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Evaluation thématique n°4

« Soutien financier aux spin-off et autres entreprises innovantes »

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Résumé du rapport

Ce rapport d'étude s'inscrit dans le cadre du programme d'évaluation du Plan Marshall 2.Vert commandité par le Gouvernement wallon à l'IWEPS. Il vise à **mettre à la disposition des décideurs publics une série de recommandations susceptibles d'éclairer leurs actions destinées à faciliter l'accès des jeunes entreprises innovantes aux sources de financement adéquates pour soutenir leur développement.**

Pour formuler ces recommandations, **le présent rapport s'appuie sur une large revue de la littérature récente réalisée**, à la demande de l'IWEPS, **par une équipe d'experts de la Vlerick Business School** de Gand. Le texte qui suit fournit une synthèse du travail de cette équipe.

De façon générale, les PME, qualifiées de « traditionnelles », se financent largement par crédit bancaire. Quant aux jeunes entreprises innovantes, objet de l'étude, elles se caractérisent par (i) des investissements immatériels importants (R&D), (ii) un haut degré de risque et d'incertitude, (iii) des flux de trésorerie négatifs et un manque d'immobilisations corporelles ; autant de spécificités qui ne leur permettent pas d'avoir accès au financement bancaire. Des formules de financement plus adaptées au profil particulier de ces entreprises existent toutefois : l'apport de capital, de quasi-capital ou les prêts subordonnés, les *business angels* et, plus récemment, le financement participatif ou *crowd funding*. **Ces modes de financement, liés au capital à risque, sont au centre de la revue de la littérature réalisée.**

Le recensement porte sur des travaux empiriques, des analyses d'études de cas ou encore des études comparatives (*benchmarking*) des systèmes de financement des jeunes entreprises innovantes identifiés à l'étranger, tant publics que privés. Il apporte ainsi en creux un éclairage sur les dispositifs mis en œuvre dans la même perspective en Wallonie.

Pointant les éléments de convergence ou de divergence entre les résultats des études analysées, la revue dégage *in fine* un ensemble de recommandations à l'attention des décideurs. **Ces recommandations s'articulent autour de cinq axes,** qui structurent l'ensemble du rapport :

- **l'optimisation du cadre institutionnel ;**
- **la professionnalisation de la demande de capital à risque ;**
- **la stimulation de l'offre privée de capital à risque (y compris les *business angels* et le le *crowd funding*) ;**
- **l'action de l'Etat comme investisseur en capital à risque ;**
- **le rôle de l'Etat dans l'accès au financement des nouvelles entreprises actives dans le secteur du *cleantech* (« technologies propres »).**

Pour faciliter l'appropriation de la thématique, chaque section inclut des **tableaux synthétiques reprenant les principaux résultats des études analysées** et se termine en reprenant les **références académiques les plus pertinentes** sur le sujet. Le rapport comporte également **un lexique des termes de référence** utilisés dans le rapport.

Dans la mesure du possible, le rapport positionne la situation de la Belgique – Etat fédéral et/ou Régions selon le cas – (indicateurs, législation en vigueur, etc.) pour chaque dimension étudiée.

Les lignes qui suivent résument les principales conclusions et recommandations de la revue de la littérature établie selon les cinq axes susmentionnés. Il convient de noter que **ces conclusions et recommandations sont formulées dans une perspective focalisée sur le marché du capital à risque**, dans ses segments de financement les plus précoces, **avec l'objectif d'en optimaliser le fonctionnement.**

Axe 1 - L'optimisation du cadre institutionnel

Le cadre institutionnel d'un pays (**règlementations en vigueur**, **politique macroéconomique menée et culture dominante)** a des effets sur l'offre et la demande de capital à risque. Sont analysés successivement dans le rapport l'influence des modes de régulation du marché du travail, des dépenses publiques de recherche et développement, du système légal de protection des investisseurs, de la régulation des fonds de pension et autres investisseurs institutionnels, de la législation sur les faillites et, enfin, de la fiscalité.

