(0.00501)
Liquid liabilities	0.00213		0.00506**	0.00547**	0.00552**	0.00572**	0.00551**	0.00587***
	(0.00161)		(0.00216)	(0.00216)	(0.00214)	(0.00226)	(0.00219)	(0.00217)
GDP per capita in logarithm		0.1912**	-0.0691	-0.0268	-0.0525	-0.0509	-0.0280	-0.0601
		(0.09031)	(0.128)	(0.128)	(0.130)	(0.128)	(0.132)	(0.126)
Inflation			0.000512	0.000384	0.000205	0.000476	0.000398	0.000636
			(0.000786)	(0.000779)	(0.000780)	(0.000798)	(0.000782)	(0.000833)
Real interest rate			0.00381**	0.00344**	0.00332*	0.00359**	0.00348*	0.00396**
			(0.00175)	(0.00174)	(0.00169)	(0.00175)	(0.00177)	(0.00177)
Trade Openness			0.000513	-0.000113	0.000511	0.000193	0.000147	-0.000173
			(0.00132)	(0.00137)	(0.00131)	(0.00134)	(0.00131)	(0.00133)
Urbanization rate			-0.029***	-0.029***	-0.025***	-0.027***	-0.028***	-0.0267***
			(0.00888)	(0.00919)	(0.00895)	(0.00896)	(0.00920)	(0.00884)
Control of Corruption			0.516***					
			(0.172)					
Bank credit to private		0.004669						
		(0.00258)						
Gov. Effectiveness				0.225				
				(0.218)				
Political Stability					0.211			
					(0.150)			
Regulatory Quality						-0.0405		
						(0.213)		
Rule of Law							0.169	
							(0.213)	
Voice and Accountability								0.314**
								(0.138)
Years dummies	No	No	No	No	No	No	No	No
Observations	404	404	214	214	214	214	214	214
Centered R2	0.010	0.0194	0.254	0.216	0.226	0.216	0.217	0.228
Number of id	28	28	20	20	20	20	20	20
Hansen J-OID test p-value	0.9335	0.7172	0.6552	0.8786	0.7281	0.7539	0.8986	0.6249
Cragg–Donald stat.	114.057	95.813	78.987	78.188	77.968	78.945	83.133	83.765
Critical value of Stock and Yogo (10%)	19.93	19.93	19.93	19.93	19.93	19.93	19.93	19.93

Robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

The results of the specific sample of ASS confirm the positive impact of foreign investment on non-life penetration (table 3.5). Similarly, liquid liabilities to GDP and real interest rate have a positive impact while rate of urbanization negatively affect non-life insurance consumption in SSA. According to the indicators of quality of governance, control of corruption and voice and accountability have positive effects on the development of non-life insurance sector. Thus, in sub-Saharan Africa, a decrease in corruption and an improvement of the voice and accountability stimulate the development of non-life insurance due to increased confidence of

economic agents. Unlike the total sample, political stability has not a significant impact on insurance in SSA, but voice and accountability improvement has a positive impact.

Table 3.6: Other developing countries specificities

	Non-life insurance premiums (%GDP) : IV/GMM-FE							
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
FDI	0.0114***	0.00715*	0.0149***	0.0167***	0.0128**	0.0177***	0.0145**	0.0152***
	(0.00415)	(0.00371)	(0.00559)	(0.00596)	(0.00542)	(0.00633)	(0.00561)	(0.00555)
Liquid liabilities to GDP	0.00767***		0.00356*	0.00365*	0.00449**	0.00377*	0.00314	0.00419**
	(0.00205)		(0.00206)	(0.00208)	(0.00214)	(0.00207)	(0.00199)	(0.00200)
GDP per capita in logarithm			0.698***	0.796***	0.810***	0.864***	0.668***	0.690***
			(0.216)	(0.236)	(0.224)	(0.238)	(0.205)	(0.218)
Inflation			-0.00101	-0.000258	-0.00197	-0.00117	-0.00075	-0.00116
			(0.00200)	(0.00223)	(0.00215)	(0.00189)	(0.00189)	(0.00207)
Real interest rate			-0.00537	-0.00443	-0.00647	-0.00478	-0.00479	-0.00599
			(0.00415)	(0.00434)	(0.00409)	(0.00414)	(0.00406)	(0.00431)
Trade Openness			0.00369*	0.00339*	0.00315*	0.00348*	0.00358*	0.00341*
			(0.00192)	(0.00192)	(0.00183)	(0.00190)	(0.00196)	(0.00191)
Urbanization rate			0.000729	0.00238	-0.00310	0.00157	0.00160	0.000209
			(0.0140)	(0.0140)	(0.0137)	(0.0138)	(0.0141)	(0.0143)
Control of Corruption			0.260					
			(0.282)					
Bank credit to GDP		0.00765***						
		(0.00140)						
Gov. Effectiveness				0.616				
				(0.557)				
Political Stability					0.962***			
					(0.286)			
Regulatory Quality						0.578		
						(0.374)		
Rule of Law							-0.231	
							(0.379)	
Voice and Accountability								0.495
								(0.392)
Years dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	674	671	454	454	454	454	454	454
Centered R2	0.087	0.099	0.086	0.087	0.105	0.087	0.086	0.089
Number of id	48	48	44	44	44	44	44	44
Hansen J-OID test p-value	0.7624	0.7724	0.9222	0.9879	0.8657	0.9317	0.9075	0.9657
Cragg–Donald stat.	198.974	192.170	124.044	123.703	124.369	115.555	120.500	123.816
Critical value of Stock and Yogo (10%)	19.93	19.93	19.93	19.93	19.93	19.93	19.93	19.93

Robust standard error are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

In other developing countries, the results are globally identical to that of the total sample (Table 3.6). Indeed, foreign investment inflows remains a robust determinant of non-life insurance premiums. The liquid liabilities to GDP indicating the level of financial development and bank credit to private have also a significant positive effect on the development of non-life insurance. The political stability positively influences the development of insurance sector in the other developing countries contrasting to those of SSA (table 3.6). Thus, overall, we can conclude that our results are robust because the foreign direct investment inflows are determinant of non-life insurance in SSA, in the other developing countries as well as in the total sample.

3.4. Heterogeneities in non-life insurance development and FDI inflows: testing for nonlinearities

This subsection is devoted to identification of potential heterogeneities in the relationship between FDI inflows and non-life insurance penetration. First, we interact of FDI coefficients with other variables that are likely to influence the attractiveness of FDI in local economy. Second, we analyze whether a "SSA effect" could modify the marginal impact of FDI on non-life insurance development. These variables are: Index of human capital, infrastructure development measured by the number of passenger cars per 1,000 people, index of risks related to investment profile[22] and SSA dummy. The infrastructure development data were drawn from *World Bank database*, the investment profile data come from the International *Country Risk Guide* (ICRG) and *Penn World Table, version 8.0* for the index of human capital.

The literature has showed that FDI effects on the growth in developing countries are dependent on domestic conditions of host country (economic, political, social, cultural or others). Indeed, Borensztein et al. (1998) have showed that human capital stock is essential to determine the magnitude of FDI effects on economic growth. Furthermore, Asiedu (2002 and 2006) add that infrastructure quality and political environment are the determinants of FDI in developing countries. Thus, we think that FDI effect on non-life insurance development should be similar to that on economic growth. Therefore, the countries with of favorable domestic conditions should benefit an additional gain of FDI entry. We control all these considerations by including per capita GDP, financial development, inflation rate, real interest rate and Urbanization rate. The estimation results using also estimator of instrumental variable (IV-GMM) developed by Baum et al. (2007) are reported in Table 3.6.

[22] The variable is rated from 0 to 12, high values mean very low risk of investment

Table 3.7: Testing for heterogeneities in non-life insurance development and FDI inflows

Non-life insurance premiums (%GDP) : IV/GMM-FE				
VARIABLES	(1)	(2)	(3)	(4)
FDI	0.0144**	0.0233**	0.0295***	0.01951***
	(0.00610)	(0.0111)	(0.00876)	(0.0066)
FDI*Human_Capital	-0.00481			
	(0.00689)			
Human_Capital	0.284			
	(0.395)			
FDI*Internet_users		-0.000402		
		(0.000459)		
Internet_users		-0.00792**		
		(0.00332)		
FDI*InvestProfile			-0.0430**	
			(0.0177)	
InvestProfile			0.0639	
			(0.104)	
FDI*Sub-Saharan Africa				-0.01543**
				(0.00730)
Liquid liabilities	0.00598***	0.00702***	0.00968***	00735***
	(0.000952)	(0.00174)	(0.00176)	(0.00192)
GDP per capita in logarithm	0.539***	0.407***	0.0734	0.41288***
	(0.118)	(0.132)	(0.0903)	(0.12436)
Inflation	-0.000695***	-0.00103***	-0.000457**	-0.00063***
	(0.000219)	(0.000308)	(0.000216)	(0.0002)
Real interest rate	-0.00385*	-0.00339**	-0.00328**	-0.00348**
	(0.00205)	(0.00170)	(0.00129)	(0.00164)
Urbanization rate	-0.0180***	-0.00340	-0.0148**	-0.002722
	(0.00628)	(0.00865)	(0.00654)	(0.00915)
Years dummies	No	No	No	Yes
Observations	653	802	661	814
Centered R2	0.125	0.084	0.097	0.0936
Number of id	49	64	51	64
Hansen J-OID test p-value	0.2692	0.1507	0.4129	0.5773
Cragg–Donald stat.	47.245	56.265	74.298	129.524
Critical value of Stock and Yogo (10%)	10.27	19.93	9.08	19.93

Robust standard error are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

We observe that interactive coefficients with index of human capital (column 1) and infrastructure development (column 2) are not significant while that interactive coefficient with investment profile (column 3) and SSA dummy (column 4) are negative and significant. Thus, the impact of FDI on non-life insurance is not conditional to level of human capital. The negative conditional effect of investment profile means that effect of FDI on insurance decreases with the improvement of business climate related to investment profile. Thus, when index of the business climate improves from 0.01 to 0.02 unit, the marginal effect of FDI on non-life insurance penetration decreases by 0.0252 to 0.0209 *ceteris paribus* (column 3). FDI and business climate thus seem substitutes for enhancing non-life insurance. The marginal effect of FDI on non-life insurance becomes negative when investment profile is greater than

0.686[23]. Most countries in our sample 83% (63 countries) stand below this threshold then benefit from a positive marginal impact of FDI on non-life insurance. Beyond this threshold, the development of non-life insurance is no longer affected by FDI flows. At last, coefficient of interaction between FDI and SSA dummy is significantly negative (column 4). The results indicate that, although FDI promotes non-life insurance development in both SSA and non-SSA countries, the marginal benefit from improved FDI is somewhat less for countries in SSA. Specifically a 1% increase in FDI leads to a 0.0195% increase in non-life insurance penetration for non-SSA country. This compares with a 0.0040% (0.01951- 0.01543) increase for a comparable country in SSA. The negative and significant estimated interactive coefficient of SSA dummy suggests that there may be an adverse regional effect for SSA. This can be explained by the negative perception of Africa expressed by risk-rating agencies. Moreover, there is at lack of information about the countries in continent, investment decisions are often not guided by country-specific conditions but rather based on inferences from the environment of neighboring countries (Asiedu, 2002).

[23] $\frac{\partial \text{Non_life}}{\partial \text{FDI}} = 0.0295 - 0.043 * \text{InvestProfile} = \text{o}$ Thus, the threshold of the $\text{InvestProfile}^{*} = \frac{0.0295}{0.043} = 0.686$

4. Conclusion and policy implications

This paper has analyzed the impact of foreign direct investment inflows on non-life insurance penetration on a panel of 76 developing countries over the period 1996-2011. We used a method of econometric estimation for taking into account the potential endogeneity to analyze the effect of foreign investment inflows. The main results show that an increase of FDI leads to an increase in non-life insurance premiums. In other words, the countries who receive more foreign direct investment inflows tend to have a greater non-life insurance penetration. Thus, we identify an additional determinant of the development of non-life insurance activity. The results are robust to use of alternative estimation method and inclusion of additional control variables. Moreover, the marginal effect of FDI on non-life insurance depends on the characteristics of the host country. Thus, FDI impact is low in countries where the risk of investment is low, indicating a substitution effect between FDI and investment profile. Finally, FDI effect on non-life insurance penetration is low in SSA countries compared to non-SSA countries.

Our results suggest that there is another favorable impact of FDI on economic development beyond its positive impact on economic growth, namely its positive effect on non-life insurance development. However, some further research is needed in order to be able to draw policy implications. First, it would be very useful to distinguish FDI in insurance (or at least in the financial sector and the remainder of FDI) to identify direct and indirect channels. Second, improving the set of control variables (in particular to capture the security of insurance contracts) should allow dropping the SSA dummy. It would give more specific information to promote insurance sector development in SSA.

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Appendices

Table A-3.1: Descriptive statistics

Variables	Obs	Mean	Std. Dev.	Min	Max
Life insurance penetration	288	0.2722882	0.3521372	0.011	2.645
Life insurance density	288	456.0538	665.5353	0.427174	2885.916
GDP per capita	320	1082.384	1671.193	129.5231	7628.723
Life expectancy	320	52.64017	5.153914	40.77578	63.7989
Young Dependency Ratio	320	5.836393	1.176905	4.7655	11.24931
Old Dependency Ratio	320	85.32202	9.746554	54.42328	105.1271
Dependency ratio	320	91.15841	9.552795	60.07084	110.5901
Real interest rate	298	8.330733	14.28889	-94.21996	93.91508
Financial development	317	23.66522	8.712524	6.914201	54.03433
Property_Rights	312	0.6209207	0.2276376	0	1
LawOder	300	0.4904445	0.2323199	0	1
Fiscal_Freedom	312	0.4304792	0.2672678	-7.27e-08	1
Government_stability	300	0.3503111	0.195411	-3.98e-07	1
Social Security	189	3.985979	6.855506	0	33.61
FDI	320	3.399121	4.392516	-8.589433	40.16725
Education	196	29.80096	17.37159	5.16489	81.70265
Remittance	285	2.259679	2.855364	0.000197	13.0426
French	320	0.4	0.4906652	0	1

Table A. 3.2: List of countries

Angola, Albania, Argentina, Azerbaijan, Burundi, Benin, Burkina Faso, Bangladesh, Bulgaria, Bosnia and Herzegovina, Belarus, Belize, Bolivia, Brazil, Botswana, China, Cote d'Ivoire, Cameroon, Colombia, Cabo Verde, Costa Rica, Dominica, Dominican Republic, Algeria, Ecuador, Egypt. Arab Rep., Ethiopia, Fiji, Gabon, Ghana, Guatemala, Guyana, Honduras, Hungary, Indonesia, India, Jamaica, Jordan, Kazakhstan, Kenya, Lebanon, Sri Lanka, Morocco, Moldova, Madagascar, Mexico, Macedonia. FYR, Mali, Mozambique, Mauritius, Malawi, Malaysia, Namibia, Niger, Nigeria, Nicaragua, Nepal, Pakistan, Panama, Peru, Philippines, Paraguay, Romania, Senegal, El Salvador, Chad, Togo, Thailand, Turkey, Tanzania, Uganda, Ukraine, Venezuela. RB, Vietnam, South Africa, Zambia.

Table A-3.3: Source and definition of the variables

Variables	Variable Definition	Source
Non-life insurance penetration	Gross volume of non-life premiums to GDP (%)	Beck et al. (2013)
Liquid liabilities	Liquid liabilities to GDP (%)	
Bank credit	Bank credit to the private credit to GDP (%)	
FDI	Foreign direct investment inflows (% of GDP)	UNCTD (2015)
GDP per capita	GDP per capita (constant 2005US Dollars)	World Development Indicators (WDI, 2014), World Bank
Urbanization rate	Urban population (% of total)	
Inflation	Consumer price index	
Real interest rate	Real interest rate (%)	
Gini index	Measures the extent to which the distribution of income or consumption expenditure among individuals or households within an economy deviates from a perfectly equal distribution. Thus a Gini index of 0 represents perfect equality, while an index of 100 implies perfect inequality	
Employment	Proportion of the population employed in% of total population	
Population Growth	Population growth (annual %)	
Population density	Population density (people / square kilometer)	
CARS	Number of passenger cars per 1,000 people	
Trade Openness	Sum imports and exports to GDP (%)	
Infrastructure development	Internet users per 100 people	
Rule of Law	measuring the extent to which law enforcement agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, the police and courts, as well as the likelihood of crime and violence	
Regulatory quality	Measuring the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development.	Kaufmann et al. (2013)
Gov. Effectiveness	indique la compétence de la bureaucratie et la qualité de la prestation du service public.	
Corruption	Measuring the extent to which public power is exercised for private gain (including both petty and grand forms of corruption), as well as "capture" of the state by elites and private interests.	
Political Stability	Measuring perceptions of the likelihood that the government will be destabilized or overthrown by unconstitutional or violent means, including political violence or terrorism.	
Voice and Accountability	measuring the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and free media	
Kaopen	Financial openness Index. It measures a country's degree of capital account openness	Chinn-Ito Dataset (2012)
Human capital	Index of human capital per person, based on years of schooling (Barro/Lee, 2012) and returns to education (Psacharopoulos, 1994)	Penn World Table, version 8.0

Chapter 4:

Does Banking Credit leads to the Development of Insurance activity in Sub-Saharan Africa countries?*

Abstract

This paper analyzes the impact of bank credit to private sector on insurance (life, non-life and total insurance) activity and causal link between those financial services for 20 countries of Sub-Saharan African (SSA) over the period from 1996 to 2011. Panel data techniques with heterogeneous slope (Mean Group model) and Granger causality procedure based on Meta-analysis in heterogeneous mixed panels are used. The MG estimator indicates that private credit consumption has a negative impact on life insurance density for the panel of SSA economies. The overall panel support the presence of unidirectional causality running from real private credit density to life insurance and total insurance density. The individual country results indicate that only in a minority of the countries (Benin, Burkina Faso, Cabo Verde Ghana, Mali and Senegal), that there is a causality relationship between life insurance activity and real banking credit to private sector.

Keywords: Insurance activity, Banking credit, Granger Causality; Heterogeneous mixed panels.
JEL classification: C33, E51, G22.

*A version of this chapter, is currently under review in *Economics Bulletin*.

1. Introduction

Insurance market activity, both as financial intermediary and as provider of risk transfer and indemnification was widely studied in literature. Thus, according to the literature (See Skipper, 1997; Skipper and Kwon, 2007; Haiss and Sümegi, 2008, Njegomir and Stojić, 2010), insurance activity contributes to economic growth, by showing that it: i) promotes financial stability; ii) facilitates the development of trade and commerce by increasing creditworthiness, lowering the total necessary amount and cost of capital, and decreasing total risk; iii) mobilizes domestic savings; iv) allows different risks to be managed more efficiently by encouraging the accumulation of new capital; v) fosters a more efficient allocation of domestic capital; vi) helps reduce or mitigate losses. In addition, there are likely to be different effects on economic growth from life and nonlife insurance[24] given that these two types of insurance protect households and corporations against different kinds of risks (Arena, 2008). Moreover, life insurance companies facilitate long-term investments rather than short-term investments as do the case for non-life insurance industry (G. Liu et al., 2014). Consequently, life and nonlife insurance activities can affect the economic growth in diverse way.

Most empirical studies have analyzed the relationship between the development of life insurance and growth in three ways. First, according to the "*supply-leading*" hypothesis, previous studies have shown that the development of insurance services is a determinant of economic growth (Arena, 2008; Haiss and Sümegi, 2008; Chen et al., 2012; Lee and Chiu, 2012; Outreville, 2013; Lee et al., 2013; Lee, 2013). Secondly, according to the "*demand-following"* hypothesis, the empirical studies have found that insurance development is influenced by the economic growth (Outreville, 1990; Beck and Webb, 2003; Feyen et al., 2011; Chang and Lee, 2012; etc.). Thirdly, there are some studies which have investigated on applying both the supply-leading and demand-following theories i.e. the causal nexus between insurance activity and economic growth (Ward and Zurbruegg, 2000; Kugler and Ofoghi, 2005; Lee et al., 2013; Lee, Lee and Chiu, 2013; Lee, 2013; Alhassana and Fiador, 2014; etc.).

The relationship between insurance development and other financial services (particularly banking development) has not received much attention in the empirical literature. However, according to the theoretical literature, the relationship of complementarity between banking and

[24]From Swiss Re explanation, life insurance premiums are supplemented by estimated premiums for group pension business; nonlife insurance includes state funds, accident and health insurance, regardless of how these lines are classified in the individual countries.

insurance activities can be tenable, because of risk transfer between the two sectors. Furthermore, consumer credit may take the form of personal loans (either for general purpose or specified one), the purchase of durable goods (e.g., cars, and furniture), or revolving credit such as credit cards. More credit consumption is (*ceteris paribus*), more insurance coverage is bought by hypothesis. Thus, the relationship between bank credit and insurance development is probably most obvious one, as creditors often require insurance coverage for providing credit. Furthermore, given that banks and insurers have mutual disclosures in many areas, banks have unbundled their credit risks to insurance providers mainly through the securing of both credit portfolios and derivatives (Lee, 2013). Thus, the development of insurance activity could encourage bank borrowing by reducing companies' market cost of capital, which influences economic growth by increasing the demand for financial services (Grace and Rebello, 1993). Also, property insurance may facilitate bank intermediation activity by for example partially collateralizing credit, which would reduce bank's credit risk exposures promoting higher levels of lending (Zou and Adams, 2006). At the same time, the development of banking sector facilitates the development of insurance activity through a much more effective payment system allowing an improved financial intermediation of services (Webb, Grace and Skipper, 2002). However, one can have a "*saving substitution effect*" between insurance activities, particularly life insurance, and banks (Haiss and Sümegi, 2008) because in market for intermediated saving, insurance companies compete and could reduce banks' market share in developing countries (Allen and Santomero, 2001). Thus, given also that insurance coverage is a secondary product in the market for consumer credit it seems logical to view development in the credit market in relation to insurance markets.

Regarding to the empirical literature, the previous studies have been focused more on the one hand on the bank credit impact on the development of insurance and on the other hand on the simultaneous effect between insurance and banking development on economic growth. Thus, Outreville (1996), Ward and Zurbruegg (2002), Beck and Webb (2003) showed that the development of banking sector is significantly and positively correlated with the development of insurance market. Beck and Webb (2003) argue that countries whose the banking sector are more developed have larger insurance sectors. However, for the simultaneous effect between banking and insurance development, Webb et al.(2005) and Arena (2008) have showed that there is a complementary relationship between baking credit and insurance (life and non-life insurance) markets, while Tenant et al. (2010) and Chen et al. (2012) have indicated a competitive relationship between banking credit and insurance market. Moreover, the previous

studies which have investigated the causal relationship between insurance activity and banking credit in a macro perspective are of Liu and Lee (2014) and G. Liu et al. (2014) which find that there is a causal nexus between insurance activity and banking credit in China and G-7 countries respectively.

This chapter aims at filling the gap in literature and to contribute to existing literature (Liu and Lee, 2014 and G. Liu et al., 2014) by investigating the relationship between insurance activity (life, non-life insurance and total insurance) and bank credit to private sector for 20 countries of Sub-Saharan African (SSA). Thus, firstly, we search to verify whether the relationship between insurance activity and banking credit is complementary or substitutionary during the period from 1996-2011. Secondly, we want to know whether the private credit consumption causes insurance (life, non-life and total insurance) development, insurance development (life, non-life and total insurance) causes private credit consumption expansion; or a bi-directional causality relationship.

The motivations of this chapter are at two levels. First, to best of our knowledge, the investigation represents a first attempt to undertake empirical analysis in assessing the economic relationship between bank credit density expansion to private sector and insurance development (life, non-life and total insurance) in SSA countries. Thus, the determination of the effect of bank credit to private sector on insurance sector have important implications for the governments in the conduct of monetary policy through banking credit and financial stability (G. Liu et al, 2014). Indeed, a positive (or negative) effect of the private credit on insurance development allows to know whether there is a complementarity (competition) between banks and insurers. Second, contrary to the previous studies (Lee, 2013; Liu and Lee, 2014 and G. Liu et al, 2014), we identify the direction of causality between insurance activity and banking development, by employing the methodology proposed by Emirmahmutoglu and Kose (2011) in which they propose a bootstrap Granger causality procedure based on meta-analysis in heterogeneous mixed panels. This methodology makes it possible to investigate Granger-causality for each individual panel country separately, while accounting for possible bias and cross-sectional inconsistencies that may occur in our panel data. Furthermore, this methodology has three advantages. First, it has the advantage of accounting for both heterogeneity and cross-sectional dependency which may lead to biased estimates (Pesaran, 2006). Moreover, this methodology does not require pretesting for unit roots and cointegration apart from the lag structure. Finally, this test has the advantage to be valid for four different

data generating processes (DGP) in mixed panels involving I (0), I (1), cointegrated and non-cointegrated series.

The plan of the chapter is as follows. Section 2 presents the econometric model specification to be employed. We discuss an empirical application of insurance-banking relationship in section 3. Section 4 concludes the paper and besides some policy implications are given.

2. Econometric model and data

The econometric analysis on the relationship between insurance activity and banking credit follows two steps. First, we estimate the effect of bank credit to private sector on insurance activity (life, non-life and total insurance) by using Mean Group (MG) estimator of Pesaran and Smith (1995). Second, we employ the Granger causality procedure based on Meta-analysis in heterogeneous mixed panels proposed by Emirmahmutoglu and Kose, (2011) to identify the direction of causality between insurance and banking activity. These methods are more robust for the low sample of countries.

To understand the overall impact of bank credit to private sector on insurance activity, we consider the panel model following:

$$Y_{it} = \alpha_{it} + \gamma_t t + \beta_i X_{it} + \omega_{it} \qquad (4.1)$$

Where Y_{it} denotes insurance density (life, non-life and total insurance), β_i is the country specific slope on the observable regressor, $X_{it}$is bank credit to private per capita[25] and ω_{it} stands for the error term. We also include linear trend *"$\gamma_t t$"* to capture time variant unobservables. We estimate the equation (4.1) by using the *Mean Group* (MG) estimator which authorizes the presence of variables that can be integrated in different orders, either I(0) and I(1) or cointegrated (Pesaran and Shin, 1999). This technique allows the slope coefficients to differ across panel members and opens up a further dimension of inquiry, namely, the analysis of the patterns and the ultimate source of this parameter heterogeneity.

The second stage of the process is to examine the causal linkages between insurance activity and banking credit. Thus, we apply the panel causality test with lag augmented VAR (LA-VAR)

[25]We do not use control variables because our goal is to identify only the direction of the relationship between the development of banking sector activity and that of insurance sector. Furthermore, the control variables were used in chapters 2 and 3.

approach in the presence of cross-sectional dependence proposed by Emirmahmutoglu and Kose (2011). This approach is based on Meta-analysis of Fisher (1932) in heterogeneous mixed panels. They extended the lag augmented VAR (LA-VAR) approach by Toda and Yamamoto (1995), which uses the level VAR model with extra $dmax_i$ lags to test Granger causality between variables (insurance activity and private credit density) in heterogeneous mixed panels.

Following Emirmahmutoglu and Kose (2011), we consider a level VAR model with $k_i + dmax_i$ in heterogeneous mixed panels:

$$X_{i,t} = \mu_i^x + \sum_{j=1}^{k_i+dmax_i} \theta_{11,ij} X_{i,t-j} + \sum_{j=1}^{k_i+dmax_i} \theta_{12,ij} Y_{i,t-j} + u_{i,t}^x \quad (4.2)$$

$$Y_{i,t} = \mu_i^y + \sum_{j=1}^{k_i+dmax_i} \theta_{21,ij} X_{i,t-j} + \sum_{j=1}^{k_i+dmax_i} \theta_{22,ij} Y_{i,t-j} + u_{i,t}^y \quad (4.3)$$

Where $X_{i,t}, Y_{i,t}$ denote insurance density (life, non-life insurance or total insurance) and banking credit to private sector per capita, respectively. The index i ($i = 1, \dots, N$) denotes individual cross-sectional units and the index t ($t = 1, \dots, T$) denotes times periods, $\mu_i^x$and $\mu_i^y$are two vectors of fixed effects, $\mu_{i,t}^x$ and $\mu_{i,t}^y$ are column vectors of errors terms, $u_{i,t}^x$ and $u_{i,t}^y$ identically distributed (i.i.d) across individual with $E(u_{i,t}^x) = E(u_{i,t}^y) = 0$ and $V(u_{i,t}^x) = \sum_{u_{i,t}^x}$ and $V(u_{i,t}^y) = \sum_{u_{i,t}^y}$ are positive definite covariance matrices. $k_i$is the lag structure which is assumed to be known and may differ across cross-sectional units, and $d\ max_i$ is a maximal order of integration suspected to occur in the system for each i. We focus on testing causality from insurance activity to banking credit to private sector in Eq. (4.3). A similar procedure is applied for causality from banking credit density to insurance activity in Eq. (4.2).

According to Emirmahmutoglu and Kose (2011), the bootstrap Granger causality tests can be generated in following five steps:

Step 1: Determine the maximal order of integration of variables in the system for each cross-section unit based on the Augmented Dickey Fuller (ADF) unit root test. We estimate the regressions (4.2) or (4.3) by OLS for each individual and select the lag orders k_is via Schwarz information criteria (SBC) or Akaike information criteria (AIC).

Step 2: By using k_i and dmax from step 1, we re-estimate Eq. (3.3) by OLS under the non-causality hypothesis ($\theta_{21,ij} = \cdots = \theta_{21,ik_i} = 0$) and obtain the residuals for each individual.

$$\hat{u}_{i,t}^{y} = Y_{i,t} - \hat{\mu}_{i}^{y} - \sum_{j=k_i+1}^{k_i+d\max_i} \hat{\theta}_{21,ij} X_{i,t-j} - \sum_{j=1}^{k_i+d\max_i} \hat{\theta}_{22,ij} Y_{i,t-j} \quad (4.4)$$

Step 3: Stine (1987) suggests that residuals have to be centered with

$$\tilde{u}_t = \hat{u}_t - (T - k - l - 2)^{-1} \sum_{t=k+l+2}^{T} \hat{u}_t \quad (4.5)$$

Where $\hat{u}_t = (\hat{u}_{1t}, \hat{u}_{2t}, .., \hat{u}_{Nt})$, $k = \max(k_i)$ and $l = \max(dmax_i)$. Next, we develop the $[\tilde{u}_{i,t}]_{NxT}$ from these residuals. We select randomly a full column with replacement from the matrix at a time to preserve the cross covariance structure of the errors. We denote the bootstrap residuals as $\tilde{u}_{i,t}^{*}$where $t = 1,2, \dots, T$.

Step 4: A bootstrap sample of Y generated under the null hypothesis, i.e.

$$Y_{i,t}^{*} = \hat{\mu}_{i}^{y} + \sum_{j=k_i+1}^{k_i+dmax_i} \hat{\theta}_{21,ij} X_{i,t-j} + \sum_{j=1}^{k_i+dmax_i} \hat{\theta}_{22,ij} Yi,_{t-j}^{*} + \tilde{u}_{i,t}^{*} \quad (4.6)$$

Where $\hat{\mu}_{i}^{y}$, $\hat{\theta}_{21,ij}$ and $\hat{\theta}_{22,ij}$are the estimations from step 2.

Step 5: For each individual, Wald statistics are calculated to test for the non-causality null hypothesis by substituting $Y_{i,t}^{*}$ for $y_{i,t}$and estimating equation (4.3) without imposing any parameter restrictions.

Using individual p-values (p_i) that correspond to the Wald statistic of the i^{th} individual cross-section, the Fisher test statistic (λ) is obtained as follows:

$$\lambda = -2 \sum_{i=1}^{N} \ln(p_i) \;\; i = 1,2, \dots, N \quad (4.7)$$

The bootstrap empirical distribution of the Fisher test statistics are generated by repeating steps 3 to 5, 10,000 times and specifying the bootstrap critical values by selecting the appropriate percentiles of these sampling distributions. Bootstrap critical values are obtained at the 1, 5 and 10% levels based on these empirique distributions[26].

[26]More detail, see Emirmahmutoglu and Kose (2011).

Using simulation studies, Emirmahmutoglu and Kose (2011) demonstrate that the performance of LA-VAR approach under both the cross-section independency and the cross-section dependency seem to be satisfactory for the entire values of T and N.

The data used in this paper are the annual data from 1996 to 2011 for 20 countries in Sub Saharan Africa[27]. The measure of the real insurance density (life, non-life and total insurance), defined as the average annual premiums per capita and real banking credit density indicates the average annual domestic credit to private sector by banks for one inhabitant. Indeed, insurance density (life, non-life and total insurance) shows the average annual premiums per capita than an inhabitant in one country spends on insurance products and banking credit density indicates the average annual domestic credit provided by banking sectors for one inhabitant in private sector. The annual data for real insurance density (life, nonlife, and total insurance) and real banking credit to private density are taken from *Global Financial Development Database of Čihák et al. (2012).* All variables are expressed in natural logarithmic, and measured in constant 2005 $SD to be comparable over time.

[27] These countries are: Benin, Burkina Faso, Botswana, Cote d'Ivoire, Cameroon, Cabo Verde, Ethiopia, Ghana, Kenya, Madagascar, Mali, Mozambique, Malawi, Nigeria, Senegal, Chad, Togo, Uganda, South Africa and Zambia.

3. Empirical results

3.1. The results of banking credit impact on insurance activity

The results of banking credit to private sector effect on insurance (life, non-life and total insurance) activity are reported in table 4.1.

For the relationship between real life insurance density and real banking credit density, the panel parameter is -0.3189 (column 1) of real banking credit density on life insurance density, that is statistically significant at the 5% level while the effect of banking credit on non-life and total insurance is insignificant (column 2 and 3). The results show that a 1% increase in real banking credit per capita reduces real life insurance premiums density around 0.318%. Thus, the negative effect of private credit suggests that there is a competition relation between life insurers and banks for 20 countries of SSA. Contrary to G. Liu et al. (2014) that have found a positive effect of banking credit on life insurance density for G-7 countries, our results of competitive relationship between life insurance and bank activity may be explained by "saving substitution effect" of Haiss and Sümegi (2008). Thus, in the SSA countries, the development of banking sector reduces the life insurance companies' market share in the market for intermediated saving (Allen and Santomero, 2001). This situation can be explained also by the low quality and efficiency of private credit allocation and poor development of the insurance in the developing countries. This result can be also explained by the lack of integration of banking and insurance networks in countries of SSA, unlike those of developed and emerging countries.

From the perspective of individual country, banking credit has a significantly negative impact on life insurance activity for Burkina Faso and Kenya while the effect is positive for Ethiopia (column 1). We note that, a positive influence of private credit on nonlife insurance density only for Mali and Chad (column 2). As to the banking credit effect on total insurance density, it is negative at the 10 % significance level for Burkina Faso while it is positive for Mali at the 1% significance level. Thus, we can say the banking and insurance activities are not linked in most SSA countries. Furthermore, this results can also explain by the problem of endogeneity or omitted variables from the fact that we did not use of control variables. Thus, we analysis the causality between these variables in the section follows.

Table 4.1: MG estimates results

Country	Dependent variables		
	Life insurance density	Non-life insurance density	Insurance density
	1	2	3
Benin	-0.2564	0.000585	-0.0550
	(0.2307)	(0.1348)	(0.0993)
Burkina Faso	-1.125*	-0.27056	-0.7711*
	(0.5963)	(0.3313)	(0.4501)
Botswana	-0.1665	-0.02153	-0.09507
	(0.2944)	(0.1332)	(0.1664)
Cote d'Ivoire	-2.8206	-0.0972	-0.18578
	1.8084	(0.22980)	(0.21736)
Cameroon	0.0926	-0.07184	-0.31808
	(0.2889)	(0.42762)	(0.3150)
Cabo Verde	-1.04014	0.42804	0.35671
	(1.9732)	(0.4089)	(0.4066)
Ethiopia	0.4819**	-0.25663	0.30116
	(0.2123)	(0.3204)	(0.2998)
Ghana	-0.3151	-0.11717	-0.12143
	(0.3224)	(0.3299)	(0.3300)
Kenya	-0.30405**	0.0081	-0.06828
	(0.1425)	(0.1870)	(0.17923)
Madagascar	0.09175	0.34904	0.07725
	(0.3569)	(0.3641)	(0.32361)
Mali	0.31794	0.67579***	0.57229***
	(0.23343)	(0.14607)	(0.12140)
Mozambique	-0.08434	0.16497	-0.03155
	(0.1681)	(0.16814)	(0.1454)
Malawi	0.11447	-0.1646	-0.10187
	(0.4052)	(0.13495)	(0.16685)
Nigeria	0.007854	-0.24615	-0.20916
	(2.04785)	(0.1781)	(0.48371)
Senegal	-0.56401	-0.0074	-0.1356
	(0.3560)	(0.10593)	(0.14811)
Chad	-0.4333	0.5413*	0.15420
	(1.1259)	(0.3244)	(0.31619)
Togo	-0.16966	0.0835	-0.2351
	(0.3195)	(0.36587)	(0.27427)
Uganda	-0.0806	-0.06035	-0.09051
	(0.2718)	(0.2395)	(0.16718)
South Africa	-0.4442	-0.19245	-0.2485
	(0.4454)	(0.1790)	(0.16953)
Zambia	0.3194	-0.14836	-0.02399
	(0.4688)	(0.15237)	(0.14831)
Panel	-0.3189**	0.0298	-0.06148
	(0.1603)	(0.0604)	(0.06200)

Note: Standard errors in parentheses, ***, **and * indicate significance at the 1%, 5% and 10% respectively, Life, nonlife, insurance density and Bank credit to private density are in logarithm.

3.2. The results of bootstrap Granger causality test

According to Emirmahmutoglu and Kose (2011), the first step is to investigate the integrated properties of the variables for all countries. Thus, we employ the Augmented Dickey Fuller (ADF) unit root test and determine the maximum order of integration of the variables ($dmax_i$). The results are reported in table 4.2. Thus, the results confirm that the maximum order of integration is one for all 20 countries of Sub Saharan Africa (SSA).

Table 4.2: ADF test results

country	Life insurance density		Non-life insurance density		insurance density		Banking private density		dmx_i
	Levels	First differences	Levels	First differences	Levels	First differences	Levels	First differences	
Benin	0.0893	0.0067	0.7179	0.0013	0.2047	0.0040	0.0427		1
Burkina Faso	0.4741	0.0043	0.1299	0.0002	0.2459	0.0007	0.0014		1
Botswana	0.9865	0.0038	0.0094		0.9962	0.0002	0.9998	0.0343	1
Cote d'Ivoire	0.0436		0.0006		0.1600	0.0237	0.5447	0.0031	1
Cameroon	0.2777	0.0030	0.0149		0.0381		0.2709	0.0002	1
Cabo Verde	0.0418		0.9838	0.0042	0.9885	0.0079	0.9991	0.0178	1
Ethiopia	0.2884	0.0379	0.0302		0.0178		0.2578	0.0038	1
Ghana	0.0354		0.0751	0.0122	0.2454	0.0027	0.1248	0.0009	1
Kenya	0.0116		0.7356	0.0129	0.9615	0.0061	0.9733	0.0058	1
Madagascar	0.2725	0.0089	0.4484	0.0005	0.1459	0.0004	0.7471	0.0015	1
Mali	0.9999	0.0390	0.1334	0.0000	0.4618	0.0001	0.1186	0.0059	1
Mozambique	0.1223	0.0000	0.4284	0.0066	0.2577	0.0011	0.3792	0.0097	1
Malawi	0.5399	0.0044	0.5045	0.0012	0.8811	0.0044	0.9742	0.0025	1
Nigeria	0.1577	0.0001	0.1319	0.0418	0.1236	0.0385	0.2072	0.0056	1
Senegal	0.1978	0.0000	0.0027		0.0035		0.1115	0.0102	1
Chad	0.0881	0.0027	0.0018		0.0030		0.0371		1
Togo	0.9975	0.0394	0.0029		0.9436	0.0041	0.8415	0.0089	1
Uganda	0.6835	0.0011	0.0193		0.0632	0.0199	0.0378		1
South Africa	0.0751	0.0003	0.3020	0.0195	0.0461		0.8818	0.0012	1
Zambia	0.2334	0.0069	0.9194	0.0012	0.9405	0.0133	0.3629	0.0090	1

Note: The values presented in table are Mckinnon (1996) one-side p-values

The second step is to perform LA-VAR approach in mixed panels to test the hypothesis that there is a relationship between real insurance density (life, non-life and total insurance) and real banking credit to private sector. The results of LA-VAR approach are reported in Table 4. 3 k_i is the number of appropriate lag orders in level VAR systems for i^{th} country. Thus, the overall panel results confirm that there is a unidirectional causality running from real banking credit to private density to real life insurance density at 5% significance level while the opposite direction causality does not hold.

Table 4.3: Bootstrap Granger causality tests for life insurance and banking credit.

Country	k_i	Ho : Banking credit does not Granger cause life insurance activity		Ho: Life insurance activity does not Granger cause banking credit	
		Wald-Statistic (w_i)	Bootstrap p-value (p_i)	Wald-Statistic (w_i)	Bootstrap p-value (p_i)
Benin	2	8.523**	0.014	4.075	0.130
Burkina Faso	2	10.956***	0.004	5.945*	0.051
Botswana	2	0.328	0.849	0.879	0.644
Cote d'Ivoire	1	0.021	0.883	0.105	0.745
Cameroon	2	0.320	0.852	0.763	0.683
Cabo Verde	2	41.155***	0.000	3.976	0.137
Ethiopia	1	0.084	0.772	0.985	0.321
Ghana	2	5.965*	0.051	0.029	0.986
Kenya	2	2.931	0.231	4.233	0.120
Madagascar	1	0.034	0.854	1.086	0.297
Mali	2	6.592**	0.037	8.268**	0.016
Mozambique	2	0.719	0.698	1.379	0.502
Malawi	1	1.878	0.171	0.002	0.962
Nigeria	1	2.314	0.128	0.501	0.479
Senegal	1	0.994	0.319	3.423*	0.064
Chad	2	1.820	0.403	1.857	0.395
Togo	1	2.059	0.151	0.000	0.986
Uganda	1	0.946	0.331	0.330	0.565
South Africa	1	0.189	0.664	0.087	0.768
Zambia	2	0.386	0.824	1.188	0.552
Fisher test statistic (λ)		97.516**		46.609	

Note: Lag orders k_i are selected by minimizing the Schwarz Bayesian criteria. Bootstrap critical values are obtained from 10,000 replications. ***, **and * indicate significance at the 1%, 5% and 10% respectively. 114.011, 86.902 and 77.030 are the critical value at the 1%, 5% and 10% significance levels respectively for banking credit does not Granger cause life insurance density hypothesis and 121.067 , 90.907and 79.839 for testing life insurance density does not causality banking credit density hypothesis.

The individual country results remain contradictory to each other. Indeed, the results suggest that both null hypothesis of "not Granger causality form banking credit to life insurance density" and "not Granger causality form life insurance density to bank credit per capita" cannot be rejected even at the 10% significance level for 15 countries of our sample. One the one hand, there is a unidirectional causal relationship running from life insurance activity to banking credit to private sector at the 5% level of significance for Benin, Cabo Verde and at the 10% level for Ghana, while in case of Senegal, life insurance density in terms of Granger causality banking credit density hypothesis is supported at 10% significance. As for Burkina Faso and Mali, we found strong empirical support for two-way Granger causality between life insurance activity and banking credit density variables.

The table 4.4 provides the test results of bootstrap Granger causality between non-life insurance activity and real banking credit density. The results indicate that is no causal linkage between non-life insurance activity and real banking credit density for the 20 countries of SSA. For the

results of individual countries, there exist a unidirectional causal relationship running from real banking credit to private sector to non-life insurance activity in Burkina Faso, Nigeria and Uganda at the 5% level of significance and at the 10% level for Zambia. Then, for Cameroon and South Africa, there is a unidirectional causal relationship running from non-life insurance density to real banking credit per capita. Lastly, there is no bidirectional causality between non-life insurance and banking credit in any countries of our sample.

Table 4.4: Bootstrap Granger causality tests for nonlife insurance and banking credit

Country	k_i	Ho : Banking credit does not Granger cause nonlife insurance activity		Ho: Nonlife insurance activity does not Granger cause banking credit	
		Wald-Statistic (w_i)	Bootstrap p-value(p_i)	Wald-Statistic (w_i)	Bootstrap p-value(p_i)
Benin	2	3.585	0.167	0.063	0.969
Burkina Faso	2	6.827**	0.033	3.073	0.215
Botswana	1	1.201	0.273	0.088	0.767
Cote d'Ivoire	2	1.683	0.431	0.782	0.677
Cameroon	2	1.008	0.604	11.200***	0.004
Cabo Verde	1	0.729	0.393	0.504	0.478
Ethiopia	2	0.223	0.895	0.408	0.815
Ghana	1	0.530	0.467	2.708	0.100
Kenya	1	0.063	0.801	1.497	0.221
Madagascar	1	0.794	0.373	0.042	0.838
Mali	1	1.586	0.208	0.275	0.600
Mozambique	1	1.075	0.300	0.674	0.412
Malawi	1	0.739	0.390	0.083	0.774
Nigeria	2	13.752***	0.001	3.045	0.218
Senegal	1	0.021	0.885	1.399	0.237
Chad	1	0.006	0.936	0.064	0.800
Togo	1	0.251	0.617	1.493	0.222
Uganda	1	5.676**	0.017	1.235	0.266
South Africa	1	0.634	0.426	4.210**	0.040
Zambia	1	3.596*	0.058	0.425	0.514
Fisher test statistic (λ)		59.790		48.606	

Note: Lag orders k_i are selected by minimizing the Schwarz Bayesian criteria. Bootstrap critical values are obtained from 10,000 replications. ***, **and * indicate significance at the 1%, 5% and 10% respectively. 111.216, 85.060 and 75.769 are the critical value at the 1%, 5% and 10% significance levels respectively for banking credit does not Granger cause non-life insurance density hypothesis and 105.655, 82.751 and 73.904 for testing non-life insurance density does not causality banking credit density hypothesis.

The results from the panel on Granger causality between total insurance activity and real banking credit density are reported in Tables 4.5 along with the bootstrap critical values. The results show that there is a unidirectional causal effect between running real banking credit density to total insurance activity for the overall panel of 20 countries of SSA at 5% significance level. However, the insurance density does not Granger cause banking credit to private sector. We note that there is strong evidence against null hypothesis "not Granger causality from banking credit density to insurance activity" at the 5% level of significance for Benin, Burkina

Faso, Kenya, Nigeria Uganda, Zambia and at the 10% level for Togo while in case of Cote d'Ivoire and Senegal the null hypothesis that insurance activity does not Granger cause banking credit is not rejected at the 5% significance level and 10% for Cameroon.

Table 4.5: Bootstrap Granger causality tests for insurance and banking credit

Country	k_i	Ho : Banking credit does not Granger cause insurance activity		Ho: Insurance activity does not Granger cause banking credit	
		Wald-Statistic (w_i)	Bootstrap p-value (p_i)	Wald-Statistic (w_i)	Bootstrap p-value (p_i)
Benin	2	8.248**	0.016	0.110	0.946
Burkina Faso	2	8.768**	0.012	3.687	0.158
Botswana	2	1.710	0.425	0.634	0.728
Cote d'Ivoire	2	0.355	0.838	8.523**	0.014
Cameroon	2	1.832	0.400	5.071*	0.079
Cabo Verde	1	0.081	0.775	0.026	0.872
Ethiopia	2	0.215	0.898	0.805	0.669
Ghana	1	0.301	0.583	0.755	0.385
Kenya	2	6.265**	0.044	1.613	0.446
Madagascar	1	0.704	0.401	0.045	0.833
Mali	2	3.254	0.197	0.067	0.967
Mozambique	1	0.468	0.494	0.001	0.972
Malawi	1	2.583	0.108	0.159	0.690
Nigeria	2	39.856***	0.000	3.999	0.135
Senegal	2	3.843	0.146	8.676**	0.013
Chad	1	0.390	0.532	0.023	0.880
Togo	1	3.257*	0.071	0.195	0.659
Uganda	2	6.320**	0.042	2.817	0.244
South Africa	1	0.940	0.332	0.033	0.856
Zambia	2	7.749**	0.021	3.820	0.148
Fisher test statistic (λ)		106.437**		44.575	

Note: Lag orders k_i are selected by minimizing the Schwarz Bayesian criteria. Bootstrap critical values are obtained from 10,000 replications. ***, **and * indicate significance at the 1%, 5% and 10% respectively. 121.004, 89.543 and 78.181 are the critical value at the 1%, 5% and 10% significance levels respectively for banking credit does not Granger cause insurance density hypothesis and 124.762, 91.467 and 79.906 for testing insurance density does not cause banking credit density hypothesis.