Les modes de régulation du marché du travail

Un marché du travail flexible permet aux entreprises de recruter et de se séparer de travailleurs, de manière dynamique, par rapport aux besoins de l'activité. En facilitant l'ajustement du niveau des effectifs, on renforce l'attrait des projets entrepreneuriaux pour les investisseurs en capital à risque. En Belgique, le capital à risque pourrait être plus largement disponible si, au titre de mécanisme d'assurance des travailleurs, la protection de l'emploi cédait la place à une politique plus active sur le marché du travail, à l'instar du modèle danois de *flexicurity*.

Les dépenses publiques de recherche et développement (R&D)

Les dépenses publiques de R&D génèrent des externalités technologiques, et offrent ainsi de nouveaux débouchés pour les entreprises existantes ou à créer, susceptibles d'intéresser les investisseurs en capital à risque. En fonction de l'intensité de la R&D publique (dépenses publiques de R&D rapportées au produit intérieur brut), la Wallonie et la Belgique dans son ensemble devraient viser **une hausse des dépenses publiques de R&D** en vue de stimuler le marché des capitaux à risque.

Le système légal de protection des investisseurs

Pour l'investisseur en capital, actionnaire minoritaire dans les entreprises de son portefeuille, il est important de pouvoir compter sur une protection légale (protection du droit de vote des actionnaires contre les abus du management, droits de recours des actionnaires minoritaires, etc.). Toute action orientée vers une meilleure protection des investisseurs est de nature à favoriser le développement de l'offre de capital à risque.

La régulation des fonds de pension et autres investisseurs institutionnels

Parmi les investisseurs en capital à risque, les fonds de pension, les compagnies d'assurance et autres investisseurs institutionnels occupent généralement une place importante. C'est pourquoi leur régulation affecte étroitement l'offre de capital à risque : **l'assouplissement et l'harmonisation des règlementations** les concernant sont des facteurs susceptibles d'augmenter les volumes investis sous la forme de capital à risque. En Belgique, depuis de nombreuses années, ces investisseurs institutionnels sont absents du marché du capital à risque, ce qui limite les ressources disponibles pour les jeunes entreprises innovantes.

La législation sur les faillites

La législation sur la faillite personnelle, comme celle sur la faillite des sociétés, ont des répercussions sur la demande de capital à risque. Une législation trop stricte influence négativement la création d'entreprise et dissuade les entrepreneurs de solliciter des capitaux, sous la forme de crédits bancaires ou de participations (capital à risque). En Belgique, il convient donc de maintenir les dispositions qui prévoient **la libération de faillite pour les entrepreneurs honnêtes**. Des mesures pourraient par contre être prises pour **réduire le délai entre la faillite et la possibilité de réhabilitation**. De manière générale, **une législation sur la faillite moins sévère pour les débiteurs** (*debtor friendliness*) stimulerait la demande de financement extérieur.

La fiscalité

La fiscalité a également des incidences sur le développement du marché du capital à risque. En Belgique, sous certaines conditions, **les plus-values sur actions sont exonérées d'impôt**. Ce régime rend attractive la prise

de participation au capital pour les entrepreneurs et les investisseurs externes, tels que les *business angels* et les investisseurs professionnels en capital à risque. Ce régime devrait donc être maintenu. En revanche, il conviendrait de revoir **le taux d'imposition des sociétés à la baisse** pour faciliter le développement de l'activité des entreprises et le potentiel de rentabilité des investisseurs.

En complément à l'analyse de ces différents facteurs d'influence du marché du capital à risque, on peut également s'interroger sur la **cohérence des politiques publiques menées**. En effet, si la plupart des Etats européens s'engagent dans des politiques visant à faciliter l'accès au financement pour les jeunes entreprises innovantes, ils mettent quelquefois en œuvre des mesures qui mettent en question l'atteinte de cet objectif. **Les commandes publiques** en constituent une illustration. En la matière, les Etats imposent souvent des exigences strictes aux entreprises soumissionnaires : obligation de démontrer une situation financière saine des états financiers sur plusieurs années, de déclarer des bénéfices, de disposer d'un minimum de capital, etc. Or **certaines de ces exigences entravent**, de manière parfois disproportionnée, **l'accès des entreprises innovantes en démarrage aux marchés publics**. Simultanément, **le système de dépôt de caution grève les liquidités des entreprises. Les difficultés financières qui en ressortent sont par ailleurs amplifiées par les retards de paiement fréquents des pouvoirs publics.** Ainsi, le marché important que représente le secteur public est souvent inaccessible aux nouvelles entreprises, aux dépens de leur potentiel de croissance.