Comparing the results of then causality relationship between life insurance, non-life insurance and total insurance activity and banking credit density, we find that the results of causal linkage between life insurance density and banking density is similarly to that causality between total insurance activity and banking credit per capita for the panel of 20 countries of SSA. Furthermore, there is more effects of banking credit on life insurance density in more countries than the effect of banking credit density on nonlife insurance activity. Table 4.6 above summarizes the main results on the causal direction between banking credit to private sector and insurance density in countries our sample.

Table 4. 6: Summary of the causal results

	Causality Banking credit→ Life insurance	Causality Banking credit→ Nonlife insurance	Causality Banking credit→ Insurance
Countries	Benin, Burkina Faso, Cabo Verde and Mali	Burkina Faso, Nigeria, Uganda and Zambia	Benin, Burkina, Kenya, Nigeria, Togo, Uganda, and Zambia
Panel	Yes	No	Yes
	Causality Life insurance → Banking credit	Causality Nonlife insurance → Banking credit	Causality Insurance → Banking credit
Countries	Burkina Faso, Mali and Senegal	Cameroon and South Africa	Côte d'Ivoire, Cameroon and Senegal.
Panel	No	No	No

4. Conclusions and implications

In this chapter the relationship between insurance activity (life, non-life and total insurance) and real banking credit to private sector density was examined for 20 countries of SSA over the period from 1996 to 2011. Thereby, we used panel data with heterogeneous slope techniques (Mean Group model) and panel Granger causality analysis, taking into account cross-sectional dependency and heterogeneity across countries.

The empirical results show that the private credit consumption has a negative effect on the development of life insurance market for panel of 20 countries of SSA. The negative effect of life insurance is confirmed in the countries such as Burkina Faso and Kenya while in other countries there is no relationship between development bank and insurance development. Therefore, this result suggests that insurance activity and banking credit are non-cooperated and there is a competitor relationship between those financial services for 20 countries of SSA covering the period 1996-2011. Regarding the causality test, the panel result is favourable to the unidirectional causality running from real banking credit density to life insurance and total insurance activity, while that there is a no causality linkage between non-life insurance activity and banking credit to private density. Thus, the results suggest that a specific policy on non-life insurance must be conducted because this sector does not benefit from the influence of banking sector effect. The individual country results indicate that only in a minority of the countries (Benin, Burkina Faso Cabo Verde Ghana, Mali and Senegal), that there is a causality relationship between life insurance activity and real banking credit. Hence, policies of the banking credits to private sector do not affect the demand for life insurance in these countries, where there is no causality between the two financial services. Thus, the heterogeneities of the results at countries level can be explained by the structural characteristics of the countries and it will appropriate to make policies of promotion of banking credit to private sector by taking into account the own characteristics of each country.

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PART II:

Macroeconomic consequences of Insurance Development

Chapter 5:

Life Insurance Development and Economic Growth: evidence from Developing Countries*

Abstract

This article examines the relation between the development of life insurance sector and economic growth, for a sample of 86 developing countries over the period 1996-2011. We also analyze heterogeneity the effect of life insurance on growth. The econometric results show on the one hand that, the development of life insurance has a positive effect on economic growth per capita and on the other hand, this effect varies according to the structural characteristics of countries. Thus, the marginal positive impact of the development of life insurance decreases with the levels of deposit interest rate, bank credit and stock market value traded, while the effect is greater in countries with high-quality institutions. Finally, life insurance effect on growth is less for SSA and British legal system countries, compared to non-SSA and non-British legal system countries.

Keywords: Life insurance market; economic growth; Developing countries.
JEL Classification: G22; O11; O57

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1. Introduction

In the course of recent years, insurance sector in particular its life branch, in developing countries knows an increase even if the level of development of this one remains low comparatively to developed countries. Indeed, life insurance penetration in economy (life insurance premiums total volume as a percentage of GDP) of low and middle income countries rose from 0.19% of GDP in 1996 to 0.30% in 2011, while at the world level, it rose from 0.43% to 0.70 and this one of high-income countries 2.01 percent to 2.20 in the course of the same period[28].Thus, life insurance premiums have increased by 60.21% in low and middle income countries, while it has increased that 9.43% in high-income countries for period 1996 to 2011. This shows that the relative share of life insurance sector in domestic economy increases faster in developing countries than at the world level and at developed countries level.

Development of life insurance sector like all the financial intermediaries has a significant training effects on economy. Life insurance companies all as the contractual savings institutions, in addition to offer a social protection to economic agents, are specialized in mobilization of domestic savings from many small investors; and to channel it to productive investment opportunities (Dickinson, 2000). In addition, the insurance companies all as mutual fund companies of investment and retirement are the largest institutional investors on the stock, bond and real estate markets (Haiss and Sümegi, 2008). For example, life insurance companies as investment vehicle, incite to a higher level of specialization and professionalism of the part of financial market participants (enterprises and financial institutions). This allows to finance the projects that are more daring, to exploit the economies of scale by reducing the transaction costs and to encourage the financial innovation (Catalan et al., 2000; Impavido et al., 2003). In this context, it is interesting to know if the development of life insurance sector contributes to economic growth in developing countries.

Furthermore, since first session in 1964, UNCTAD formally acknowledged that *"a sound national insurance and reinsurance market is an essential characteristic of economic growth[29]".* In the stride, the economic literature (Ward and Zurbruegg, 2000; Webb et al., 2002; Kugler and Ofoghi, 2005) has shown that the economic growth and the development of insurance sector are interdependent and that an economy without insurance services would be

[28]Martin Čihák, Aslı Demirgüç-Kunt, Erik Feyen, and Ross Levine, 2012. "Benchmarking Financial Systems Around the World." World Bank Policy Research Working Paper 6175, World Bank, Washington, D.C.

[29] Proceedings of the United Nations Conference on Trade and Development (1964), Final Act and Report, p.55, annex A.IV.23.

much less developed and stable. Indeed, a sector of insurance more developed and in particular life insurance provides long and stable maturity funds for development of public infrastructure and at the same time, reinforce the country's financing capacity (Dickinson, 2000).

However, until now, most of the empirical works on financial sector have focused more on effect of banking sector and stock market on economic growth (Beck and Levine, 2004). Although, the literature (Skipper, 1997) has highlighted the contribution to life insurance sector on economic growth, it has hardly been studied empirically especially in developing countries and those with low-income. The empirical studies on impact of the development of life insurance sector on growth are more focused on developed and emerging countries (Ward and Zurbruegg, 2000; Webb et al., 2002; Arena, 2008; Avram et al. 2010; Chen et al. 2012; Lee et al, 2013; etc.).

In this context, the goal of this chapter is to contribute to literature, by assessing the empirical effect of the development of life insurance on economic growth and to highlight heterogeneity of life insurance effect among countries. Thus, the sample is constituted of 86 developing and emerging countries[30] over the period 1996-2011. Firstly, we use a linear model to analyze the direct effect of life insurance premiums on real GDP per capita growth and secondly, we test the presence of non-linearity in impact of life insurance penetration. To accomplish this task, the regressions are realized by the method of instrumental variables developed by Baum et al. (2007) in order to overcome at best the endogeneity bias that arise from reverse causality and / or omitted variables. Thus, we used the percentage of the Muslim population and life insurance penetration lagged two periods as instruments of the development of life insurance. In addition, the legal origin code is used as instrument for banking and stock market variables in non-linearity model.

The contribution of this chapter to empirical literature is at two levels. Firstly, this study provides empirical evidence to literature on the relationship between life insurance and economic growth by using a much larger sample of developing countries compared to previous studies (Webb et al., 2002; Arena, 2008 and Chen et al, 2012). Secondly, we highlight the presence of heterogeneity in impact of the development of life insurance on growth by including interaction variables. This allows us to go beyond the direct effect and to analyze the conditional effects of impact of the development of life insurance on the economic growth in developing countries. These conditional variables are financial, income, regional and institutional. Thus,

[30]The choice of the sample size has been driven by the availability of the data over a long period.

the conditional coefficients will allow also to know if life insurance effect is mitigated (negative coefficient) or magnified (positive coefficient) by these conditional variables.

The rest of the chapter is organized as follows. Section 2 provides a brief review of empirical literature on the relationship between the development of life insurance market activity and economic growth. The section 3 presents the methodology of estimation and the different variables of this study. Section 4 presents and discusses our main results, while Section 4 concludes and draws some policy implications.

2. Review of the relationship between life insurance and economic growth literature.

In this section we shed light on the role of life insurance and its contribution to economic development and we do an overview of the main empirical conclusions by having analyzed the relationship between the development of life insurance and economic growth. A more detailed listing can be found in Appendix A-5.1.

Regarding to the life insurance supply, the existing studies (Skipper, 1997; Skipper and Kwon, 2007; Arena, 2008) have showed that the insurance industry contributes to economic growth. Indeed, insurance activity encourages the economic development through various channels: it reduces the costs of the necessary financing for firms, stimulates the investments and innovation by creating an economic environment that is more certain; insurers are strong partners in development of a social protection system of workers, in particular in the retirement and health coverage and as institutional investors, the insurers also contribute to the modernization of the financial markets and facilitate the accumulation of new capital by firms (Skipper, 1997; Dickinson, 2000; Skipper and Kwon, 2007; Njegomir and Stojić, 2010).

The empirical literature on the relationship between financial development and economic growth is more focused on banking development and financial market (Levine, 1998 and 1999; Levine and Zervos, 1998; Levine et al., 2000; Beck and Levine, 2004). Some research on the link between the economic growth and life insurance development are more concerned by the effects of growth on the consumption of life insurance rather than the inverse relationship (Outreville, 1996; Enz, 2000; Beck and Webb, 2003; Chang and Lee, 2012).

The literature has analyzed the role of life insurance on economic growth from several angles. First, there are studies which properly are concerned with the causality between life insurance

premiums and economic growth. Thus, Ward and Zurbruegg (2000) indicate that in long run, there is a bidirectional causal relationship between real insurance premiums and real GDP for Australia, Canada, Italy, and Japan, whereas a unidirectional causality exist from real GDP to real insurance premiums for France. In interpreting the findings, the authors refer to cultural predispositions towards uncertainty avoidance (Hofstede, 1995; Fukuyama, 1995) and resulting propensity for insurance and the effects of regulation for explain this situation. Kugler and Ofoghi (2005) analyzed also the causality between insurance premiums and economic growth on the period 1966-2003 for United Kingdom. Through the Johansen cointegration test, they highlight a causality running from insurance to economic growth. Then, Webb et al. (2005) also found a bidirectional causality between life insurance and economic growth for a sample of 55 developed and emerging countries. By using a vector error correction model (VECM), Vadlamannati (2008) analyzed the short-run causality between life and non-life insurance and economic growth in India and indicated there is a bidirectional causality between life insurance sector and economic growth. In contrast, Adams et al. (2009) provided evidence of unidirectional causality running from insurance to economic growth, but with no reverse effect, in the case of Sweden. Finally, Lee et al. (2013) have used the cointegration technique to examine the relationship between life insurance premiums and growth in 41 countries according to their economic development level during the course of the period 1979-2007. The results show that there is a relationship of long-term equilibrium between real GDP per capita and life insurance demand. Thus, the estimated long-term results indicate that life insurance demand contributes positively to real GDP growth. Then, they also show the presence of bidirectional causality between life insurance premiums and economic growth at short-term and long-term.

In addition to the studies on the causality between life insurance premiums and economic growth, there are those which have analyzed the empirical impact of the development of life insurance on economic growth. Thus, Avram et al. (2010) have examined the relationship between insurance and economic growth over the 1980-2006 period using both Ordinary Least Squares (OLS) on cross-sectional data and Generalized Method of Moments (GMM) estimations on panel data. They found a positive effect of the insurance (life and non-life) on growth. They also show that at the disaggregated level, life insurance and non-life premiums per capita have a positively influence on economic growth. Then, Hou et al. (2012) have studied the impact of financial institutions on economic growth on a panel of 12 European countries during the period 1980-2009. They use a fixed effects model and find that life insurance development and banking activity are important determinants of economic development.

Finally, Keke and Houedokou (2013) have analyzed the contribution of insurance (life and non-life insurance) to economic growth in WAEMU[31] countries during the period 1999-2009. They also made a comparative analysis between the results of WAEMU countries and those of CEMAC[32]. The estimation of a dynamic panel grouping all the countries of the African Franc Zone did not provide clear results on the contribution of insurance sector to economic growth. Furthermore, the results conclude that there is no significant effect of life insurance on economic growth in the WAEMU and CEMAC zone, while the non-life[33] insurance has a significant effect.

Regarding the empirical analysis of nonlinear effects of life insurance on economic growth, Arena (2008) has showed that life insurance positively influences economic growth in 56 countries (both developed and developing). More specifically, he establishes that impact of life insurance on economic growth is driven by high-income countries only. Furthermore, the results indicate that the financial development and insurance sector have complementary effects on economic growth. In other terms, life insurance has a bigger impact on economic growth in country with stock market development deeper, particularly for intermediate and high stages of stock market development. As regards Chen et al. (2012), they have analyzed life insurance effect on economic growth and the conditions factors that affect the relationship between life insurance market and economic growth. Thus, the insurance-growth nexus varies across countries with different conditions. For example, the positive impact on economic growth is mitigated in middle-income countries, but amplified in low-income countries. Moreover, both the development of stock market and life insurance market are substitutes rather than complements.

Our study is in continuity of two previous studies (Arena, 2008 and Chen et al., 2012) by adopting the same methodology but differs in several levels. First, this study goes beyond that of Chen et al. (2012) by introducing the variables of the institutions quality and legal environment to analyze the heterogeneities. Indeed, the taking into account of the institutions quality as conditional factors is justified by the fact that the effect of institutional environment on the development of life insurance in high-income economies is not as significant as those in low-income economies (Outreville, 2008). Thus, according Outreville (2008), the quality of

[31] WAEMU: West Africa Economic and Monetary Union includes Benin, Burkina Faso, Ivory Coast, Mali, Niger, Senegal, Togo and Guinea-Bissau.
[32] CEMAC: Central African Economic and Monetary Community includes Cameroon, Congo, Gabon, Equatorial Guinea, Central African Republic and Chad.
[33] Or IARD: Fire, Accident and Risk Various

institutions has more effect in developing countries than in developed countries. Hence, the interaction variable between life insurance premiums and institutions quality also allows to capture to what extent the marginal effect of life insurance premiums is influenced by the quality of institutional environment. Secondly, unlike studies of Arena (2008) and Chen et al (2012) we use a larger sample of developing countries and a relatively long period (1996-2011) to take advantage on maximum information contained in the data. Finally, at the estimation method level, we use technique of instrumental variables (IV/GMM) developed by Baum et al (2007) that is robust in the presence of heteroscedasticity of the errors.

3. The econometric strategy and data

3.1. The econometric model and estimation method

Our empirical strategy to test the effect of the development of life insurance on economic growth, uses the methodology by Beck and Levine (2004) to analyze the empirical relationship between banks, stock markets and economic growth. Thus, our regression equation of growth is defined as follows:

$$Y_{i,t} - Y_{i,t-1} = \alpha * Y_{i,t-1} + \beta * INS_{i,t} + \delta' * X_{i,t} + \eta_t + \varepsilon_{i,t} \quad (5.1)$$

Where $(Y_{i,t} - Y_{i,t-1})$ is real GDP per capita growth[34], X represents a vector of control variables (population growth[35], index of human capital, domestic investment, inflation, government consumption, openness to trade and terms of trade), $Y_{i,t-1}$, the logarithm of initial GDP per capita to control the conditional convergence effect of the standard Solow-Swan growth theory and INS is life insurance penetration[36] defined as ratio of life insurance premiums to GDP. η_i is time fixed effects, $\varepsilon_{i,t}$ is the idiosyncratic error term and the subscripts i= 1,…, N and t= 1,…, T represent country and time period, respectively. In equation (1), β is our coefficient of interest and allows to determine the direct effect of life insurance premiums on economic growth. We

[34] We use the following approximation to calculate the real GDP per capita growth between t et $t-1$: $\frac{y_t - y_{t-1}}{y_t} = \frac{\Delta y_t}{y_t} \cong Ln(y_t) - Ln(y_{t-1})$.

[35] According to literature on growth regressions to Solow, authors such as Mankiw et al. (2002), Caselli et al. (1996) or Hoeffler (2002) make assuming of a rate of technical progress and of a depreciation rate of the physical capital constants, the sum of which is $\rho + d = 0.05$. This is why the variable of population used in the regressions is actually the logarithm of the sum of the population growth rate and 0.05.

[36] We also study an alternative measure of insurance development commonly used in the literature, life insurance density, to test the robustness of our results.

anticipate a positive sign for β. Furthermore, the convergence hypothesis between the economies studied suggests that the coefficient (α) of $Y_{i,t-1}$ is negative and significant in our growth model, ie $0 < 1 + \alpha < 1$.

To examine the heterogeneity for the effect of life insurance on economic growth, we specify an augmented version of equation (5.1) as follows:

$$Y_{i,t} - Y_{i,t-1} = \alpha' * Y_{i,t-1} + \beta' * INS_{i,t} + \rho * [INS_{i,t} * M_{i,t}] + \gamma * M_{i,t} + \theta' * X_{i,t} + \eta'_t + \varepsilon_{i,t} \quad (5.2)$$

Where $M_{i,t}$ represents the conditional variables of country-specific structural characteristics which are financial, economic development level, region and institutions quality and legal system.

The four categories of conditional variables defined above include variables described as follows: first, to determine whether the effect of life insurance demand on growth is influenced by the development of local financial institutions, we retain the private credit by deposit money banks to GDP, interest rate of bank deposits and stock market total value traded to GDP. Indeed, insurance market activity cannot only contribute directly to economic growth, by itself but also through complementarities with banking sector and stock market. Thus, by reducing information and transaction costs, pooling risk, enhancing financial intermediation through the channeling of savings to domestic investment, and fostering a more efficient capital allocation through the gathering of substantial firm information, insurance activity may contribute to reinforcing the process of resource allocation done by banks and capital markets (Arena, 2008). In contrast, life insurance sector activity may have a substitution effect with banking sector in the mobilization of savings by reducing the market shares of other financial systems particularly in developing countries (Allen and Santomero, 2001). Then, heterogeneity related to the economic development level is proxied by income per capita of country. Thus, we introduce dummies for Low and Middle income (LMY) and for Upper Middle income (UMC). Regional condition variables are defined by the dummies of Sub-Saharan Africa (SSA), Europe and Central Asia (ECA), Latin America and Caribbean (LAC), Middle East and North Africa (MNA), South Asia (SAS) and East Asia and Pacific (EAP). Finally, last category of conditional variable measures the institutions quality that are bureaucratic quality, control of corruption and Law and order. In addition to these institutional indicators, we capture the overall effect of the institutions quality by the average of these three indicators (IQ). But before introducing these indicators in econometric estimates, we normalize them on a scale of 0-1 in order to facilitate the calculation of the composite index of the institutions quality (IQ) and

comparisons of the different equations. A higher score represents a better institutional quality. We also analyze the effect of legal environment, by introducing the dummies for British legal system (British) and french (French).

From the equations (5.1) and (5.2), the marginal effect of life insurance premiums on economic growth can be determined as follows:

$$\frac{\partial(Y_{i,t} - Y_{i,t-1})}{\partial INS_{i,t}} = \beta \tag{5.3}$$

$$\frac{\partial(Y_{i,t} - Y_{i,t-1})}{\partial INS_{i,t}} = \beta' + \rho M_{i,t} \tag{5.4}$$

Equation (5.3) is obtained from equation (5.1) and aims at measuring the direct effect of life insurance premiums on growth (β). Equation (5.4) result of the equation (5.2); the term ($\rho M_{i,t}$) represents the indirect effect and ($\beta' + \rho M_{i,t}$) is the marginal effect of the development of life insurance on economic growth. More specifically, if $\beta' > 0$ and $\rho < 0$ then life insurance development has a positive link with economic growth and a negative coefficient for the variable $M_{i,t}$ apparently reduces positive impact of the particular life insurance development on economic growth. On the other hand, if $\beta' > 0$ and $\rho > 0$, then the conditional variable $M_{i,t}$ favorably affects that positive impact of the development of life insurance.

The estimate of the influence of life insurance premiums on growth (equation 5.1 and 5.2) by OLS estimator raises a number of problems of which the most important constitutes the endogeneity bias. Indeed, this problem may originate from a number of sources. The existence of a correlation between the dependent variable lagged and individual effects leads OLS estimators biased and not convergent. Also in the case of reverse causality or omission of variables, OLS estimator is inconsistent and biased. To face these problems, we draw on instrumental variables techniques and thus on several instruments to estimate the impact of the life insurance activity on economic growth. Thus, we instrument the development of life insurance by the percentage of the Muslim population in 2010 and the value of life insurance premiums lagged two years. Indeed, previous studies have shown that Muslims believe that the purchase of life insurance is inconsistent with the Koran. Thus, they have found that the proportion of Muslim population has a negative and significant effect on the demand for life insurance (Browne and Kim, 1993; Webb et al. 2002; Ward and Zurbruegg, 2002; Beck and Webb, 2003; Feyen et al, 2011). Then, by basing on work of Laporta et al. (1998), we use legal origin system dummy (English or French) as instruments of banking and stock market variables

in our equation (5.2). In addition, life insurance indicator lagged two years and conditional variable is also used as instrument in our augmented equation (5.2). Thus, the equations (5.1) and (5.2) are estimated with the heteroskedastic-efficient two-step generalized method of moments (IV-GMM) estimator developed by Baum et al (2007), which generates efficient coefficients as well as consistent standard errors estimates. Indeed, the advantages of IV-GMM over IV are clear: if heteroskedasticity is present, the IV-GMM estimator is more efficient than the simple IV estimator, whereas if heteroskedasticity is not present, IV-GMM estimator is no worse asymptotically than the IV estimator (Baum et al. 2007).

3.2. Definition of data sources and statistical analyses

The data used in this study are annual data from 1996 to 2011 for 86 developing countries (see Appendix A5.4 for countries list). Our main variable of interest, life insurance premiums total value to GDP measures the penetration of insurance activity in economy, and is obtained from the database «*Benchmarking Financial Systems Around the World*» of Čihák et al. (2012). To test, the robustness of our results, we have recourse to life insurance premiums per capita (life insurance density)[37] as an alternative measure of the consumption of life insurance. The financial condition variables such as the bank credit to private sector and rate of stock market transaction and bank deposit interest rate, also come from Čihák et al. (2012). Real GDP per capita growth defined by the logarithm difference of real GDP per capita is extracted from *World Development Indicators (2014)* compiled by the World Bank. Similarly, population growth, inflation rate, government consumption, openness to trade, terms of trade, dummies of the economic development level (Low and Middle income = LMY and Upper Middle income = UMC) and regional dummies (Sub-Saharan Africa, Europe and Central Asia, Latin America and Caribbean, Middle East and North Africa, South Asia and East Asia and Pacific) all taken from World Development Indicators. The human capital index is derived from *Penn World Table 8.0.* Finally, the variables of the institutions quality condition are extracted from *International Country Risk Guide (CGRI) database, (2013)* Appendix A-5.2 presents full definitions and sources of the different variables.

The table 5.1 presents descriptive statistics of our variables in basic model. There is considerable variation in share of life insurance premiums in GDP across countries, ranging

[37] Life insurance density is calculated starting from the penetration of life insurance and real GDP per capita.

from 0.001% in Albania (average 1996-2011) to 15.784% in South Africa (average 1996-2011). Real GDP per capita growth also shows variation, ranging from -0.165 in Madagascar to 0.2854 in Azerbaijan (both for 1996-2011). Most of the control variables also presents disparities between countries in the period.

Table 5.1: Summary statistics

Variables	Obs	Mean	Std. Dev.	Min	Max
GDP per capita growth	1273	0.02496	0.0417	-0.1658	0.2854
Life insurance premiums (%GDP)	1286	0.76992	1.6402	0.001	15.784
Log(Initial GDP per capita)	1278	7.6326	1.3157	4.8638	12.556
Log (Population growth)	1237	0.5206	0.7726	-6.1170	2.8544
Index of Human capital	1087	2.2926	0.4877	1.1355	3.2680
Domestic Investment (%GDP)	1357	23.368	7.2737	4.142	57.991
Log (1+Inflation)	1299	2.8481	0.5252	-1.5977	8.332
Log (Government consumption)	1254	3.2229	0.3677	-0.5942	4.0631
Log (Degree of openness)	1334	4.2722	0.4702	2.7035	5.3954
Log (Terms of trade)	1315	4.6233	0.3292	3.3044	6.2480

4. Results of the estimates and discussions

4.1. Results of the basic model

Our results show that the development of life insurance activity is an important determinant of economic growth on the sample of 86 developing countries over the period 1996-2011[38]. The diagnostic tests on the efficient of IV-GMM estimator are presented in table 5.2 below. The quality of the instruments is validated by the statistics of Fisher and Hansen over-identification test of the first stage estimation results. Thus, the diagnostic test validates the instruments used.

Columns 1 to 4 of the table 5.2 indicate the results of life insurance penetration effect by controlling the other determinants of economic growth. We note that whatever the specifications, life insurance penetration has a positive and significant effect on real GDP per capita growth. This result suggests that life insurance demand contributes to economic growth in our sample of developing countries. Indeed, in terms of impact, the coefficient is between 0.0011 and 0.0017. Thus, on the basis of results of complete empirical model (column 4), an increase in one standard deviation in life insurance premiums to GDP, *ceteris paribus*, would imply an increase of 0.2132% in economic growth. This result is consistent with the theoretical of financial development of Patrick (1966) based "*supply-leading*" which stipulates that the financial development improves the economic growth. Thus, the insurance companies as well as mutual fund investment and pensions constitute one of main institutional investors in the stock, bond and real estate market that induce the economic growth. The results also confirm empirical studies that found that the development of life insurance significantly influences economic growth (Outreville, 1996; Webb et al., 2002; Arena, 2008; Haiss and Sümegi, 2008; 2008; Han et al. 2010; Lee, 2010; Chiu and Lee, 2012; Lee et al., 2013; etc.).

Regarding the control variables, real GDP per capita initial, population growth, inflation, degree of openness and terms of trade have negative effects on economic growth while the human capital and domestic investment positively influence the economic growth. Thus, the negative effect of the population is in conformity with the growth theory of Solow (1956) which stipulates that population growth reduced the quantity of capital per capita and therefore the product per capita. Moreover, the positive effect of human capital is in conformity with that found by Barro (1997) and suggests that an increase of investment in human capital is a growth

[38] We do not test the stationarity of variables because the time dimension is small (16 years) and according to Hurlin and Mignon (2006) for that the problematic of stationarity presents an interest, the time dimension of the panel must exceed 20 years.

stimulating factor. However, negative effect of Degree of openness and the terms of trade is against intuitive and which may be explained by the fact that the developing countries are more dependents of the imports.

Table 5.2: Base line: Two-step IV/GMM estimation of life insurance penetration impact on Economic growth

	Dependent Variable: GDP per capita growth			
VARIABLES	(1)	(2)	(3)	(4)
Life insurance premiums (%GDP)	0.00128***	0.00119***	0.00173***	0.00136***
	(0.000418)	(0.000410)	(0.000572)	(0.000453)
Log (Initial GDP per capita)	-0.00669***	-0.00688***	-0.00685***	-0.00657***
	(0.00124)	(0.00119)	(0.00131)	(0.00133)
Log (Population Growth)[39]	-0.00731***	-0.00753***	-0.00765***	-0.00707***
	(0.00158)	(0.00156)	(0.00163)	(0.00150)
Index of Human capital	0.0129***	0.0131***	0.0136***	0.0135***
	(0.00338)	(0.00329)	(0.00354)	(0.00351)
Domestic Investment (%GDP)	0.00169***	0.00166***	0.00179***	0.00166***
	(0.000205)	(0.000200)	(0.000209)	(0.000194)
Log (1+ Inflation)		-0.00987**	-0.00801*	-0.00995**
		(0.00398)	(0.00467)	(0.00450)
Log (Government consumption)			-0.00430	-0.00459
			(0.00366)	(0.00346)
Log (Degree of openness)				-0.00552**
				(0.00253)
Log (Terms of trade)				-0.0101**
				(0.00469)
Constant	0.00751	0.0373**	0.0417***	0.106***
	(0.0113)	(0.0152)	(0.0156)	(0.0280)
Year FE	Yes	Yes	No	Yes
Observations	795	771	736	702
R^2 Centered	0.318	0.332	0.228	0.352
Hansen J, p-value	0.3748	0.5120	0.3983	0.8281
First-stage F-statistic	77.601	89.089	66.607	40.773
(p-value)	0.0000	0.0000	0.0000	0.0000

Note: Life insurance variable is instrumented by percentage of the Muslim papulations and life insurance penetration lagged two period. Robust standard errors are in parentheses. *Significantly different from zero at the 10 percent significance level, ** 5 percent significance level, *** 1 percent significance level.

In terms of robustness, we replace life insurance penetration by life insurance density as an alternative measure of indicator of the development of life insurance. The results are reported in table 5.3 below. As previously, we include the control variables to test the stability of the life insurance density effect on economic growth (columns 1 to 4). Column 4 integrates simultaneously all explanatory model as variables previously. We observe that the tests of diagnostic associated to the specification gives the satisfying results. For example, the statistic

[39] Referring to Mankiw et al. (1992), Caselli et al. (1996) and Hoeffler (2002), population growth rate has been adjusted for capital depreciation and growth rate of technical progress, the sum of which worth conventionally 0.05.

of Fisher Hansen J overidentification test (which is robust to heteroskedasticity) does not reject the validity of instrumental variables.

Table 5.3: **Robustness: Two-step IV/GMM estimation of life insurance density impact on Economic growth**

	Dependent Variable: GDP per capita growth			
VARIABLES	(1)	(2)	(3)	(4)
Log (1+life insurance per capita)	0.00216**	0.00215*	0.00253**	0.00196*
	(0.00104)	(0.00118)	(0.00123)	(0.00107)
Log (initial GDP per capita)	-0.00841***	-0.00874***	-0.00890***	-0.00821***
	(0.00165)	(0.00172)	(0.00173)	(0.00173)
Log (Population Growth)	-0.00672***	-0.00734***	-0.00710***	-0.00648***
	(0.00157)	(0.00167)	(0.00165)	(0.00149)
Index of Human capital	0.0124***	0.0132***	0.0136***	0.0137***
	(0.00339)	(0.00355)	(0.00359)	(0.00354)
Domestic Investment (%GDP)	0.00165***	0.00178***	0.00175***	0.00161***
	(0.000203)	(0.000204)	(0.000207)	(0.000193)
Log (1+ Inflation)		-0.00873**	-0.00796*	-0.00980**
		(0.00437)	(0.00467)	(0.00452)
Log (Government consumption)			-0.00382	-0.00409
			(0.00366)	(0.00346)
Log (Degree of Openness)				-0.00592**
				(0.00249)
Log (Terms of trade)				-0.00909*
				(0.00479)
Constant	0.00778	0.0417***	0.0518***	0.129***
	(0.0131)	(0.0147)	(0.0167)	(0.0306)
Year FE	Yes	No	No	Yes
Observations	792	768	733	699
R^2 Centered	0.318	0.226	0.226	0.351
Hansen J, p-value	0.2879	0.2803	0.2592	0.7002
First-stage F-statistic	65.906	68.791	43.076	43.277
(p-value)	0.0000	0.0000	0.0000	0.0000

Note: Life insurance variable is instrumented by percentage of the Muslim papulations and life insurance density lagged two period. Robust standard errors are in parentheses. *Significantly different from zero at the 10 percent significance level, ** 5 percent significance level, *** 1 percent significance level

We generally find the same results as above with life insurance penetration. Indeed, in all the equations, life insurance density has a positive and significant effect on growth. Thus, in terms of impact, the logarithm of life insurance density coefficient is between 0.0019 and 0.0025. From column (4), a one standard deviation increase in the logarithm of the life premiums per capita would increase real GDP per capita growth by 0.3374%. Hence, we show that the positive impact of life insurance density on growth is conform to previous studies that have also used the life insurance density, such as those of Avram et al. (2010), Lee (2010), Han et al. (2010), Lee and Chiu (2012), Lee et al. (2013), etc. The control variables also keep their sign as

previously which confirms the robustness of our results. Similarly, initial GDP per capita is also significant.

4.2. Testing for heterogeneity in the life insurance-growth nexus

As shown in the previous analysis, the development of life insurance increases real GDP per capita growth. In this sub-section, we examined whether the relationship between the development of life insurance sector and economic growth could be influenced by different structural characteristics of the country. Thus, in addition to variables of the basic model (equation (5.1)), we include the conditional variables (M) and interaction variables (INS x M) by highlighting the simultaneous effect of life insurance penetration and conditional variables.

4.2.1. Financial development and life insurance effect on growth

Table 5.4 presents the results of estimation (IV-GMM), by using financial indicators such as conditional variables. These indicators are private credit by deposit money banks to GDP (Private credit), stock market total value traded to GDP (Stocktra) and bank deposit interest rate to measure the financial structure. The coefficients of the interaction term between life insurance development and financial variables are significant and negative; suggesting that life insurance development is positively related to economic growth, but the positive effect is moderated by the private credit and stock market transaction and deposit interest rate. Indeed, as illustrated in column 1 of Table 5.4 below, a country in our sample that sees its deposit interest rate increased by 5 to 10%, the marginal impact of its life insurance activity on growth decreases from 0.00737 to 0.00730[40]. Thus, the mitigating effect of interest rate on the relationship between life insurance and growth is due to the fact that high interest rates encourage economic agents to do banking investment rather than to subscribe to contractual savings (life insurance). Furthermore, private credit (column 2) or stock market transaction (column 3) reduces the positive effect of life insurance penetration on economic growth. In other words, the results suggest that the development of banking sector or stock market restrain the marginal impact of life insurance activity on economic growth until it is neutralized from a certain threshold. For example, regarding the banking system, the threshold of private credit to

[40] $\frac{\partial(Y_{i,t}-Y_{i,t-1})}{\partial INS_{i,t}} = 0.00738 - 0.00709 * (\text{Deposit interest rate})$.

GDP from which the marginal impact of life insurance on growth neutralizes is 72%[41]. For the stock market transaction, the threshold is 79.678%. The substitution effect between life insurance development and other financial segments (banks and stock market) is not intuitive to the theoretical literature which stipulate a complementary effect between those financial systems. Moreover, this result is not going towards the same sense as Webb et al. (2005) and Arena (2008) who have found a complementarity effect between bank, stock market and life insurance development in a samples of 55 developed and developing countries. However, unlike developed economies where insurance companies play an important role in the financial sectors and their importance as providers of financial services and investment funds in capital markets is very pronounced, there are striking differences in many developing countries where insurance premiums remain low (Lee, Huang, et al 2013; Lee et al., 2013). Thus, the situation of low development of life insurance can explain our findings of substitution effect between life insurance activity and banking credit in developing countries. In addition, our results confirm the study of Chen et al. (2012) who have also found the substitution effect between the development of the stock market and life insurance on the growth process. Then, our results can be also supported by, Haiss and Sümegi (2008) who have indicated that the life insurance sector expansion can weaken the banking sector effect on economic growth by reducing the market share of the banking sector in the mobilization of savings (Allen and Santomero, 2001).

Furthermore, to analyze the direct effect of the three financial segments (insurance, banks and stock market) on economic growth, we have introduced in addition to life insurance premiums, other financial indicators in our basic model (equation 5.1 above). Thus, we are trying to check the previous studies as Webb et al. (2002), Beck and Levine (2004) and Lee (2010) who also have analyzed the effect of the different financial services on economic growth. Results show that the development of life insurance sector and stock market has a positive and significant effect on income per capita growth while bank credit has not significant impact (column 4 and 5). The results are going to the same direction as the results of previous empirical studies (Beck and Levine, 2004 and Arena, 2008) who have also found that life insurance development and stock market have a positive effect on economic growth. However, bank credit to private sector has a not significant effect on economic growth and is not conform to Beck and Levine (2004).

[41]The marginal effect of life insurance is determined by $\frac{\partial(Y_{i,t}-Y_{i,t-1})}{\partial INS_{i,t}} = \beta + \rho * M_{i,t}$, if β and ρ have opposite signs, a threshold level arises $\frac{\partial(Y_{i,t}-Y_{i,t-1})}{\partial INS_{i,t}} = \beta + \rho * M_{i,t} = 0$ and we have $M_{i,t}{}^{*} = \frac{\beta}{\rho}$ with $M_{i,t}{}^{*}$ measures the minimum conditional variables required for a full absorption of the life insurance effect.

Table 5.4: Life insurance and growth, and interaction with financial condition variables

	Dependent Variable: GDP per capita growth				
VARIABLES	(1)	(2)	(3)	(4)	(5)
Life insurance premiums (%GDP)	0.00738***	0.00828***	0.00396***	0.00114**	0.000579
	(0.00260)	(0.00296)	(0.00113)	(0.000549)	(0.000508)
Deposit interest rate (%)	-0.000610*				
	(0.000341)				
Life insurance*Deposit interest rate	-0.000709**				
	(0.000296)				
Private credit by bank (% GDP)		0.000203**		5.52e-05	
		(8.89e-05)		(7.90e-05)	
Life insurance*Private credit		-0.000115***			
		(4.38e-05)			
Stock market total value traded (% GDP)			0.000136***		8.08e-05**
			(4.60e-05)		(4.03e-05)
Life insurance*Stocktra			-4.97e-05***		
			(1.32e-05)		
Log (initial GDP per capita)	-0.00620***	-0.00745***	-0.00713***	-0.0067***	-0.00660***
	(0.00149)	(0.00137)	(0.00143)	(0.00133)	(0.00145)
Log (Population growth)	-0.00704***	-0.00739***	-0.00571***	-0.0074***	-0.00718***
	(0.00161)	(0.00211)	(0.00149)	(0.00151)	(0.00211)
Index of Human capital	0.0115***	0.0134***	0.0159***	0.0126***	0.0115***
	(0.00384)	(0.00346)	(0.00419)	(0.00354)	(0.00410)
Domestic Investment (%GDP)	0.00168***	0.00134***	0.00170***	0.00145***	0.00162***
	(0.000217)	(0.000220)	(0.000170)	(0.000221)	(0.000168)
Log (1+ Inflation)	0.00348	-0.00572	-0.0158***	-0.00535	-0.0126***
	(0.00528)	(0.00500)	(0.00515)	(0.00453)	(0.00443)
Log (Government consumption)	-0.00352	-0.0118***	-0.0105**	-0.0092***	-0.0109***
	(0.00415)	(0.00371)	(0.00416)	(0.00344)	(0.00405)
Log (Degree of openness)	-0.00554*	-0.00567**	-0.00724**	-0.00455*	-0.00339
	(0.00311)	(0.00250)	(0.00285)	(0.00249)	(0.00250)
Log (Terms of trade)	-0.0143***	-0.00515	-0.00971*	-0.00755	-0.00769
	(0.00541)	(0.00491)	(0.00533)	(0.00485)	(0.00529)
Constant	0.103***	0.103***	0.160***	0.117***	0.118***
	(0.0311)	(0.0285)	(0.0364)	(0.0296)	(0.0328)
Year FE	No	Yes	Yes	Yes	Yes
Observations	622	658	514	680	506
R^2 Centered	0.253	0.360	0.450	0.351	0.431
Hansen J, p-value	0.6064	0.2008	0.2171	0.1594	0.3277
First-stage F-statistic	63.822	32.214	35.428	33.560	88.021
(p-value)	0.0000	0.0000	0.0000	0.0000	0.0000

Note: Life insurance variable is instrumented by percentage of the Muslim papulations and life insurance lagged two period. In addition, banking and stock market variables are instrumented by legal origin. Robust standard errors are in parentheses. *Significantly different from zero at the 10 percent significance level, ** 5 percent significance level, *** 1 percent significance level.

4.2.2. A country's stage development and the life insurance-growth relationship

To answer to the question whether the different stages of economic development influence the relationship between life insurance and growth. Our sample of 86 developing countries include Low and middle income countries (LMY) and Upper middle income countries (UMC). The results of income group[42] effect are presented in table 5.5.

Table 5.5: Economic development level on life insurance-growth relationship

	Dependent Variable: GDP per capita growth	
VARIABLES	(1)	(2)
Life insurance premiums (%GDP)	0.00109**	0.00581*
	(0.000435)	(0.00301)
Low & middle income dummy (LMY)	-0.0107***	
	(0.00400)	
Life insurance premiums*LMY	0.00324	
	(0.00303)	
Upper middle income dummy (UMC)		0.0118***
		(0.00402)
Life insurance premiums*UMC		-0.00476
		(0.00307)
Log (initial GDP per capita)	-0.00949***	-0.00931***
	(0.00167)	(0.00167)
Log (Population growth)	-0.00714***	-0.00698***
	(0.00150)	(0.00149)
Index of Human capital	0.0116***	0.0108***
	(0.00355)	(0.00355)
Domestic Investment (%GDP)	0.00150***	0.00150***
	(0.000218)	(0.000217)
Log (1+ Inflation)	-0.00807*	-0.00874*
	(0.00450)	(0.00451)
Log (Government consumption)	-0.00597*	-0.00639*
	(0.00337)	(0.00338)
Log (Degree of openness)	-0.00285	-0.00315
	(0.00255)	(0.00256)
Log (Terms of trade)	-0.00741	-0.00876*
	(0.00463)	(0.00469)
Constant	0.119***	0.134***
	(0.0292)	(0.0313)
Year FE	Yes	Yes
Observations	702	702
R^2 Centered	0.356	0.357
Hansen J, p-value	0.1217	0.5548
First-stage F-statistic	41.614	42.748
(p-value)	0.0000	0.0000

Note: Life insurance variable is instrumented by percentage of the Muslim papulations, life insurance lagged two period and interaction between life insurance and dummy of development level lagged two years. Robust standard errors are in parentheses. *Significantly different from zero at the 10 percent significance level, ** 5 percent significance level, *** 1 percent significance level.

[42] The analysis is done by interacting a dummy variable, which takes the value of 1 when the country is in the category of income group, with the insurance variables. The sample is not divided into two groups to perform the analysis.

The results show that the income group does not influence the marginal effect of life insurance on the economic growth in low and middle income countries (column 1) and upper- middle income countries (column 2). Thus, our results are in the same direction as those of Arena (2008) and Chen et al. (2012) who have found the same results for developing countries. However, we note a negative effect of the coefficient of dummy for low and middle income countries on growth (column 1) and a positive effect for upper- middle income countries (column 2). Thus, the negative effect for low and middle income countries can be explained by the lack of the necessary structure and framework to promote economic growth via the financial sector (Avram et al., 2010).

4.2.3. Life insurance development and economic growth: role of regional specificities.

Table 5.6 reports the results using regional dummies. We observe that the dummy of Sub-Saharan Africa (SSA) region has a negative and significant effect and negatively influences the impact of life insurance on economic growth (column 1). Other regions do not significantly influence the effect of insurance on growth (column 2 to 6). Thus, the marginal effect of life insurance on economic growth is less for SSA countries compared to non-SSA countries. Specifically, a percentage point increase of life insurance premiums to GDP induces a 0.153 percentage points increase in real GDP per capita growth for SSA countries[43]. This compares with a 0.580 percentage points increase for a comparable country in non-SSA (either 0.427 percentage points lower for SSA countries). The negative and significant effect of the Sub-Saharan Africa region dummy can be explained by the socio-political situation in the region characterized by the political instabilities that do not favor the growth and play unfavorable on the development of life insurance sector.

[43] (0.0058- 0.00427*Sub-Saharan Africa)*100

Table 5.6: **Regional effect and life insurance-growth relationship**

	Dependent Variable: GDP per capita growth					
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
Life insurance premiums	0.0058***	0.00171***	0.00137***	0.00149***	0.00135***	0.00144***
(%GDP)	(0.00191)	(0.000463)	(0.000474)	(0.000458)	(0.000440)	(0.000457)
Sub-Saharan Africa (SSA)	-0.00513*					
	(0.00294)					
Life insurance premiums	-0.00427**					
(%GDP)*SSA	(0.00194)					
Europe & Central Asia (ECA)		0.0115				
		(0.00830)				
Life insurance premiums		0.100				
(%GDP)*ECA		(0.0709)				
Latin America & Caribbean			-0.00402			
(LAC)			(0.00360)			
Life insurance premiums			0.00403			
(%GDP)*LAC			(0.00585)			
Middle East & North Africa				0.00156		
(MNA)				(0.00392)		
Life insurance premiums				0.00143		
(%GDP)*MNA				(0.0101)		
South Asia (SAS)					0.00359	
					(0.00373)	
Life insurance premiums					0.00307	
(%GDP)*SAS					(0.00357)	
East Asia & Pacific (EAP)						0.00411
						(0.00552)
Life insurance premiums						-0.00107
(%GDP)*EAP						(0.00291)
Log (initial GDP per capita)	-0.0070***	-0.0066***	-0.00624***	-0.0062***	-0.0059***	-0.0061***
	(0.00135)	(0.00133)	(0.00145)	(0.00130)	(0.00138)	(0.00137)
Log (Population growth)	-0.0062***	-0.0073***	-0.00719***	-0.0073***	-0.0073***	-0.0073***
	(0.00145)	(0.00148)	(0.00147)	(0.00148)	(0.00149)	(0.00149)
Index of Human capital	0.0113***	0.0131***	0.0145***	0.0136***	0.0130***	0.0131***
	(0.00355)	(0.00357)	(0.00334)	(0.00354)	(0.00364)	(0.00350)
Domestic Investment (%GDP)	0.00141***	0.00155***	0.00151***	0.00153***	0.00151***	0.00153***
	(0.000185)	(0.000182)	(0.000187)	(0.000188)	(0.000192)	(0.000196)
Log (1+ inflation)	-0.00533	-0.00835**	-0.00662	-0.00749*	-0.00758*	-0.00803*
	(0.00453)	(0.00421)	(0.00452)	(0.00447)	(0.00429)	(0.00441)
Log (Government	-0.00483	-0.00697**	-0.00660*	-0.00577	-0.00503	-0.00484
consumption)	(0.00343)	(0.00337)	(0.00350)	(0.00371)	(0.00357)	(0.00346)
Log (Degree of openness)	-0.00359	-0.00270	-0.00399	-0.00387*	-0.00247	-0.00441*
	(0.00239)	(0.00233)	(0.00250)	(0.00235)	(0.00245)	(0.00242)
Log (Terms of trade)	-0.00786*	-0.00913*	-0.00971**	-0.00972**	-0.00939**	-0.0100**
	(0.00475)	(0.00467)	(0.00468)	(0.00476)	(0.00468)	(0.00469)
Constant	0.0956***	0.104***	0.100***	0.101***	0.0912***	0.103***
	(0.0284)	(0.0272)	(0.0277)	(0.0278)	(0.0283)	(0.0278)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	702	702	702	702	702	702
R^2 Centered	0.359	0.362	0.348	0.348	0.350	0.348
Hansen J, p-value	0.2081	0.3264	0.4929	0.3486	0.1945	0.3028
First-stage F-statistic	64.215	31.055	85.393	67.520	38.740	94.180
(p-value)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Note: Life insurance variable is instrumented by percentage of the Muslim papulations, life insurance lagged two period and interaction between life insurance and dummy of region lagged two years. Robust standard errors are in parentheses. *Significantly different from zero at the 10 percent significance level, ** 5 percent significance level, *** 1 percent significance level

4.2.4. Life insurance and economic growth: role of the institutions quality and legal environment

In this section we discuss the hypothesis on which the responsiveness of economic growth to life insurance development depends, in a linear fashion, upon institutional quality and legal origin. The regression results from the estimation of Equation (5.2) are reported in Table 5.7. Each institutional variable is included along with its interaction with life insurance penetration. Diagnostic tests of Fisher and Hansen are favorable to the validity of our instruments. Our results support the prediction that the responsiveness of economic growth to life insurance development depends on the level of institutional quality and legal environment.