Axe 2 – La professionnalisation de la demande de capital à risque

Un marché financier en bonne santé implique une attention tant aux conditions d'offre que de demande. Au niveau de la demande, on observe un problème majeur : **de nombreux entrepreneurs sont peu versés en technique financière**. Ils ne maîtrisent pas les bases de la discipline et connaissent peu les différentes sources de financement possibles, y compris parfois celles proposées par le secteur public. Leur faible connaissance des alternatives financières limite l'éventail des options prises en considération et conduit *in fine* à des choix sous-optimaux de stratégie financière. Leur manque de compétences les affaiblit également dans la négociation des modalités de l'investissement. Pour pallier ces faiblesses, il peut être fait appel à des conseillers, comme **les comptables ou les avocats.** Toutefois ces acteurs **ne sont pas nécessairement compétents en matière de financement par capital à risque**.

En fonction de ces constats, il est préconisé de veiller à :

- améliorer la formation en matière financière, par **l'insertion dans les cursus de formation de cours obligatoires de finance** pour les élèves de l'enseignement secondaire et les étudiants de l'enseignement supérieur ;
- développer, à l'attention des chefs d'entreprise, **des formations ou coaching sur les alternatives financières existantes et sur le fonctionnement du marché du capital à risque** et, pour les entrepreneurs qui s'orientent en connaissance de cause, vers le capital à risque, **des formations de type « *investor readiness* »** (structuration d'un plan d'affaires, techniques de présentation aux investisseurs potentiels, etc.) pour maximiser leurs chances de lever des capitaux ;
- accorder **une place plus large au financement par capital à risque dans la formation initiale des comptables** - les comptables étant les premiers conseillers des chefs d'entreprise dans leur politique de financement - **et dans la formation continue des conseillers de l'entrepreneur** (les comptables, mais aussi les avocats ou les banquiers).

Axe 3 – La stimulation de l'offre privée de capital à risque

Dans les jeunes entreprises innovantes, le capital à risque est essentiellement apporté par (i) **l'entrepreneur lui-même, sa famille et ses amis (« *love money* » - « *Family, Friends, Fools* » (FFF))**, (ii) **les *business angels***, (iii) **les investisseurs professionnels en capital à risque** et, depuis peu, (iv) **le *crowd funding***.

Love Money – Family, Friends, Fools

L'apport de capitaux par la famille et les amis pourrait s'intensifier sous l'effet de meilleures connaissances financières (à long terme) et de la politique fiscale (à court terme). En Flandre, par exemple, famille et amis bénéficient d'une réduction d'impôt s'ils consentent un prêt subordonné à une entreprise en démarrage. Ce système, connu sous le nom de ***win-wineling***, est en place depuis 2006 et a bénéficié à ce jour à 3000 entreprises pour un montant total de l'ordre de 100 millions d'euros.

Crowd funding

Le *crowd funding* ou financement participatif est une technique qui permet aux **entrepreneurs – de manière individuelle ou en groupe – de faire financer leurs initiatives par des contributions relativement réduites d'un nombre important de particuliers, et cela par l'intermédiaire d'une plate-forme internet et sans recours aux intermédiaires financiers classiques**. S'il s'est initialement développé dans les activités créatives, le *crowd funding* contribue aujourd'hui à la réalisation de projets entrepreneuriaux dans divers secteurs. La littérature identifie quatre grands types de *crowd funding*, selon ce que l'investisseur reçoit en contrepartie de sa contribution : le *crowd funding* sur la base de dons (aucune contrepartie), le *crowd funding* avec récompense (avantage non financier), le *crowd funding* par prêt (revenu périodique fixe et remboursement du principal) et le *crowd funding* sur la base de capital (participation au capital ou similaire). Si le 4e modèle, sur la base de capital, est encore relativement rare, il enregistre actuellement la plus forte croissance et attire ainsi l'attention des décideurs.