The interaction terms of life insurance and the quality of bureaucracy (BQ), control of corruption (COR) and the composite index of the institutions quality (IQ) are positive and significant with coefficients equal to 0.0204, 0.0284 and 0.0206, respectively (column 1, 2 and 4). Thus, the improvement of the institutions quality contributes to improve the marginal positive effect of life insurance premiums on economic growth. Indeed, the positive signs of interactive terms suggest that the positive effect of the development of life insurance on economic growth is more pronounced for countries with high-quality institutions. These results imply an important economically effect of institutions on the responsiveness of economic growth to life insurance development. In terms of impact, *ceteris paribus*, when the index of the institutions quality increases from 0.25 to 0.75 percentage points (column 4), the marginal impact of life insurance growth increases by 0.0179 to 0.0282. As for quality of the bureaucracy and control of corruption, the responsiveness of economic growth to the life insurance development increases from 0.0102 and 0.0142, respectively (column 1 and 2).

Regarding the role of the legal environment, we note that British legal system dummy positively and significantly influences the economic growth while the interaction term with life insurance is negative (column 5). In other words, life insurance development positively influence the economic growth, but its marginal impact is less for British colonial countries. In contrary, French legal system has a negative effect on growth but does not influences the marginal effect of life insurance (column 6). This result can be explained by the fact that life insurance is most developed in English legal system countries while in French legal system, there is an obligatory social security system for public and private sector workers.

Table 5.7: Life insurance and institutions quality and legal environment

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
Life insurance premiums	0.0113**	0.0131*	0.00434*	0.0128**	0.00630***	0.00094*
(%GDP)	(0.00469)	(0.00737)	(0.00234)	(0.00586)	(0.00231)	(0.00056)
Bureaucracy quality (BQ)	0.00356					
	(0.0102)					
Life insurance premiums*BQ	0.0204**					
	(0.00938)					
Control of Corruption (COR)		0.0299**				
		(0.0123)				
Life insurance premiums*COR		0.0284**				
		(0.0143)				
Law and order (LO)			0.0168***			
			(0.00609)			
Life insurance premiums*LO			-0.00401			
			(0.00321)			
Index of the institutions quality				0.0330**		
(IQ)				(0.0145)		
Life insurance premiums				0.0206**		
(%GDP)*IQ				(0.0102)		
British Colony					0.00635**	
					(0.00263)	
Life insurance					-0.00555**	
premiums*British					(0.00233)	
French Colony						-0.0070***
						(0.00286)
Life insurance						0.00245
premiums*French						(0.00237)
Log (initial GDP per capita)	-0.00689***	-0.0069***	-0.0071***	-0.0069***	-0.00609***	-0.0056***
	(0.00132)	(0.00133)	(0.00125)	(0.00125)	(0.00135)	(0.00148)
Log (Population growth)	-0.00731***	-0.0066***	-0.0072***	-0.0069***	-0.00841***	-0.0095***
	(0.00168)	(0.00168)	(0.00174)	(0.00168)	(0.00178)	(0.00198)
Index of Human capital	0.0140***	0.0150***	0.0152***	0.0127***	0.0126***	0.0117***
	(0.00376)	(0.00337)	(0.00345)	(0.00331)	(0.00370)	(0.00394)
Domestic Investment (%GDP)	0.00141***	0.00140***	0.00127***	0.00122***	0.00149***	0.00154***
	(0.00017)	(0.000178)	(0.00019)	(0.000191)	(0.000184)	(0.000196)
Log (1+ Inflation)	-0.00713*	-0.00721*	-0.00438	-0.00426	-0.00830*	-0.006419
	(0.00427)	(0.00417)	(0.00387)	(0.00409)	(0.00445)	(0.004604)
Log (Government	-0.00598*	-0.00558	-0.00766**	-0.0096***	-0.00398	-0.006555
consumption)	(0.00354)	(0.00355)	(0.00345)	(0.00343)	(0.00366)	(0.00402)
Log (Degree of openness)	-0.00521**	-0.00522**	-0.00551**	-0.00512**	-0.00373	0.0000301
	(0.00255)	(0.00244)	(0.00249)	(0.00239)	(0.00235)	(0.00255)
Log (Terms of trade)	-0.00868*	-0.00866*	-0.00740	-0.00707	-0.00844*	-0.00648
	(0.00486)	(0.00483)	(0.00454)	(0.00453)	(0.00474)	(0.0049)
Constant	0.0997***	0.118***	0.112***	0.121***	0.0900***	0.08209***
	(0.0286)	(0.0294)	(0.0279)	(0.0296)	(0.0283)	(0.02877)
Year FE	Yes	Yes	Yes	Yes	Yes	No
Observations	672	670	672	672	687	687
R^2 Centered	0.353	0.351	0.354	0.356	0.358	0.359
Hansen J, p-value	0.2750	0.4590	0.2327	0.4603	0.2823	0.2628
First-stage F-statistic	53.241	55.142	104.184	27.566	63.391	34.056
(p-value)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Note: Life insurance variable is instrumented by percentage of the Muslim papulations, life insurance lagged two period and interaction between life insurance and indicators of institution quality lagged two years. Robust standard errors are in parentheses. *Significantly different from zero at the 10 percent significance level, ** 5 percent significance level, *** 1 percent significance level.

5. Conclusion

This chapter has examined the effect of life insurance activity on economic growth and heterogeneity of insurance effect. Using a sample of 86 developing countries over the period 1996-2011 and controlling for endogeneity of life insurance premiums, the econometric results suggest that countries with better-developed life insurance activity have to higher level of economic growth. This result is robust to the addition of other determinants of growth and other specifications with alternative measure of the development of life insurance. However, the results highlight some important heterogeneities on life insurance effect among countries. Thus, the marginal positive impact of life insurance on economic growth decreases with the levels of deposit interest rate, bank credit to private sector and stock market traded. In addition, the marginal positive impact of insurance on economic growth is lower in the countries of the Sub-Saharan African region and in British legal system countries. Finally, the development of life insurance has a greater effect on economic growth in presence of high quality institutions.

This work provides an empirical justification to reinforce the promotion of life insurance market in developing countries. Thus, it will be judicious to continue the reforms aimed at developing the financial sector in particular life insurance sector, which may be a captive source of long term financing alternative of the economy to boost economic growth. This is particularly the case in countries with high-quality institutions.

In this study, we have analyzed the effect of insurance on growth. This does not allow us to analyze life insurance development on the development of banking sector and stock market. However, a growing body of research emphasizes the importance of insurance sector in the development of stock and bond markets (Dickinson, 2000; Catalan et al, 2000 and Impavido et al., 2003.).

Future work could deepen those things by analyzing the effects of the development of insurance on the development of banking and stock market sector; which will identify the effects of the transmission channels of insurance development on economic growth. Future work needs to deepen these findings by analyzing the insurance effect on banking and stock market; that will allow to identify the channels of transmission of the insurance effect on economic growth.

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Appendices

Table A -5.1: Review of previous studies on the relationship between insurance and growth

Authors	Year	Sample of countries	Study period	Dependent variables	Explanatory variables	Methodology used
Ward & Zurbruegg	2000	9 OECD countries	1961-1996	Total real premiums, real GDP	Real GDP, total premiums	Bi-variate VAR Granger causality
Webb, Grace and Skipper	2002	55 countries	1980-1996	GDP& GDI per capita	Bank credit, property liability premiums/GDP, life premiums/GDP	3SLS
Kugler and Ofoghi	2005	United Kingdom	1966-2003	Real GDP per capita	General insurance premium, long-term insurance premiums (life +pension)	VAR, Granger causality, cointegration
Arena	2008	55 countries	1976-2004	Real GDP per capita growth	Private credit/GDP, stock market turnover, life premiums/GDP, non-life premiums/GDP	GMM system estimator (dynamic panel)
Haiss and Sümegi	2008	29 European countries	1992-2004	Real GDP per capita	Physical capital stock, human capital stock, life and non-life premiums, yearly insurance total investment	Panel least square
Avram, Nguyen and Skully	2010	93 countries	1980-2006	Real GDP per capita growth	Life , non-life and insurance premiums/GDP and per capita	OLS and GMM system
Han, Li, Moshirian and Tian	2010	77 countries	1994-2005	Real GDP per capita	Life , non-life and insurance premiums/GDP and per capita	GMM (dynamic panel)
Han, Cheng and Yu	2012	12 European countries	1980-2009	Real GDP	Life and non-life premiums/GD¨P, Private credit/GDP, liquid liabilities of the financial intermediary to GDP.	Cross-section and fixed effect Panel
Chen, Lee and Lee	2012	60 countries	1976-2005	Real GDP per capita	Life , non-life and insurance premiums/GDP and per capita	GMM-system (dynamic Panel)
Lee, Lee, and Chiu	2013	41 countries	1979-2007	Real GDP per capita	Life , non-life and insurance premiums/GDP and per capita	Cointegration and causality in panel

Adapted with modification form Avram and al (2010).

Table A-5.2: Definition and source of variables

Variables	Definition and construction	Source
Real GDP per capita	Ratio of GDP to population. GDP is in constant 2005 US$	World Bank (WDI)
Real GDP per capita growth	Log difference or real GDP per capita	Author's calculation using WDI
Initial GDP per capita	Real GDP per capita in beginning of period	Author's calculation using WDI
Life insurance penetration	Life premiums to GDP	Čihák et al. (2012)
life insurance density	(Life premiums to GDP x Ratio of GDP to population)/100	Author's calculation using WDI and Čihák et al. (2012)
Population growth	Population growth (annual %) is the exponential rate of growth of midyear population from year t-1 to t, expressed as a percentage.	
Inflation rate	Annual change in CPI (%)	WDI
Government consumption	ratio of government consumption to GDP	
Degree of openness	(Imports + Exports) / GDP	
Changes in terms of trade	Terms of trade of goods and services	World Bank's Database of Political Institutions
Domestic investment rate	Gross fixed capital formation (% of GDP)	WDI
Human capital	Index of human capital per person, based on years of schooling (Barro /Lee, 2012) and returns to education (Psacharopoulos, 1994)	Penn World Table, Version 8.0
Deposit interest rate	Deposit interest rate (%)	WDI, 2014
Private credit by bank	Private credit by deposit money banks to GDP	
Stock market total value traded (% GDP)	Total shares traded on the stock exchange to GDP	Čihák et al. (2012)
Low & middle income	Low & middle income =1 others =0	
Upper middle income	Upper middle income=1 others =0	
Sub-Saharan Africa	Sub-Saharan Africa =1 others=0	
Europe & Central Asia	Europe & Central Asia=1 others =0	
Latin America & Caribbean	Latin America & Caribbean=1 others =0	
Middle East & North Africa	Middle East & North Africa=1 others =0	World Bank Atlas
South Asia	South Asia=1 others=0	
East Asia & Pacific	East Asia & Pacific=1 others =0	
French	Dummy variable that is equal to 1 if the country uses French's legal system and zero otherwise	
British	Dummy variable that is equal to 1 if the country uses British's legal system and zero otherwise	
Control of corruption	Index assessing the control of corruption within the political system. It ranges from 0 to 6, with a higher value of the index reflecting a better control of corruption	
Law and Order	Index assessing the strength and the impartiality of the legal system, as well as the popular observance of the law. The index ranges from 0 to 6, with a higher value of the index reflecting a higher institutional quality.	Authors' calculations based on International Country Risk Guide (ICRG, 2012) data
Bureaucracy Quality	Index of the institutional strength and quality of the bureaucracy, ranging from 0 to 4. The higher the index, the stronger the quality of the bureaucracy	
index of Institutional Quality	Synthetic index of Institutional Quality: arithmetic mean of ICRG indices of Bureaucracy Quality, Law and Order, and Control of Corruption. The higher the index, the higher the institutional quality.	

Table A-5.3: Descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
GDP per capita growth	1273	0.024967	0.0417028	-0.1658664	0.285408
Life insurance premiums (%GDP)	1286	0.7699246	1.640257	0.001	15.784
Log (1+life insurance per capita)	1273	2.190132	1.772696	0.0158299	8.577292
Log(Initial GDP per capita)	1278	7.63264	1.315799	4.863859	12.55699
Log (Population growth)	1237	0.5206107	0.7726027	-6.117022	2.854452
Index of Human capital	1087	2.292636	0.4877972	1.135571	3.268062
Domestic Investment (%GDP)	1357	23.36869	7.273782	4.142	57.991
Log (1+Inflation)	1299	2.848138	0.5252723	-1.597744	8.332093
Log (Government consumption)	1254	3.222975	0.3677855	-0.594207	4.063129
Log (Degree of openness)	1334	4.272271	0.4702486	2.703563	5.395478
Log (Terms of trade)	1315	4.623377	0.3292781	3.304411	6.248037
Deposit interest rate (%)	1240	9.334478	9.885214	0.8541667	147.125
Private credit by bank	1282	30.29233	25.40346	1.049314	165.8018
Stock market total value traded (% GDP)	822	14.5298	30.64491	0.0022657	349.2441
Bureaucracy quality	1301	0.54702	0.1882262	0	1
Control of Corruption	1301	0.53175	0.1624121	0	1
Law and order	1301	0.52664	0.2150418	0	1
Index of the institutions quality	1301	0.53514	0.1288538	0	1
British Colony :	1343	0.32166	0.4672903	0	1
French Colony	1343	0.53536	0.4989333	0	1

Table A-5. 4: Countries grouped by region

Sub-Saharan Africa (SSA)	Europe & Central Asia (ECA)	Latin America & Caribbean (LAC)	Middle East & North Africa (MNA)	South Asia (SAS)	East Asia & Pacific (EAP)
Angola	Albania	Argentina	Algeria	Bangladesh	China
Botswana	Azerbaijan	Bolivia	Egypt	India	Indonesia
Burkina Faso	Belarus	Brazil	Islamic Republic of Iran	Nepal	Malaysia
Cameroon	Bulgaria	Colombia	Jordan	Pakistan	Papua New Guinea
Côte d'Ivoire	Hungary	Costa Rica	Lebanon	Sri Lanka	Philippines
Ethiopia	Kazakhstan	Dominican Republic	Libya		Thailand
Gabon	Moldova	Ecuador	Morocco		Vietnam
Ghana	Serbia	El Salvador	Tunisia		
Kenya	Turkey	Guatemala	Yemen		
Madagascar	Ukraine	Guyana			
Malawi		Honduras			
Mali		Jamaica			
Mauritius		Mexico			
Mozambique		Nicaragua			
Namibia		Panama			
Niger		Paraguay			
Nigeria		Peru			
Republic of Congo		Suriname			
Senegal		Venezuela			
South Africa					
Sudan					
Tanzania					
Togo					
Uganda					
Zambia					

Chapter 6:

Does Insurance Development Affect Financial Market in Developing countries?*

Abstract

This paper investigates the impact of insurance on stock market development in 37 developing countries over the period 1987-2011. By controlling for the potential endogeneity bias by System GMM estimator, we show that the insurance premiums significantly increase the stock market value traded. This result is robust to the use of alternative measure of stock market development and control of the political and legal system quality. In addition, the results highlight that an improvement in property rights promotes the deepening of the financial market. Thus, the results argue for insurance policies promoting and an improvement of the legal environment to benefit from the financial market development.

Keywords: Stock market, Insurance Premiums, Developing countries, Panel Data.

Codes JEL: C23, G10, G22.

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1. Introduction

Since UNCTAD[44] report in 1982 showing the importance of insurance promotion for the economic development in developing countries, several studies have addressed this issue as well in the developed, emerging and developing countries. Most of these studies have analyzed the insurance effect on economic growth (Webb et al., 2002; Ward and Zurbruegg, 2000; Arena, 2008, Avram et al., 2010; Outreville, 2011; Chang and Lee, 2012) and insurance direct effect on the development of financial market has been less analyzed. However, the insurance companies just like other institutional investors may not only help to improve the allocation of capital on financial market, but also strengthen their investments through enhanced surveillance (Masci et al., 2007). Capital markets may also be a driving force for the benefit of the development of institutional investors. Given that, the insurance companies have of the products whose the maturities are lengthy, they are a natural complement for the development of capital markets (Masci et al., 2007). Furthermore, the insurance companies have large cash inflows and reserves (linked to payment of premiums), whose a portion may be invested in less liquid instruments such as the bonds and equities. In this context, the development of insurance services plays a primordial role in the development of financial markets through the risk management, savings allocation and financial market growth.

The previous literature has shown that the development of contractual savings activities (pension funds and insurance companies), which constitute the main institutional investors, contributes to the development of financial markets (Viattas, 1998; Catalan et al., 2000). Indeed, the development of contractual savings can have at once a direct and indirect impact on the development of financial markets. The direct impact is linked to modification of composition of the supply of funds in economy: the relative supply of long term funds increases, which translates into an increased demand for the instruments of the market capital. Thus, the development of contractual savings promotes depth and liquidity of capital markets, and improves financial structure of enterprises and governments by increasing the equity to debt ratio and lengthening the maturity of debt (Impavido and Musalem, 2000). Regarding the indirect impact, the institutional investors development can lead an improving to efficiency of

[44] UNCTAD (United Nations Conference on Trade And Development) is an organ of the United Nations whose objective is (a) to reduce and eventually eliminate the trade gap between the developed and developing Countries, and (b) and to accelerate the rate of economic growth of the developing world.

financial market by encouraging the other financial intermediaries and the corporate sector to more specialization and professionalism (Dickinson, 2000).

There are a few empirical studies on the relationship between the assets generated by the contractual savings institutions and financial market development. These studies concern the countries of OECD and some emerging countries (Catalan et al., 2000 and Impavido et al., 2003). Indeed, Catalan et al. (2000) found that the development of life insurance and pension funds to Granger-cause the development of capital markets in countries of OECD. In regards to Impavido et al. (2003); they showed firstly that an increase in assets of contractual savings institutions relative to assets of the domestic financial system has a positive impact on the deepening of stock and bond markets. Then, the impact of contractual savings development on stock market development is amplified in countries where the information on the companies is more transparent. Finally, they highlighted a significant heterogeneity between countries as a function of the nature of their financial system.

However, though the previous studies bring a significant contribution to analysis of the effects of the development of insurance companies on capital market, they are not exempt from criticism. First, they do not take into account the developing countries which the two systems (insurance and financial markets) are experiencing a significant evolution and constitute an important potential sources of long-term financing. Secondly, the previous studies do not distinguish between the effect of different contractual savings companies (insurance and pension funds) on stock market development while unlike to the developed countries, in developing countries the insurances are more developed than the pension funds.

The goal of this chapter is to contribute to literature by testing effect of the development of insurance activity on the development of financial market. Thus, we analyze the impact of the insurance activities development on stock market transaction value in a sample of 37 developing countries over the period 1987-2011. Indeed, OECD report in 2014 on the cooperation for the development has shown that contractual savings companies constitute a potential source for long-term financing in development countries. Thereby, we think that, this study will allow us to prove empirically whether the development of insurance sector contributes effectively to functioning of stock markets in developing countries. Finally, unlike to the existing literature (Catalan et al. 2000 and Impavido et al. 2003), we also try to control the quality of institutions and legal system in the development of stock markets. This is justified in literature (La Porta et al. 1998) who showed that the financial system is developing rapidly

in countries where there is more of protection of investor rights and an independence of the judicial system in the settlement of commercial disputes.

The rest of the chapter is articulated as follows. The section 2 shows econometric model and the estimate strategy. The section 3 presents data of the study. The section 5 is consecrated to interpretation the mains results and the last section concludes the paper.

2. Empirical approach

Does insurance penetration (i.e. insurance premiums to GDP) affect the development of stock market? Thys to understand the impact of insurance development on the development of stock market, we estimate the following regression:

$$\text{Stocktra}_{i,t} = \alpha + \beta_1 * INS_{i,t} + \beta_2 * X_{i,t} + \varepsilon_{it} \quad (6.1)$$

Where, $\text{Stocktra}_{i,t}$ is a measure of the development of financial market development and $\text{INS}_{i,t}$is proxy for insurance development for the country i in period t. X represents a vector of the control variables identified in the literature as determinants of the stock market. α, β_1 and β_2 are unknown parameters to be estimated. ε are country fixed effects and idiosyncratic error term, respectively.

In line with the empirical work of the factors of financial market development (Yartey, 2008), we control for initial real GDP per capita, domestic investment to GDP, ratio of domestic credit allocated to private sector to GDP, inflation, real interest rate and Foreign Direct Investment as a percentage of GDP (FDI). Unlike previous studies, we also control quality of institutions and legal system by protection of Property Rights, Legal System and Property Rights and Rule of Law[45]. Control variables are from World Development Indicators (WDI) and the indicators of the quality of intuitions come from Economic Freedom of the World Index, Fraser Institute and International Country Risk Guide (ICRG).

The estimate of our equation (6.1) above runs against to traditional problems of endogeneity, originating from of simultaneity bias. Indeed, insurance development could be also influenced by the development of stock market; for example a stock market development could improve

[45] These variables are used interchangeably in the regressions. The Legal System and Property Rights, measure of the quality of a country's legal system and protection of property rights is from the Economic Freedom of the World Index, Fraser Institute.

the financial results of the insurance companies and lead to an increase of their activities: which increases the confidence of economic agents to consume the assurance (Beck and Webb, 2003). In order to control this potential simultaneity bias, we estimate equation of the development of stock markets well as his transformation in first differences as a system of equations by using the System GMM estimator developed by Blundell and Bond (1998)[46].

Indeed, the System GMM estimator allows not only to take into account heterogeneity of countries, but also to treat problem of endogeneity of variables that may arise in our relationship between the development of stock markets and insurance penetration. This estimator consists to combine for each period the equation in levels and equation in first differences which allows for the use of lagged differences and lagged levels of the explanatory variables as instruments (Blundell and Bond, 1998). We use the method of Windmeijer (2005) finite-sample correction to standard errors in two-step estimation. The instrumentation procedure was performed so as to limit the problem of too many instruments (Roodman et al., 2009)[47].

The Panel data are averaged over nonoverlapping five-year for period 1987-2011 as follows: 1987-1991, 1992-1996, 1997-2001, 2002-2006 and 2007-2011. This approach has been also used by Beck and Levine (2004)[48]. Furthermore, in our estimates, we estimate impact of insurance on stock market on whole the period (1987-2011) and period before the financial crisis (1987-2006). The estimation of insurance effect on financial market before the crisis (1987-2011) is justified by the fact that the financial crisis has affected mainly the financial market and banking. Thus, given that stock market has experienced a crisis, insurance effect on this latter could be more influenced by the financial crisis that enabled the insurance companies to develop by proposing of savings products less volatile.

[46] GMM stands for Generalized Method of Moments

[47] Too many instruments may overfit endogenous variables leading to a failure in expunging their endogenous components.

[48] The use of five-year averages also avoids the problem of non-stationarity of the variables.

3. Data and summary statistics

This section describes the variables and provides the summary statistics (see Table 6.1). Devising an indicator for stock market development is not an easy task at all. Ideally, such an indicator should simultaneously reflect liquidity, volume of transactions, informational efficiency, degree of concentration, volatility, depth, legal and institutional, and other factors that determine the overall performance of a stock exchange. In this study, we use stock market transaction ratio which is equal stock market total value traded to GDP. It is an indicator of deepening of financial market and measures liquidity of stock market by relative to size of economy. This indicator has the advantage to take into account both size and activity of stock market (Čihák et al., 2012). Thus, it is used as a good proxy for the development of stock markets. Regarding to indicator of the development of insurance activities, it is expressed by the total premiums to GDP. It measures total revenue of insurance companies relative to economy activity. These two indicators of stock market and insurance development are derived from the *Benchmarking financial systems around the world* developed by Čihák et al. (2012).

Table 6.1 presents the descriptive statistics of our different variables for sample of 37 developing countries. We observe that average of period 1987-2007, stock market transaction ratio represents 6.71 times the insurance penetration. Regarding the average of the bank credit ratio, it represents more than 16 times insurance penetration and more than 2 times the stock market transactions ratio on period 1987-2011. These show that insurance sector is poorly developed in relation to other financial institutions (banks and stock markets). As indicated also in table 6.1, there are of significant variations in financial market transaction ratio in the different countries. For example, average of period 1987-2011, stock market value traded to GDP varies from 0.0116% of GDP in Bolivia to 200.831% of GDP in Singapore. In return, insurance penetration rate varies from 0.166% of GDP in Bangladesh 17. 469% in South Africa over the same period.

TABLE 6.1: Summary statistics

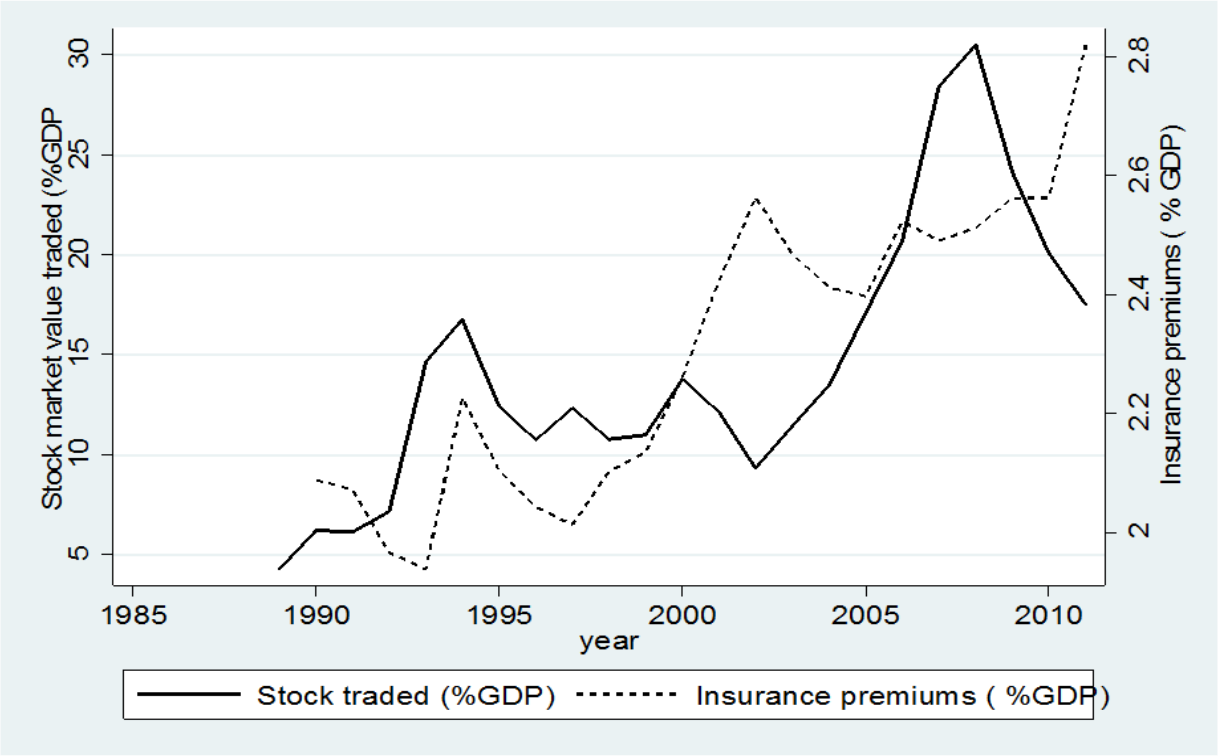
Variables	Obs	Mean	Std. Dev.	Min	Max
Stock market total value traded (% GDP)	760	15.3429	29.5049	0.0116	200.8311
Insurance Premiums (% GDP)	735	2.2863	2.3156	0.166	17.469
Domestic investment (% GDP)	931	21.4512	6.5289	5.4589	45.9602
Private credit by deposit money banks (% GDP)	912	38.4634	30.5436	2.0848	165.8018
Initial GDP per capita	881	3576.983	4411.472	260.7826	34758.41
Real interest rate	733	7.9709	12.4303	-58.3547	78.7899
FDI inflows net[49] (%GDP)	938	3.0963	3.7916	-12.2084	27.8737
Property Rights	413	5.0864	1.5919	1.1666	9.2043
Legal System and Property Rights	512	5.2803	1.3422	1.9532	8.9683
Rule of Law	852	3.2146	1.2477	0	6

Source: Čihák et al. (2012), World Bank, ICRG, and authors' calculations.

The figure 6.1 shows evolution of stock market total value traded to GDP and insurance premiums as a percentage of GDP in our sample of countries. One notices the two curves have similar evolutions serrated with an increasing general tendency during period of study. This situation shows that the two financial sectors are sensitive to economic situation of countries. Indeed, we observe an increase of stock market transaction after the years 2000 but until now a strong decrease in early 2008 following the financial crisis. However, insurance penetration knows a growth despite the crisis. This situation of insurance sector may be explained by several arguments. Firstly, the divergence of evolution can be explained by the fact that the two financial sectors are not affected in same way by the financial crisis, especially that a large part of assets of insurance companies in developing countries are bank deposits and government securities that are disconnected from world financial markets. Then, insurance sector could develop because stock and banking markets are in crisis: the insurance companies stronger and less affected (by their nature) by the stock market fluctuations could benefit from the crisis on stock market by providing the products less volatiles. Finally, one can also think that increase of insurance activities is explained by economic growth in developing countries especially in emerging countries leading to an increase of insurance demand.

[49] Negative sign of FDI inflows indicates disinvestment in the country

Figure 6.1: Stock market value traded to GDP and Insurance premiums to GDP (1987-2011).



Source: Čihák et al. (2012) and authors' calculations

4. Results of the estimations

The results of the estimations are presented in table 6.2. Thus, columns 1 to 4 have been estimated by considering the period from 1987 to 2011 and columns 5 to 8 for the period 1987-2006. Consistent with the findings of earlier empirical studies (Impavido et al. 2003), the regressions results in Table 6.2 show that countries with higher levels of insurance sector development experienced higher levels of stock market development over period 1987-2011, even when one controls the effect of GDP per capita and development financial[50]. Coefficient of insurance penetration range from 3.152 to 4.885 and from 4.219 to 6.760 for the period 1987-2011 and 1987-2006, respectively. Indeed, the positive effect of the insurance premiums in all the regressions means that the development of insurance contributes to stock market development in developing countries. Thus, the increase in insurance premiums allows the

[50]The diagnostic statistics are favorable. The Hansen test of overidentification, which is robust to heteroscedasticity, does not reject the validity of instrumental variables used and the Arellano and Bond test rejects the second order serial correlation

insurance companies to have sufficient resources for long-term investments and hold the less liquid assets in their portfolios more profitable; which contributes to improve equity trading.

Among the control variables, only domestic investment has a positive and significant effect in the period from 1987 to 2011 (column 2, 3 and 4). This suggests that, on average, the countries with domestic investments rise have tendency to experience the higher levels of stock trading that the countries with the less investments. Thus, increased investment improves the development of financial market by means of the demand of funds to finance certain investments particularly heavy. This result is conform the work of Yartey (2008).

Table 6.2: The impact of insurance development on financial market

Dependent Variable: Stock market total value traded (% GDP)	Averaged over fixed non-overlapping five-year periods between 1987 and 2011				Averaged over five-year periods between 1987 and 2006			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Lagged dependent	0.82257***	0.84658***	0.7939***	0.78237***	0.79284***	0.98319***	0.84042**	0.85729**
	(0.1857)	(0.1398)	(0.2505)	(0.1374)	(0.23812)	(0.40434)	(0.3167)	(0.30475)
Insurance Premiums	3.1521***	3.6946***	4.298***	4.8850***	4.219*	5.4887*	5.14423*	6.760**
(%GDP)	(1.2747)	(0.9385)	(1.57247)	(1.34167)	(2.271)	(2.7290)	(3.0235)	(2.7362)
Initial GDP per capita	0.00028	0.00026	0.000126	-0.00136	-0.00093	-0.0011	-0.00082	-0.00331
	(0.0008)	(0.0010)	(0.00134)	(0.0018)	(0.00076)	(0.0009)	(0.0008)	(0.00216)
Investment		1.6987*	1.83963**	1.56458**		1.3796	1.29927	1.41616
		(0.9834)	(0.8889)	(0.7067)		(1.115)	(1.55622)	(0.9557)
Private credit (% GDP)		-0.2500	-0.22264	-0.20887		-0.3190	-0.15656	-0.23626
		(0.2134)	(0.2949)	(0.1648)		(0.4386)	(0.44033)	(0.2652)
Inflation		-0.0023		0.00490		-0.00124		0.009153
		(0.00266)		(0.0061)		(0.0033)		(0.0069)
Real interest rate			0.10758				0.07346	
			(0.1732)				(0.2034)	
FDI				2.4348				3.56144
				(2.0463)				(2.48871)
Constant	-1.75268	-29.2624*	-34.502**	-33.6345**	-2.7848	-19.8536	-24.6745	-32.2126
	(2.7752)	(16.2078)	(14.832)	(13.7140)	(3.4952)	(21.0170)	(25.4759)	(21.424)
Observations	126	122	105	122	89	86	75	86
Countries	37	36	33	36	36	35	32	35
AR(1): p-value	0.043	0.052	0.040	0.044	0.097	0.089	0.029	0.030
AR(2):p-value	0.325	0.195	0.266	0.187	0.290	0.224	0.303	0.187
Hansen OID test: prob.	0.194	0.106	0.278	0.270	0.404	0.106	0.169	0.305
Instruments	24	26	26	27	15	17	17	18

Note: The estimation method is the two-step System-GMM method with the Windmeijer (2005) correction for finite sample bias. Robust standard errors are reported in parentheses. AR (1): and AR (2): denote the Arellano and Bond statistics tests for lack of one-order and second-order serial correlation, respectively * P < 0.1, ** p < 0.05, *** p < 0.01. All the variables of the model are assumed to predetermined and instrumented by their delays at most 5 periods.

We also explore the robustness of our results by controlling effect of legal system quality on the development of stock market using always the system GMM estimator. The results are presented in Table 6.3. The results with the control variables of legal system quality are robust because we find positive effect of insurance on stock market development in all the regressions (column 1 to 6). Moreover, we observed that, protection of property rights has a positive and significant impact on stock market (column 1 and 4) while the index of legal system and property rights and rule of law have not the significant effect. Thus, the positive impact of the

index of property rights (column 1 and 4) confirms that the development of stock market just like the others financial services (insurance, pension funds, banks) requires a good legal framework which supports property rights (Avram et al., 2010). The underlying theory is that in countries with more secure property rights, firms might allocate resources better and consequently grow faster as the returns on different types of assets are more protected (Claessens and Laeven, 2003).

Table 6.3: Robustness: control of the legal system quality.

Dependent Variable: Stock market total value traded (% GDP)	Averaged over fixed non-overlapping five-year periods between 1987 and 2011.			Averaged over five-year periods between 1987 and 2006		
	(1)	(2)	(3)	(4)	(5)	(6)
Lagged dependent	0.6294***	0.74914***	0.81193***	0.79249***	0.85635***	0.51165**
	(0.1512)	(0.2129)	(0.16438)	(0.17387)	(0.2348)	(0.2137)
Insurance Premiums (%GDP)	3.3462**	3.2023**	3.3848***	4.15298	4.4453*	3.0841***
	(1.06106)	(1.2604)	(0.93829)	(3.1244)	(2.2125)	(0.6978)
Initial GDP per capita	-0.00042	0.000026	0.000213	-0.001172	-0.00099	-0.00031
	(0.00098)	(0.0009)	(0.00089)	(0.00082)	(0.00105)	(0.0007)
Investment	1.05875	1.07215	1.4856**	-0.09044	0.2849	1.21444
	(1.0185)	(0.8691)	(0.6871)	(0.89774)	(0.9678)	(0.7977)
Private credit (% GDP)	0.00904	0.05698	-0.16882	-0.15888	-0.05178	-0.00998
	(0.10891)	(0.08489)	(0.17414)	(0.15978)	(0.07231)	(0.2523)
Inflation	0.13777	-0.00049	-0.0082	0.075605	-0.00221	-0.00586
	(0.52299)	(0.0038)	(0.00543)	(0.4003)	(0.0053)	(0.0044)
Property Rights	5.51697*			9.527*		
	(2.87303)			(4.835)		
Legal System and Property Rights		-1.02215			0.77905	
		(3.98351)			(5.58861)	
Rule of Law			0.25228			0.73026
			(2.59211)			(2.86048)
Constant	-49.5726*	-20.0594	-27.3459**	-24.9415	-9.22052	-24.8703*
	(25.2566)	(15.0164)	(12.1434)	(20.18919)	(18.6563)	(13.1495)
Observations	73	121	116	40	85	82
Number of id	33	36	34	27	34	33
AR(1): p-value	0.030	0.037	0.028	0.020	0.080	0.020
AR(2):p-value	0.886	0.241	0.132	0.730	0.283	0.139
Hansen OID test: prob.	0.108	0.220	0.167	0.571	0.267	0.139
Instruments	24	28	27	15	19	18

Note: The estimation method is the two-step System-GMM method with the Windmeijer (2005) correction for finite sample bias. Robust standard errors are reported in parentheses. AR (1): and AR (2): denote the Arellano and Bond statistics tests for lack of one-order and second-order serial correlation, respectively * P < 0.1, ** p < 0.05, *** p < 0.01. All the variables of the model are assumed to predetermined and instrumented by their delays at most 5 periods. The Legal System and Property Rights, measure of the quality of a country's legal system and protection of property rights is from the Economic Freedom of the World Index, Fraser Institute.

The second analysis of robustness considers an alternative measure of stock market development, namely the stock market capitalization to GDP. Contrary the stock market total value traded to GDP which measures stock market liquidity, market capitalization represents size of stock market in domestic economy. This measure is equal to the value of listed shares divided by GDP. The market capitalization as a percentage of GDP was used in several empirical studies as a proxy of the development of stock market (see Levine and Zervos 1998;

Boyd et al. 2001; Beck and Levine 2004). As for the stock market total value traded to GDP, there is wide variation in stock market capitalization to GDP on average of period 1987-2011, ranging from less than 0.190% in Latvia to more than 328.876% in Malaysia.

Table 6.4: Robustness: Alternative measure of stock market development.

Dependent Variable: Stock market capitalization (GDP)	Averaged over fixed non-overlapping five-year periods between 1987 and 2011.				Averaged over five-year periods between 1987 and 2006			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Lagged dependent	0.30602**	0.25187***	0.24601**	0.1170	0.1043	0.07510	0.06646	-0.05653
	(0.1217)	(0.087)	(0.0931)	(0.111)	(0.084)	(0.0546)	(0.0586)	(0.1311)
Insurance Premiums	9.25688**	6.7150***	6.0995***	4.4002	12.8772**	9.3368***	8.5805***	4.58200
(%GDP)	(3.00472)	(1.829)	(2.0459)	(2.7485)	(4.9878)	(3.1960)	(2.9793)	(4.7798)
Initial GDP per capita	0.00196*	0.00146	0.00151	0.000475	0.00141	0.00111	0.00155	0.00451
	(0.00101)	(0.0011)	(0.0012)	(0.0029)	(0.0014)	(0.0014)	(0.0012)	(0.00575)
Investment		0.00322	0.00318	1.9460**		-0.4912	-0.4688	2.6225***
		(0.5959)	(0.6101)	(0.85609)		(0.8115)	(0.6050)	(0.9291)
Private credit (% GDP)		0.511677**	0.60685**	1.4850***		0.64153**	0.67568**	1.7010***
		(0.22554)	(0.2739)	(0.3392)		(0.2686)	(0.3157)	(0.5261)
Inflation		-0.00316		-0.0105		0.06012		-0.030254
		(0.1334)		(0.0111)		(0.1684)		(0.02620)
Real interest rate			0.05994				0.0504	
			(0.22091)				(0.2047)	
FDI				-0.036891				-6.66160
				(3.1711)				(9.3777)
Constant	-0.6175	-13.0978	-15.951	0.980373	-4.82999	-11.328	-12.1548	19.46035
	(5.197)	(11.0072)	(11.963)	(15.3158)	(7.32192)	(16.9528)	(12.0212)	(22.7626)
Observations	125	121	104	121	88	85	74	85
Countries	37	36	33	36	36	35	33	35
AR(1):p-value	0.041	0.026	0.057	0.086	0.046	0.036	0.071	0.122
AR(2):p-value	0.166	0.124	0.143	0.496	0.185	0.153	0.153	0.885
Hansen OID test: prob.	0.217	0.280	0.458	0.217	0.332	0.230	0.146	0.678
Instruments	24	26	27	27	15	17	18	18

Note: The estimation method is the two-step System-GMM method with the Windmeijer (2005) correction for finite sample bias. Robust standard errors are reported in parentheses. AR (1): and AR (2): denote the Arellano and Bond statistics tests for lack of one-order and second-order serial correlation, respectively * P < 0.1, ** p < 0.05, *** p < 0.01. All the variables of the model are assumed to predetermined and instrumented by their delays at most 5 periods

The results in Table 6.4 show that our basic results are robust to use of alternative measure of the development of stock market. The coefficient of insurance penetration is positive and significant in all the regressions during the period 1987-2011 and period before financial crisis (1987-2006). This suggests a substantial economic effect of the development of insurance sector on stock market development. Thus, *ceteris paribus*, an increase of 0.1% unit of standard deviation of insurance penetration leads to an increase in stock market capitalization of 28.173% (column 3). Moreover, using stock market capitalization to GDP as proxy for stock market development, the positive effect of domestic investment on stock market remains significant (column 4 and 8). The initial GDP per capita and private credit have a positive and significant effect on stock market capitalization while inflation, real interest rate, and FDI have not a significant effect on stock capitalization.

5. Conclusion

This chapter has analyzed impact of insurance premiums on the development of stock market from a sample of 37 developing countries over period from 1987 to 2011. Thus, it is using of the econometric estimates technique (System GMM) which allows take into account potential endogeneity of insurance premiums. The results show that when the insurance premiums increase, stock transaction also increases. The positive impact of insurance penetration is robust to control legal system quality and to use of alternative measure of stock market development. Thus, insurance development creates necessary atmosphere for the development of stock market. Furthermore, legal system quality such as protection of property rights is a significant determinant of stock market deepening.

The conclusions of this chapter have policy implications for developing countries. Given the evidence that insurance has a positive relationship with the development of stock markets, the developing countries should undertake of the policies that aim to encourage insurance development (especially life insurance); which will allow to insurance companies to mobilize significant stable resources for finance the economy through purchase of financial assets. In addition, the conclusions on legal system quality suggest that an improvement of legal framework, in particular the improvement of property rights is necessary for a country to obtain the full benefits of insurance development on stock market.

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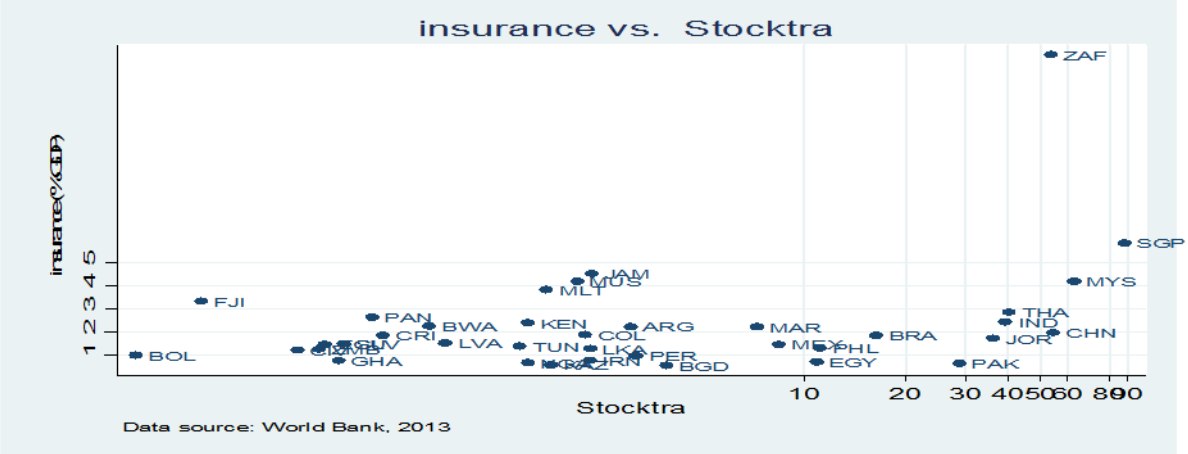
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Appendix

Figure: Correlation between the stock market total value traded (% GDP) and insurance premiums (%GDP)



List of countries: Argentina, Bangladesh, Bolivia, Botswana, Brazil, China, Colombia, Costa Rica, Cote d'Ivoire, Ecuador, Sri Lanka, El Salvador Egypt. Arab Rep., Fiji, Ghana, India, Iran. Islamic Rep., Jamaica, Jordan, Kazakhstan, Kenya, Latvia, Malaysia, Malta, Mauritius, Mexico, Monaco, Nigeria, Pakistan, Panama, Peru, Philippines, Singapore, South Africa, Thailand, Tunisia, Zambia.

Chapter 7:

Non-life Insurance Development and International Trade in Developing countries*.

Abstract

This paper analyzes long-term relationship between non-life insurance development and international trade for a sample of 52 developing countries over period 1990-2011. Results of Pooled Mean Group (PMG) estimator show that there are a long-term relationship and that the development of insurance is associated with more trade openness. Furthermore, positive impact of insurance premiums on trade openness is robust in specific case of low and middle income countries and to the use of an alternative measure of insurance development.

Keywords: Insurance premiums, International trade, Developing countries, Pooled Mean Group estimator

JEL Codes: C33, F13, G22

*A version of this chapter, is currently under review in *The International Trade Journal*

1. Introduction

Since the summit of UNCTAD in 1964, it is widely believed that financial services in general and particularly the insurance services are important for economic development. Thus, literature has shown that the development of insurance sector as a risk transfer instrument and as an institutional investor can contribute to economic growth through following channels: i) Facilitate trade and commerce (especially non-life insurance[51]), ii) Improve financial intermediation by creating liquidity and mobilization of savings (life insurance), iii) Mutualize and reduce the various risks and iv) Promote a more efficient allocation of domestic capital (Skipper, 1997).

Insurance is foremost a commercial activity and its development contributes to the development of international trade through the improving the structure of trade balance. Indeed, non-life insurance is known to play a major role in supporting trade (both domestic and international), commerce, and entrepreneurial activity. The international character of insurance services relating to goods in international trade is not a recent phenomenon (Outreville, 2013). Indeed, transit-transport insurance as well as export credit insurance is often historically connected with the pattern of international trade (Outreville, 2013). The development of insurance has a direct effect on structure of trade balance of invisibles depending on whether one is importer or exporter of insurance services. Thus, the importance of the development of insurance sector for external equilibrium goes beyond its positive impact on economic growth. In addition, many goods and services are produced and sold only because there is a non-life insurance adequate for covering the risks involved (Skipper and Kwon, 2007)[52]. Consequently, insurance is also a key factor for promoting cross border trade and investment (Brainard, 2008). From this point of view, we can say that international trade rests on insurance, hence the need to analyze long-term relationship between the development of non-life insurance and international trade.

Till now, the empirical studies have evaluated impact of financial development on the development of international trade (Beck; 2002, Gries et al; 2009 and Kiendrebeogo; 2012) and have neglected the role of insurance sector while insurance companies constitute an important segment of financial sector. Furthermore, the previous studies on the effects of the development of non-life insurance on economic development have directly analyzed the impact of the latter

[51] According to Swiss Re, non-life insurance includes, among other things, property insurance, comprehensive and compulsory motor-vehicle insurance, liability insurances, financial insurances and health insurances.
[52]For example the transportation of goods and services across aerial transport, maritime and road requires insurance.

on economic growth without analyzing the transmission channels such as impact of the development of non-life insurance on the development of international trade (see for instance, Arena, 2008; Haiss and Sümegi, 2008; Avram et al, 2010; Han et al, 2010, etc.). However, according to theoretical literature (Skipper, 1997), one of the channels of transmission of insurance development effect on economic development is the development of trade. Thus, contrary to Din et al. (2013) who have examined the causality between marine insurance and trade openness in Pakistan, this chapter tries to go beyond by exploring long-term relationship between the development of non-life insurance activity and trade openness in developing countries.

Analysis uses a sample of 52 developing countries over period 1990-2011, to examine long-term relationship between the development of non-life insurance and trade openness. Then, we refine this study by separating countries with low and middle income and upper-middle-income which will allow to examine the specific effect of non-life insurance development on international trade in low and middle income countries which represents about 2% and 4% respectively of the world insurance and trade. Thus, given that the objective of study is to analyze long-term relationship, the appropriate estimation method is the Pooled Mean Group (PMG) developed by Pesaran et al (1999), which is effective for analyze the heterogeneous panels. In addition, this estimator allows short-run heterogeneity while imposing long-run homogeneity on trade openness determination across countries.

The rest of this chapter is organized as follows. Section 2 presents data and stylized facts about the variables of interest. Section 3 discusses empirical model and estimation strategy. Section 4 presents the main results and their robustness. The last section concludes.

2. Data and stylized facts

2.1. Data

We have constructed a panel of 52 developing countries during period 1990-2011 (Appendix A-7.1 for list of countries). The sample is made in 28 low and middle income countries (53.84%) and 24 upper-middle-income countries (46.16%). The number of countries in sample is limited exclusively on basis of the availability of data, particularly regarding the indicator of the development of non-life insurance activity[53]. We use only non-life insurance because according to Swiss Reinsurance Sigma database, non-life insurance includes all the different types of private insurance except life insurance, regardless of how these lines are classified in the individual countries. Thus, we think that, the development of non-life insurance has more effect on international trade through insurance of goods and services, which justifies our choice to use only non-life insurance. In addition, this is non-life insurance that is available for period 1990-2011 of our sample.

Our main variable of interest, non-life insurance penetration defined as the percentage of total direct premiums of non-life insurance to GDP originates from the *Benchmarking financial systems around the world database* of Čihák et al (2012). Non-life insurance penetration measures the importance of non-life insurance sector activity relative to size of domestic economy. Trade openness rate is measured by the percentage of the sum of exports and imports to GDP ((Exports + Imports)/GDP) and is extracted from database of World Bank (WDI, *World Development Indicators, 2015*). It is a measure of the importance of international trade in overall economy. However, this measure is not without controversy and has its own advantages and disadvantages. The main advantage is that this measure is simple and intuitively appealing to measure actual trade flows, and unlike other measure indices that measure openness based on subjective evaluations of tariffs, and institutional (and economy) specific structural characteristics (Seyoum et al, 2014). (Exports + Imports)/GDP index is not contrived, that is, it does not suffer from subjective inclusion or preclusion of other variables. In addition, data are widely available for many countries over a long period that most empirical studies use (Brückner and Lederman, 2012; Seyoum et al, 2014; etc.). However, the main disadvantage of (Exports + Imports)/GDP it is the fact that it does not take into account certain factors that determine openness of economy as trade barriers, structural characteristics of specific

[53] The insurance data on trade would more interesting but they are not available for this study.

economies and institutional arrangements. Which does not constitute a real problem for this study because our objective is to evaluate importance of existing trade flows and not a policy of open trade. So, we just need to a measure of the importance of trade and no opening.

In reference to literature on the determinants of trade openness, we consider four control variables namely foreign investments inflows to GDP (FDI), ratio of domestic credit to private sector to GDP (Domestic credit), the terms of trade and the real effective exchange rate, which are likely to influence trade openness. Indeed, FDI inflows are capital net inflows to acquire a lasting participation in an enterprise operating in another economy other than that of investor. Thus, FDI inflows may have a complementary relationship with trade in countries host. Previous empirical studies as Asiedu (2002), Onyeiwu and Shrestha (2004) and Tandrayen-Ragoobur (2011) have found a complementary relationship between trade and FDI inflows for African countries. Domestic credit to private sector excludes credits to central, development, and private banks, as well as credits to the private sector by non-money banks. It is assumed to better channel the domestic financial savings to domestic private sector. The literature has showed that domestic credit to private sector is a determinant of international trade (Beck, 2002, Kiendrebeogo, 2012; etc.). Terms of trade, which measures how much imports an economy can get for a unit of export goods may have an influence on trade openness. Indeed, a terms of trade improvement may raise the value of exports (price effect) and may also boost imports (thanks to an increased purchasing power in foreign currencies). However, if the improvement is due to a decrease of price of the imports (case of oil importers), short term effect is to reduce the value of imports (price effect), but it is probable that effect of purchasing power leads to an increasing of imports. Thereby, terms of trade could have an ambiguous effect on trade openness. As for real effective exchange rate (REER), it is calculated from nominal effective exchange rate (NEER) and a measure of relative price or cost between country under study and its 67 trading partners[54]. An appreciation of real effective exchange rate leads to a drop of exports and to an increase of imports therefore an ambiguous effect on trade openness.

[54]Following Darvas, Zsolt (2012a), the REER is calculated as: $REER_t = \frac{NEER_t * CPI_t}{CPI_t^{(Foreign)}}$, where $NEER_t$is the real effective exchange rate of the country under study against a basket of currencies of trading partners, $CPI_t$is the consumer price index of the country under study, $NEER_t = \prod_{i=1}^{N} S(i)_t^{w^{(i)}}$ is the nominal effective exchange rate of the country under study, which is in turn the geometrically weighted average of $S(i)_t$, the nominal bilateral exchange rate between the country under study and its trading partner i (measured as the foreign currency price of one unit of domestic currency), $CPI_t^{(Foreign)} = \prod_{i=1}^{N} CPI(i)_t^{w^{(i)}}$is the geometrically weighted average of CPI indices of trading partners, $CPI(i)_t$is the consumer price index of trading partner i, $w^{(i)}$is the weight of trading partner i and N is the number of trading partners considered (Here $N = 67$). The weights sum to one, ie $\sum_{i=1}^{N} w^{(i)} = 1$. Zscotte uses geometrically weighted averages, because this is the most frequently used method in the literature.

2.2. The stylized facts

Table 7.1 shows the descriptive statistics of the variables in our sample of 52 developing countries that are used in our econometric estimates. It is observed that average rate of non-life insurance penetration of the total sample during period 1990-2011 is about 0.987% of GDP. On average of period 1990-2011, non-life insurance penetration, varies from less than 0.019% of GDP in Mozambique to more than 5.395% in Ukraine. Furthermore, as indicated in Table 7.1, there is not significant variations of the logarithm of trade openness between countries. For example, the logarithm of the average of trade openness during period 1990-2011, varies between 2.374% in Brazil and 5.395% in Malaysia. One notes less important differences for logarithm of domestic credit, terms of trade and real effective exchange rates.

Table 7.1: Summary statistics

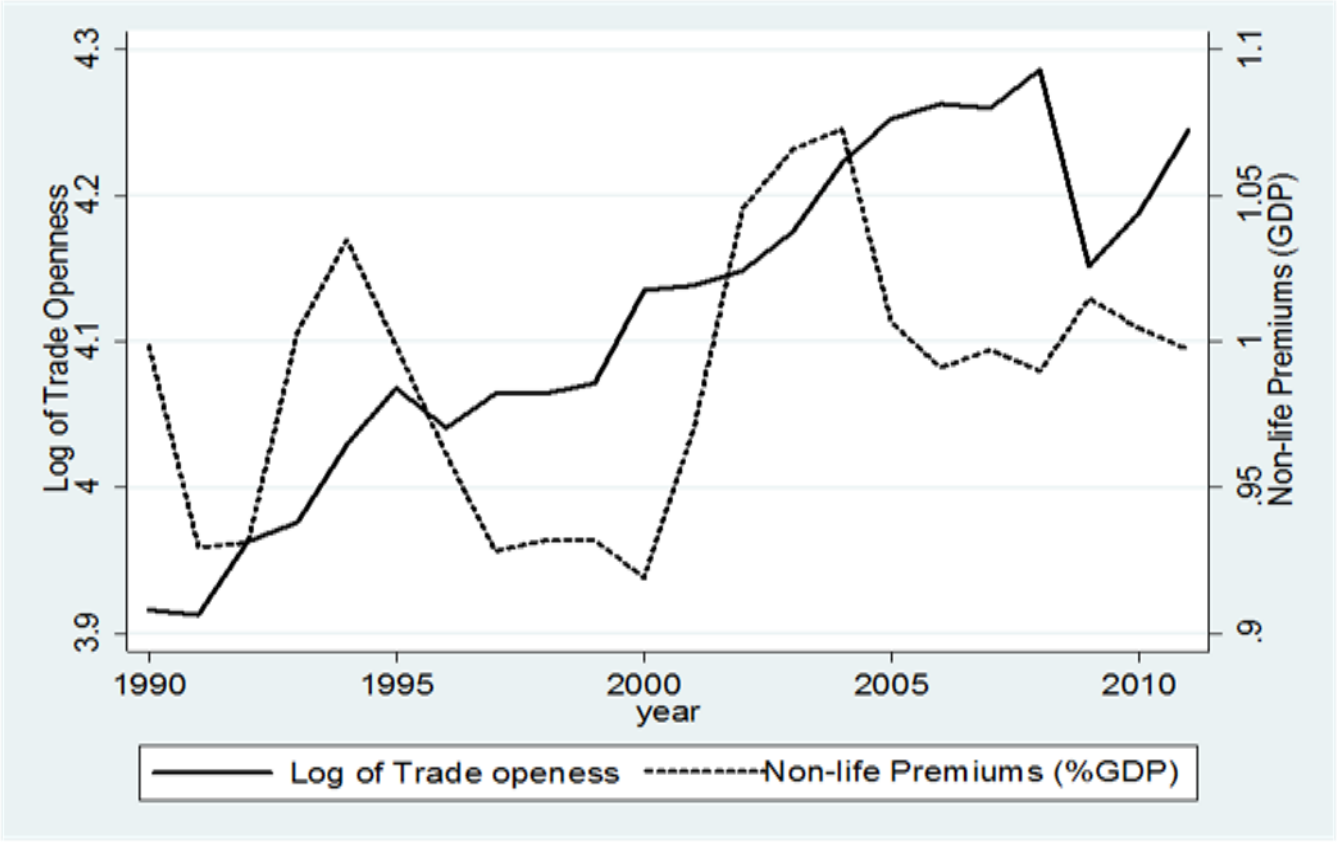
Variables	Obs	Mean	Std. Dev.	Min	Max
Log (Trade Openness)	1144	4.1167	0.4922	2.3747	5.3954
Non-Life insurance Premiums (%GDP)	1144	0.9873	0.6260	0.019	5.431
FDI (%GDP)	1144	2.5368	2.7902	-8.589	29.049
Log (Domestic credit to GDP)	1144	3.2018	0.8172	0.3259	5.1102
Log (Terms of trade)	1144	4.6099	0.3069	3.3596	5.840
Log (Real Effective Exchange Rate)	1144	4.6457	0.31747	2.9440	7.2179

Figure 7.1 illustrates the tendencies of the unweighted means of trade openness and non-life insurance penetration for the sample of 52 developing countries and for Low and middle income countries (28 countries) and Upper-middle income (24 countries) during the period 1990-2011.

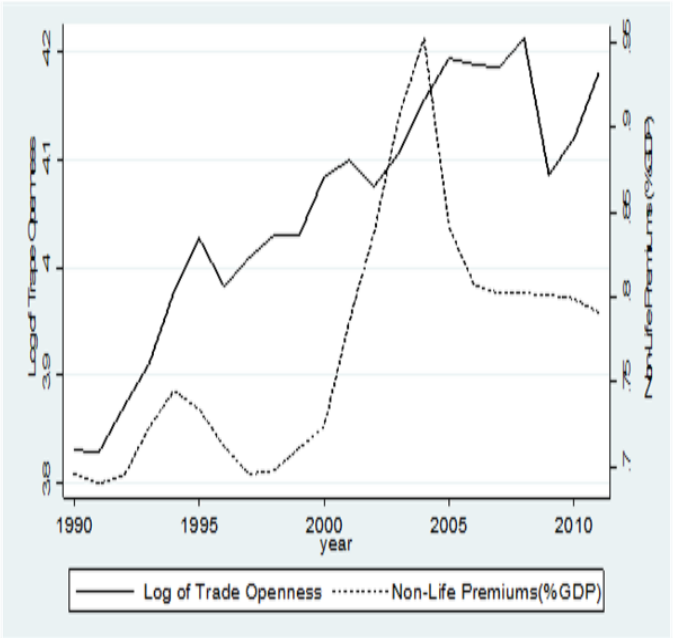
For the total sample, we observe a co-movement between trade openness and non-life insurance penetration and on average the periods of augmentation on non-life insurance premiums are associated with an increased international trade. One notices a general trend increasing of non-life insurance premiums and degree of openness (Figure 7.1-A). The co-movement between non-life insurance premiums and trade openness is longer perceptible in low and middle income countries (Figure 7.1-B) than in upper-middle-income countries (Figure 7.1-C). Moreover, trend of graphics suggest a potential existence of a cointegration relationship between non-life insurance premiums and international trade. The following econometric analysis gives a clearer picture of the potential positive correlation between non-life insurance premiums and trade openness shown in the graphical analyses (Figure 7.1).

Figure 7.1: Trade Openness and Non-life Premiums (Unweighted means for a panel of countries)

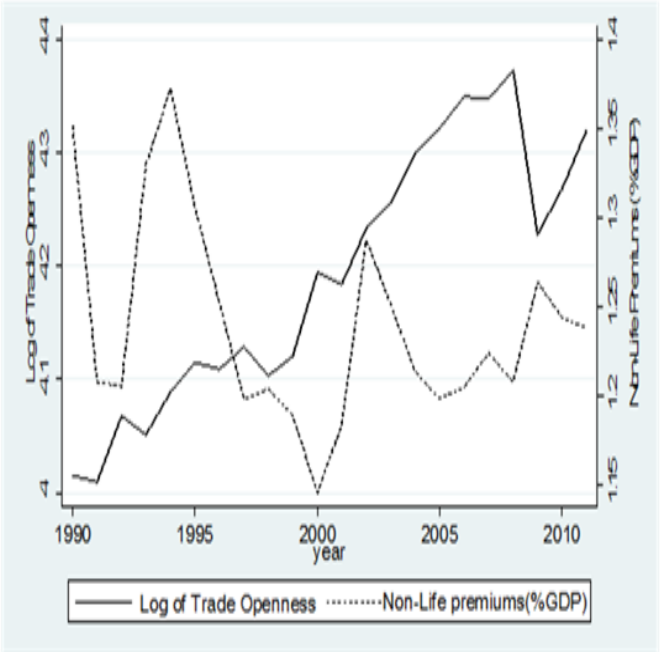
All countries (52 countries)



Low-income and middle income countries (28)



Upper-middle income countries (24)



Source: Čihák et al. (2012), WDI (2015) and authors' calculations

3. Econometric model

To verify the potential cointegration between the variables of interest illustrated through our graphical analysis, we assume that long-term movements between trade openness and non-life insurance penetration should be identical in all the countries but in short term movements should take into account factors specific to each country. Thus, we use PMG estimator of Pesaran et al. (1999) for this econometric specification. Indeed, PMG approach is preferred to MG (Mean Group) estimator of Pesaran and Smith (1995), which does not consider potential homogeneity between groups in long term. Furthermore, PMG estimator presents advantage to take into account both heterogeneity of countries, dynamics of the series and non-stationary character of variables when the series are long (Pesaran et al., 1999).

Long-term or cointegration relationship between trade openness and non-life insurance penetration is given by following equation:

$$\mathrm{TRADE}_{it} = \theta_0 + \theta_1 * \mathrm{NLIP}_{it} + \theta_2 * \mathrm{X}_{it} + \vartheta_{it}. \quad (7.1)$$

Where TRADE_{it} is trade openness rate of country i in period t, NLIP_{it} represents non-life insurance penetration, X_{it} a vector of the control variables which are likely to influence international trade. The term error ϑ_{it} is stationary when the variables are cointegrated and in this case the dynamic heterogeneous panel model of Pesaran et al. (1999) is in the form of error correction model. Thus, error correction autoregressive distributed lag (ARDL) (p, q) can be modeled as follows:

$$\Delta\mathrm{TRADE}_{it} = \phi_i \mathrm{TRADE}_{i,t-1} + \beta_i \mathrm{NLIP}_{it-1} + \varphi_i' \mathrm{X}_{it-1} - \sum_{j=1}^{p-1} \lambda_{ij} \Delta\mathrm{TRADE}_{i,t-j} - \sum_{j=0}^{q-1} \delta_{ij} \Delta\mathrm{NLIP}_{i,t-j} - \sum_{j=0}^{q-1} \gamma_{ij}' \Delta\mathrm{X}_{i,t-j} + \varepsilon_{it} \quad (7.2)$$

ϕ_i, coefficient of lagged dependent variable and disturbance ε_{it} are supposed to be normally and independently distributed across i and t with zero mean and variances $\sigma_i^2 > 0$. Coefficient ϕ_i is also called adjustment to long-run equilibrium and it is expected that $\phi_i < 0$. It is noted that one of the advantages of ARDL models is that the multipliers of short and long-term are estimated jointly. Furthermore, these models authorize presence of variables that can be integrated in different orders, either I (0) or I (1) or cointegrated (Pesaran et al., 1999).

Long-term equation can be redefined as follows if $\phi_i < 0$:

$$TRADE_{it} = \Theta_{1i} NLIP_{it} + \Theta_{2i}' X_{it} + \eta_{it} \quad (7.3)$$

Where $\Theta_{1i} = {}^{\beta_i}/_{\phi_i}$ and $\Theta_{2i}' = ({}^{\varphi_i'}/_{\phi_i})'$ represents respectively long-term coefficient of non-life insurance premiums and vector of control variables and η_{it} error terms of long-term relationship which are stationary.

By allowing short-term coefficients, intercepts, and error variances to differ between groups and by constraining long-term coefficients to be identical ($\Theta_{1i} = \Theta_1$ and $\Theta_{2i}'=\Theta_2'$), Pooled Mean Group estimator of Pesaran et al. (1999) derives the parameters with the maximum likelihood technique.

4. Econometric results

4.1. The basic results

Unlike the previous chapters, we do the stationarity test in this chapter because firstly, time dimension is greater than 20 years (1990-2011)[55] and secondly, the stationarity test is one of preliminary step to the use of the PMG estimator. As for the use of cointegration test, this is justified by the fact that our objective is to analyze long-term relationship between the development of non-life insurance and trade openness.

Before presenting the results of cointegration analysis, first, we validate whether the variables are nonstationary and cointegrated. We use the tests of Im, Pesaran and Shin (1997) and Maddala and Wu (1999) of first generation to verify the stationarity of variables. Table A-7.3 in appendix shows the results of unit root tests and confirms that some variables are nonstationary and could be considered as integrated of order one. We present now the results of cointegration test well as that of long-term relationship between trade openness and non-life insurance penetration by controlling the effect of some macroeconomic variables. Thus, following Pedroni (2001)[56], various cointegration tests (rho Panel, Panel-ADF, PP-Statistic

[55]According to Hurlin and Mignon (2006) for that the problematic of stationarity presents an interest, the time dimension of the panel must exceed 20 years.
[56]Pedroni (2001) showed that the Panel-ADF and ADF-Group statistics have of better properties at finite distance than the other statistics tests.

Panel, ADF-Group, etc.) confirm the existence of a cointegrating vector in all cases and especially between non-life insurance penetration and trade openness.

Table 7.2 shows the estimation results of our various regressions with PMG estimator. The negative sign of adjustment term (EC) confirms the existence of a cointegration vector. The coefficient of convergence is about -0.30 and significant for total sample of countries and low and middle income countries (Table 7.2). This means there are a mechanism to error correction and that the movement on trade openness rate in countries of our sample are corrected to 30% by feedback effect. Thus, an imbalance of trade openness rate recorded during a year is entirely resorbed after about 3 years and 6 months. Hausman tests do not reject long-term homogeneity of coefficients at 1% significance level. This result suggests that as expected, the Pooled Mean Group estimator might be preferred to the Mean Group estimator that allows heterogeneity in both short-term and long-term coefficients. Thus, focusing on long-run coefficients, the analysis presents the non-life insurance premiums effect on trade openness.

The results show that non-life insurance premiums are positively associated with international trade. The coefficient associated with non-life insurance premiums is around 0.051 and 0.087 (column 1 to 4). In terms of impact, for full model for the total sample (column 4), an increase of one standard deviation in non-life insurance penetration, *ceteris paribus*, would imply an increase of 3.38% in logarithm of trade openness to GDP. Thus, we show that the development of non-life insurance sector is a source of competitiveness for trade, in other words that the countries with better-developed of insurance sector are found to have higher level of foreign trade. Non-life insurance may constitute a new source of the comparative advantages for the countries in international trade.

Regarding of control variables, we find that foreign direct investment inflows, domestic credit and terms of trade have positive effects on international trade while real effective exchange rate influences negatively trade openness. Indeed, the positive impact of financial development on trade is consistent with previous studies who shown that financial development is a determinant of the exports of manufactured products (see for instance Beck, 2002; Beck, 2003; Gries et al., 2009 and Kiendrebeogo, 2012). FDI effect on trade confirms studies the complementary relationship between trade openness and FDI in Africa countries (Asiedu, 2002; Onyeiwu and Shrestha, 2004; Tandrayen-Ragoobur, 2011; etc.). In addition, a depreciation of the real effective exchange rate of one standard deviation drives an increased international trade of 21.239% (column 4).

Table 7.2: Impact of non-life insurance penetration on trade openness

	Dependent variable: Log (Trade openness)							
	All Countries				Low and Middle Income Countries			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
EC	-0.281***	-0.277***	-0.281***	-0.266***	-0.30***	-0.298***	-0.259***	-0.230***
	(0.031)	(0.032)	(0.032)	(0.042)	(0.048)	(0.046)	(0.041)	(0.060)
Non-life Premiums	0.087***	0.051***	0.056***	0.054***	0.077***	0.039*	-0.018	0.150***
(%GDP)	(0.018)	(0.017)	(0.017)	(0.017)	(0.019)	(0.022)	(0.028)	(0.055)
FDI (%GDP)		0.012***	0.008***	0.010***		0.013***	0.005	0.003
		(0.003)	(0.003)	(0.002)		(0.004)	(0.005)	(0.004)
Log (Domestic credit			0.046*	0.019*			0.386***	0.386***
to GDP)			(0.025)	(0.011)			(0.040)	(0.033)
Log(Terms of trade)				0.136***				-0.263***
				(0.011)				(0.054)
Log (Real Effective				-0.670***				0.0211
Exchange Rate)				(0.027)				(0.051)
Hausman test	0.39	0.86	1.34	2.89	0.31	0.67	0.92	3.24
[p-value]	*[0.53]*	*[0.65]*	*[0.511]*	*[0.235]*	[0.579]	[0.714]	[0.63]	[0.198]
Cointegration test								
Within-dimension :								
Panel v-Statistic	-5.193	-3.126	-4.387	-4.241	-3.886	-4.036	-3.575	-1.938
	[1.000]	*[0.999]*	*[1.000]*	*[1.000]*	*[0.999]*	*[1.000]*	*[0.999]*	*[0.973]*
Panel rho-Statistic	-4.302	1.112	2.465	3.377	-3.404	-0.219	1.718	2.887
	[0.000]	*[0.867]*	*[0.993]*	*[0.999]*	*[0.000]*	*[0.413]*	*[0.957]*	*[0.998]*
Panel PP-Statistic	-5.771	-5.007	-5.339	-7.715	-4.683	-2.666	-4.130	-4.291
	[0.000]	*[0.000]*	*[0.000]*	*[0.000]*	*[0.000]*	*[0.003]*	*[0.000]*	*[0.000]*
Panel ADF-Statistic	-5.036	-5.564	-5.877	-6.564	-4.571	-2.956	-5.643	-4.704
	[0.000]	*[0.000]*	*[0.000]*	*[0.000]*	*[0.000]*	*[0.001]*	*[0.000]*	*[0.000]*
Between-dimension								
Group rho-statistic	-0.342	3.766	5.325	6.018	-0.610	0.968	3.939	4.775
	[0.366]	*[0.999]*	*[1.000]*	*[1.000]*	*[0.270]*	*[0.833]*	*[1.000]*	*[1.000]*
Group PP-Statistic	-5.973	-4.611	-4.714	-8.607	-4.730	-3.207	-3.138	-5.908
	[0.000]	*[0.000]*	*[0.000]*	*[0.000]*	*[0.000]*	*[0.000]*	*[0.000]*	*[0.000]*
Group ADF-Statistic	-6.274	-4.812	-4.755	-6.325	-5.472	-4.747	-4.942	-6.015
	[0.000]	*[0.000]*	*[0.000]*	*[0.000]*	*[0.000]*	*[0.000]*	*[0.000]*	*[0.000]*
Observations	1092	1092	1092	1092	588	588	588	588
Number of countries	52	52	52	52	28	28	28	28
Log-likelihood	1115.716	1158.498	1228.464	1493.824	573.053	594.913	627.382	715.094

Note: EC refers to the error correction term. All specifications include a maximum of one lag. Akaike Information Criterion (AIC) is adopted to choose the number of lag. Numbers in parentheses are Standard Errors. Numbers in brackets for the Hausman and the cointegration tests are p-values. For cointégration tests, the null hypothesis is the absence of cointegration. The null hypothesis for the Hausman test is the restriction of long-term coefficient homogeneity. *, ** and *** Significant at 10% 5% and 1% respectively.

However, as commercial structures of emerging countries are different from those of low and middle income countries. We refine study by estimating the relationship between trade openness rate and non-life insurance penetration only in low and middle income countries. Moreover, we note that the participation of low and middle income countries in international trade represents less than 4%, making pertinent to the question whether the results of total sample remain valid for low and middle income countries. Thus, the results for low and middle income countries are overall identical to those found with total sample (column 5 to 8). Indeed, an increase of one standard deviation of non-life penetration in low and middle income countries is associated with a growth of 8.145% in logarithm of international trade (column 8).

However, we note that the terms of trade have a negative effect on international trade while real effective exchange rate has not significant effect on trade openness. This situation may be explained by the fact that low and middle income countries participate in international trade essentially with commodities and are highly dependent on international situation.

4.2. Robustness: alternative measure of non-life insurance development

In this sub-section, we consider an alternative measure of insurance development, namely non-life insurance premiums per capita (non-life insurance density). Non-life insurance density indicates how much each resident of a country is devoted to the consumption of insurance expressed in USD. To calculate insurance density, first we have determined the volume of non-life insurance premiums in current USD from GDP and subsequently reported to total population obtained from World Development Indicators (WDI, 2015). Indeed, our measure of non-life insurance density may not be perfect the fact that it is expressed in current units, but has been widely used in empirical literature on the relationship between insurance and growth (see for instance Avram et al, 2010; Han et al, 2010; Lee et al, 2012). Thus, on average each citizen of our sample spends 27.815 USD for the purchase of non-life insurance. However, we note that 78.841% (41 countries) of countries have their non-life insurance density inferior to average of sample.

Results in Table 7.3 show that our basic results are robust to use of an alternative measure of the development of non-life insurance. Non-life insurance density has a positive and significant effect in all regressions with a coefficient that is comprised between 0.035 and 0.087, suggesting an important economic effect on trade openness. For example, an increase of non-life insurance density of 10% would lead an increase of trade openness by 0.62% in total sample (Column 3).

In addition, the results of control variables do not change to use of non-life insurance density. As the results above foreign direct investments, domestic credit and the terms of trade influence positively international trade while real effective exchange rate has a negative effect.

Table 7.3: Robustness: Alternative measure of non-life insurance development

	Dependent variable: Log (Trade openness)							
	All Countries				Low and Middle Income Countries			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
EC	-0.271***	-0.267***	-0.261***	-0.286***	-0.289***	-0.084***	-0.27***	-0.309***
	(0.032)	(0.034)	(0.034)	(0.041)	(0.046	(0.026]	(0.053)	(0.063)
Log (Non-life Premiums per capita)	0.087***	0.066***	0.062***	0.035***	0.090***	0.851***	0.103***	0.047**
	(0.015)	(0.016)	(0.020)	(0.016)	(0.022)	(0.044)	(0.023)	(0.020)
FDI (%GDP)		0.010***	0.008***	0.009***		-0.040**	0.002	0.008***
		(0.003)	(0.002)	(0.002)		(0.018)	(0.004)	(0.003)
Log (Domestic credit to GDP)			0.014	0.018			0.238***	0.038*
			(0.033)	(0.018)			(0.040)	(0.022)
Log(Terms of trade)				0.136***				0.216***
				(0.015)				(0.026)
Log Real Effective Exchange Rate				-0.611***				-0.737***
				(0.029)				(0.050)
Hausman test	1.25	1.27	1.69	3.39	1.03	9.53	1.60	2.28
[p-value]	*[0.264]*	*[0.26]*	*[0.193]*	*[0.06]*	*[0.309]*	*[0.002]*	*[0.206]*	*[0.131]*
Observations	1092	1092	1092	1092	588	588	588	588
Number of countries	52	52	52	52	28	28	28	28
Log-likelihood	1118.394	1161.1	1236.024	1490.085	564.646	557.424	628.090	725.938

Note: EC refers to the error correction term. All specifications include a maximum of one lag. Akaike Information Criterion (AIC) is adopted to choose the number of lag. Numbers in parentheses are Standard Errors. Numbers in brackets for the Hausman test are p-values. *, ** and *** Significant at 10% 5% and 1% respectively.

5. Concluding remarks

This chapter investigated the effect of the development of non-life insurance sector on trade openness, using a sample of 52 developing countries over period 1990-2011. In this regard, we used PMG estimator of Pesaran et al., (1999), which accounts for long-term homogeneity in the behavior of trade openness across countries, while allowing for short-term heterogeneous shocks. Thus, the results show that the development of non-life insurance is associated with international trade increases. The positive effect of non-life insurance on international trade is robust in low and middle income countries and to use of alternative measure of non-life insurance development.

Our results suggest that there is another favourable impact of non-life insurance development on economic development beyond its positive impact on economic growth, namely, its positive effect on trade openness. As policy implications, economic policies that promote the insurance sector should rather be used to increase the participation of developing countries in international trade. In this study, we have considered trade openness rate as a proxy of international trade development. It does not allow clearly to identify the development of international trade of countries, given that the poor countries are more dependent upon outside and generally the most

open. Thus, future studies could use the manufacturing exports as a measure of international trade and marine insurance to analyze this relation.

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Appendices

Table A-7. 1: list of counties

Algeria, Argentina, Bangladesh, Belize, Benin, Bolivia, Brazil, Cameroon, China, Colombia, Costa Rica, Cote d'Ivoire, Dominican Republic, Ecuador, Egypt. Arab Rep., El Salvador, Ethiopia, Gabon, Ghana, Guatemala, India, Indonesia, Iran. Islamic Rep., Jamaica, Jordan, Kenya, Lao PDR, Libya, Macedonia. FYR, Madagascar, Malawi, Malaysia, Mauritius, Mexico, Morocco, Mozambique, Nigeria, Pakistan, Panama, Paraguay, Peru, Philippines, Romania, South Africa, Sri Lanka, Syrian Arab Republic, Thailand, Tunisia, Turkey, Uganda, Ukraine, Zambia

Table A-7.2: Non-life insurance penetration in the 52 countries with average values for the period 1990–20011

N°	country	NLIP	N°	country	NLIP
1	Bangladesh	0.198	1	Algeria	0.5741
2	Belize	2.1959	2	Argentina	1.626
3	Benin	0.5269	3	Brazil	1.20455
4	Bolivia	0.7457	4	China	0.6728
5	Cameroon	0.6864	5	Colombia	1.2179
6	Cote d'Ivoire	0.7214	6	Costa Rica	1.6890
7	Egypt. Arab Rep.	0.485	7	Dominican Republic	1.0874
8	El Salvador	0.9666	8	Ecuador	1.2003
9	Ethiopia	0.56713	9	Gabon	1.0018
10	Ghana	0.6030	10	Iran. Islamic Rep.	0.6781
11	Guatemala	0.7236	11	Jamaica	2.5460
12	India	0.4420	12	Jordan	1.4296
13	Indonesia	0.5578	13	Libya	0.4530
14	Kenya	1.6681	14	Macedonia. FYR	2.2942
15	Lao PDR	0.28481	15	Malaysia	1.6398
16	Madagascar	0.52931	16	Mauritius	1.688
17	Malawi	1.0617	17	Mexico	0.7755
18	Morocco	1.5468	18	Panama	1.7165
19	Mozambique	0.5605	19	Peru	0.5860
20	Nigeria	0.5862	20	Romania	0.7502
21	Pakistan	0.3712	21	South Africa	1.9416
22	Paraguay	0.9212	22	Thailand	1.0524
23	Philippines	0.5733	23	Tunisia	1.216
24	Sri Lanka	0.7334	24	Turkey	0.7240
25	Syrian Arab Republic	0.4828		**Upper-middle-income**	1.2402
26	Uganda	0.3894			
27	Ukraine	1.4821			
28	Zambia	0.9626			
	Low-income and Lower-middle-income	0.77049			

Table A-7. 3. Unit Root Tests

Variables	Level		First difference	
	IPS	MW	IPS	IMW
Log (Trade Openness)	-1.423	128.137	-2.019	172.015
	(0.334)	(0.054)	(0.000)	(0.000)
Non-life Premiums	-1.788	157.293	-2.127	255.111
	(0.001)	(0.000)	(0.000)	(0.000)
FDI	-1.586	115.526	-2.161	140.554
	(0.054)	(0.206)	(0.000)	(0.009)
Log (Domestic credit)	-1.779	182.771	-1.924	162.8223
	(0.001)	(0.000)	(0.000)	(0.000)
Log (Terms of trade)	-1.769	94.064	-2.471	156.966
	(0.989)	(0.747)	(0.001)	(0.000)
Log (REER)	-1.596	145.030	-2.195	188.495
	(0.047)	(0.004)	(0.000)	(0.000)

Note: MW and IPS respectively designate the test of Maddala &Wu (1999) and de Im, Pesaran and Shin (1997). The null hypothesis is the presence of unit root. Numbers reported here are p-value.

Conclusion Générale

L'importance des institutions d'épargne contractuelles[57] en particulier les compagnies d'assurance dans le financement à long terme des investissements publics et privés dans les pays en développement est devenue cruciale surtout dans le contexte actuel de crise financière et économique et d'insuffisance de l'aide financière étrangère par rapport aux besoins de financement. Ainsi, les investisseurs institutionnels apparaissent comme des nouvelles sources de financement du développement car ils jouent un rôle clé dans la mobilisation et la canalisation de l'épargne vers les investissements productifs de long terme, en particulier ceux qui peuvent être difficiles à financer[58] (OCDE, 2014). De ce fait, cette thèse a analysé les principaux déterminants et conséquences macroéconomiques du développement du secteur d'assurance dans les économies en développement. La thèse s'est adressée empiriquement aux questions suivantes: i) Quels sont les facteurs qui expliquent l'hétérogénéité de développement du secteur d'assurance entre les pays et les régions en développement?, ii) Quelles sont les conséquences du développement des secteurs d'assurance sur la croissance économique, le développement des marchés boursiers et de l'ouverture commerciale des pays en développement? et iii) Quelles sont les caractéristiques structurelles des pays qui expliquent l'hétérogénéité des effets du développement de l'assurance sur les économies?

La première partie de la thèse a analysé les déterminants du développement des compagnies d'assurances (assurance-vie et non-vie) d'un point de vue macroéconomique. Ainsi, on a examiné l'impact du niveau de revenu et de l'hétérogénéité de l'effet du revenu sur le développement de l'assurance-vie en Afrique Sub-Saharienne (ASS) d'une part (chapitre 2) et d'autre part de l'effet des flux d'investissement direct étrangers (IDE) sur le développement de l'assurance non-vie dans les pays en développement et en Afrique Sub-Saharienne (chapitre 3). De plus, on a analysé l'impact du crédit bancaire au secteur privé sur la consommation d'assurance (vie et non-vie) et le lien de causalité entre ces deux intermédiaires financiers pour les pays d'Afrique Subsaharienne (chapitre 4). La deuxième partie de la thèse met l'accent sur les conséquences du développement du secteur d'assurance sur les économies locales par le biais de trois chapitres. La première investigation a porté sur les effets de l'assurance-vie sur la croissance et de l'hétérogénéité de l'impact de l'assurance-vie en fonction des caractéristiques structurelles des économies (chapitre 5). Le chapitre 6 a analysé l'impact positif de l'assurance

[57] Les institutions d'épargne contractuelles constituent les fonds de pensions, les compagnies d'assurance et les fonds de mutuelle.

[58]Les investissements difficiles à financer sont des actifs illiquides qui sont des actifs qui ne peuvent pas facilement être vendus ou échangés contre de l'argent sans perte substantielle de la valeur.

sur le développement du marché boursier. Enfin, le dernier chapitre s'est intéressé à l'effet positif de long terme de l'assurance non-vie sur l'ouverture commerciale.

L'analyse des déterminants macroéconomiques de l'assurance-vie (chapitre 2) montre que le revenu par habitant, les droits de propriété et la stabilité politique affectent positivement l'assurance-vie tandis que l'espérance de vie et le ratio de dépendance des jeunes influencent négativement la pénétration d'assurance-vie en ASS. L'effet du développement économique sur l'assurance-vie est non-linéaire, indiquant que l'impact du revenu est faible dans les pays dont la protection des droits de propriété est élevée et dans les pays dotés de système legal de tradition française. Ainsi, les résultats renforcent la littérature existante (*World Bank Development Report*, 2000/2001, p.143) qui suggère que le marché de l'assurance est faible dans les pays en développement en raison, entre autres, des coûts de transaction élevés (faibles institutions juridiques et autres). Dans le chapitre 3, on montre que les IDE ont un effet positif sur le développement de l'assurance non-vie aussi bien dans l'ensemble des pays en développement et dans le cas spécifique des pays d'ASS. En outre, il y a une hétérogénéité de l'effet des flux d'IDE sur le développement de l'assurance non-vie, indiquant que l'impact d'IDE est faible en ASS et dans les pays en développement où le climat d'investissement est peu favorable. En revanche, l'analyse sur la relation entre le développement bancaire et l'assurance (chapitre 4) a montré que le credit bancaire au secteur privé a une influence négative sur la consommation d'assurance-vie, ce qui suggère une relation de compétitivité entre le secteur d'assurance-vie et le secteur bancaire pour les pays d'ASS. Par ailleurs, le test de causalité indique une causalité unidirectionnelle allant du secteur bancaire au secteur d'assurance-vie pour l'échantillon de pays d'ASS. Ces résultats impliquent que contrairement aux pays développés où les banques sont devenues un important canal de distribution pour les produits d'assurance, connu sous le nom «bancassureurs», dans les pays d'ASS, les banques sont des concurrents des assureurs vie dans la mobilisation de l'épargne des consommateurs (Lee et Chang, 2015).

L'analyse des conséquences du développement des compagnies d'assurance sur l'économie du pays montre que l'assurance-vie augmente la croissance économique dans le monde en développement (chapitre 5). Aussi, nous remarquons que l'effet de l'assurance-vie sur la croissance est atténué dans les pays où, le crédit bancaire au secteur privé et la capitalisation boursière et les taux d'intérêt des dépôts bancaires sont élevés tandis que l'effet est accentué dans les pays avec des institutions de meilleure qualité. Au niveau régional, l'impact de l'assurance-vie sur la croissance est faible pour les pays d'ASS comparativement aux autres

régions en développement. Le rôle du secteur d'assurance en tant qu'investisseur institutionnel dans le développement des marchés financiers est également examiné (chapitre 6). L'analyse empirique souligne que le développement des activités d'assurance améliore de manière significative le taux de titres échangés sur le marché boursier avant et après la crise financière de 2007. Enfin, le dernier point (chapitre 7) sur les conséquences de l'assurance, analyse la relation de long terme entre le développement de l'assurance non-vie et l'ouverture commerciale. Les résultats montrent qu'à long terme, il y a un équilibre entre le développement du secteur d'assurance non-vie et l'ouverture commerciale. Ainsi, le développement de l'assurance non-vie améliore significativement le commerce international dans l'ensemble des pays en développement et également dans les pays à faible et moyen revenu.

Pour résumer, les différentes parties de la thèse permettent de tirer plusieurs enseignements généraux sur le développement du secteur de l'assurance dans les pays en développement. La première partie a montré l'importance et le rôle de la qualité des institutions dans le développement des assurances dans le monde en développement. La deuxième partie montre que le secteur d'assurance exerce des effets favorables sur la croissance économique et que son effet marginal varie en fonction des caractéristiques structurelles des pays. De plus, nous montrons qu'au-delà de son effet direct sur la croissance, le développement du secteur d'assurance favorise le développement des marchés financiers et du commerce international. Ainsi, pour développer le secteur d'assurance et bénéficier de ces effets, les pays en développement doivent poursuivre les réformes de l'environnement politique et juridique afin d'améliorer la protection des droits de propriété et améliorer le climat des affaires. De ce fait, la poursuite des réformes de l'environnement politique et juridique dans les pays va renforcer la confiance des consommateurs et des investisseurs dans le secteur d'assurance, notamment l'assurance-vie. Une attention particulière devrait être également accordée aux mesures visant à attirer plus les entreprises étrangères (IDE) qui exportent leur production et les capitaux dans les pays d'accueil; ce qui contribuera à relancer le secteur d'assurance. Compte tenu du faible développement du secteur d'assurance dans les pays d'ASS, les autorités pourraient mettre en place des politiques d'incitation à la consommation d'assurance-vie et encourager l'installation des compagnies multinationales d'assurance en mettant en place par exemple des politiques d'incitations fiscales dans le secteur. Enfin, l'effet négatif du crédit bancaire au secteur privé sur la consommation d'assurance-vie (chapitre 3) recommande que les pays en développement poursuivent les réformes du système bancaire de sorte à intégrer dans leurs activités la distribution des produits d'assurance: "*Bancassurance*", comme dans certaines économies

développées (France, Espagne, Italie, etc.). De ce fait, les banques pourraient devenir un canal important de distribution des produits d'assurance (Lee et Chang, 2015) et contribuer au développement du secteur d'assurance au lieu d'être un concurrent du secteur dans la mobilisation des fonds des consommateurs.

Cependant, la thèse présente quelques limites notamment dans l'analyse des déterminants macroéconomiques du développement du secteur d'assurance. D'abord, dans l'analyse de l'effet des flux d'IDE sur le développement de l'assurance non-vie (chapitre 3), nous n'avons pas distingué les IDE d'assurance des autres types d'IDE (ou au moins dans le secteur financier et le reste d'IDE) ce qui constitue une limite de cette thèse. Ainsi, les recherches futures pourraient utiliser des données désagrégées afin d'identifier les effets directs et indirects des flux d'IDE sur le développement de l'assurance. Ensuite, notre travail n'a pas analysé le rôle de la structure et la réglementation du marché d'assurance dans le développement du secteur. De plus, au niveau de l'analyse des déterminants de l'assurance pour les pays d'ASS, les recherches futures pourraient prendre en compte les indicateurs qui captent la sécurité des contrats d'assurance car la consommation d'assurance dépend avant tout de la confiance que les agents économiques ont vis-à-vis des contrats et des dirigeants des compagnies d'assurance. Enfin, nos analyses n'ont pas permis de mettre en évidence le rôle de la globalisation financière dans le développement du secteur d'assurance alors que les politiques publiques liées au secteur bancaire, comme les barrières à l'entrée ou de l'importance des banques publiques, pourraient avoir des liens avec le développement du marché d'assurance-vie (Chang et al, 2013). Ainsi, les politiques publiques de restrictions sur les taux d'intérêt peuvent influencer le taux de rendement des instruments de placement sur le marché (Lee et Chang, 2015) et par conséquent influencer négativement les bénéfices des compagnies d'assurance et les prix d'assurance.

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Résumé de la thèse

La présente thèse est composée d'un ensemble de travaux de recherche en économie appliquée qui s'inscrivent dans le champ contemporain de l'économie de l'assurance. La thèse s'interroge sur comment les pays en développement pourraient développer davantage le secteur d'assurance afin de bénéficier des effets sur l'économie domestique. La première partie de la thèse analyse les déterminants macroéconomiques du développement du secteur d'assurance. Premièrement, les résultats montrent que l'augmentation du revenu par habitant conduit à une augmentation des primes d'assurance-vie et l'assurance-vie est un bien de luxe en Afrique Subsaharienne (**chapitre 2**). On trouve également des preuves que l'impact marginal du revenu dépend de la qualité de l'environnement juridique et politique. Deuxièmement, l'analyse de l'effet des IDE montre que, ceux-ci constituent un facteur clé dans l'augmentation des primes d'assurance non-vie à la fois dans les pays d'Afrique Subsaharienne (ASS) et dans les autres pays en développement (**chapitre 3**). Troisièmement, les activités d'assurance-vie et bancaire sont substituables en ASS, cependant les résultats indiquent une causalité unidirectionnelle allant du crédit bancaire au secteur privé vers le développement des activités d'assurance-vie (**chapitre 4**). La deuxième partie de la thèse analyse l'impact du développement du secteur d'assurance sur l'économie des pays en développement. Premièrement, il apparaît que le développement de l'assurance-vie a un effet positif sur la croissance économique dans les pays en développement d'une part et d'autre part, l'effet marginal de l'assurance-vie est influencé par les caractéristiques structurelles des pays (**chapitre 5**). Les primes d'assurance augmentent de façon significative la valeur des titres négociés sur le marché financier aussi bien avant et après la crise de 2007(**chapitre 6**). Troisièmement, la thèse a montré qu'il existe une relation à long terme entre le développement de l'assurance non-vie et l'ouverture commerciale et que les primes d'assurance non-vie améliorent l'ouverture au commerce international aussi bien dans les pays en développement que spécifiquement dans les pays à faible et moyen revenu (**chapitre 7**).

Mots clés: Primes d'assurance-vie et non-vie, Revenu, Qualité Institutionnelle, Investissements Direct Etrangers, Crédit bancaire au secteur privé, Croissance Economique, Marché Financier, Ouverture commerciale, Afrique subsaharienne, Pays en développement.

Summary of the thesis

This thesis is composed of a set of research in applied economics that enroll in the contemporary field of economics of insurance. The thesis analyses how developing countries could develop more the insurance sector and benefit from these effects on local economy. The first part explored the determinants of insurance development from a macroeconomic perspective. First, the results show that increase of income per capita leads to an increase in life insurance premiums and that life insurance is a luxury commodity in Sub-Saharan Africa (**chapter 2**). We also find evidence that the marginal impact of income varies according to the quality of legal and political environment. Second, analysis of effect of the FDI inflows shows that these are a key factor in increase of non-life insurance premiums in countries of Sub-Saharan Africa (SSA) and in other developing countries (**chapter 3**). In **chapter 4**, the results highlighted that the activities of life insurance and banking are substitutable in SSA and, however, there is presence of unidirectional causality running from real private credit density to life insurance and insurance density. The second part of the thesis has analysed effect of development of insurance sector on economy in developing countries. First, it appears that the development of life insurance has a positive effect on economic growth on the one hand and on the other hand marginal effect of life insurance is influenced by the structural characteristics of countries (**chapter 5**). In **chapter 6**, the results showed that the insurance premiums significantly increase stock market value traded, before as well and after the 2007's economic crisis. Finally, the thesis showed that there is a long term relationship between the development of non-life insurance and trade openness and that non-life insurance premiums improve openness to international trade as well in developing countries than specifically in low and middle income countries (**chapter 7**).

Keywords: Life and non-life Insurance Premiums, Income, Institutional Quality, Foreign Direct Investment, Bank credit to private sector, economic growth, financial market, Trade openness, Sub-Saharan Africa, Developing countries.