En Belgique, le financement participatif est **freiné par l'absence de cadre légal**. Une réflexion sur la construction d'un cadre juridique adéquat devrait être lancée, en s'inspirant des modèles existants en Italie ou aux Etats-Unis. En particulier, il serait intéressant de **formuler des règles spécifiques par rapport au seuil du montant en capital levé imposant la rédaction d'un prospectus**. Actuellement, en Belgique, les entreprises sont tenues de produire un prospectus lorsqu'elles espèrent lever plus de 100.000 euros en capital. En Italie et au Royaume-Uni, la limite pour les opérations de *crowd funding* a été portée à 5 millions d'euros (le maximum autorisé dans la législation européenne).

Business angels

Le *business angel* est un particulier disposant de ressources financières privées importantes (souvent un ancien chef d'entreprise) **qui investit son propre argent, seul ou avec d'autres, dans des entreprises non cotées, sans qu'il soit question de relations familiales ou amicales** (distinction avec le *love money*, cf. *supra*), **dans l'espoir d'obtenir un rendement financier significatif.**

Le financement via les *business angels* présente plusieurs caractéristiques importantes :

- aux stades du pré-démarrage (*seed stage*) et du démarrage (*start up stage*), les *business angels* s'imposent comme **la première source de capital à risque**, loin devant les investisseurs professionnels, notamment parce que ces derniers ont tendance à préférer des phases ultérieures de financement, ou les *buy-outs*, en raison du très faible rendement des stades initiaux (cf. *infra*) ;
- les *business angels* semblent **moins sensibles aux cycles du marché** que les investisseurs professionnels en capital à risque ;
- les *business angels* assurent **un *deal flow* pour les investisseurs du second tour** : les *business angels* peuvent aider les PME à accéder ultérieurement au financement d'investisseurs professionnels en présentant à ces derniers un ensemble intéressant d'opportunités d'investissement.

Les avantages de ce type de financement en capital pour les PME aux stades du pré-démarrage (*seed stage*) ou du démarrage (*start up stage*) doivent inciter les pouvoirs publics à prendre des mesures favorables au développement de ce marché. Lorsqu'il s'agit de prendre des mesures pour stimuler le marché informel du

capital à risque, le type d'intervention le plus classique est celui de l'incitation fiscale. Dans le contexte belge, d'autres actions méritent toutefois d'être mises en lumière.

Une première mesure pourrait porter sur **la formation**. De potentiels *business angels* aimeraient investir dans des entreprises en démarrage, mais ces anciens chefs d'entreprise et hommes d'affaires expérimentés hésitent à franchir le cap ; connaissant mal le processus et/ou ne disposant pas de compétences suffisantes pour investir dans une *start up*. Une formation *ad hoc* pourrait **faire de ces « *virgin angels* » des investisseurs actifs**.

Parallèlement, **une promotion active des cas de réussites**, mais aussi de cas d'échecs expliqués, pourrait renforcer la visibilité et la légitimité de ces acteurs. Il importe à cet égard de faire référence à des *business angels* « classiques» plutôt qu'à des «super-héros». *In fine*, de telles campagnes de promotion pourraient pousser des *business angels* en puissance à investir.

L'action publique pourrait également s'orienter vers **les réseaux de *business angels***. Ces derniers mettent en contact d'une part les entrepreneurs à la recherche de capital à risque et d'autre part les particuliers désireux d'investir dans de nouvelles entreprises. **Ces réseaux stimulent donc la disponibilité des capitaux en facilitant la circulation de l'information sur le marché** (soucieux de préserver leur anonymat, les *business angels* sont peu visibles sur le marché). Dans de nombreuses régions d'Europe, **les pouvoirs publics subventionnent la création et l'animation des réseaux** de *business angels* (*business angels networks* (BANs)) afin de leur permettre d'offrir des services de qualité aux entrepreneurs et aux investisseurs, avec pour objectif une augmentation de la probabilité de financement des jeunes entreprises.

Parallèlement aux BANs, on constate également l'émergence de **groupes ou *consortia* de *business angels*** – **des *business angels* qui investissent ensemble plutôt qu'à titre individuel ou en groupes constitués pour la circonstance**. Ces groupes sont intéressants à plusieurs titres :

- ils peuvent **combler le fossé croissant lié à l'absence d'investisseurs professionnels intervenant aux stades du pré-démarrage et du démarrage et aux moyens limités d'un investisseur individuel** ;
- ces groupes, comme les BANs, sont **plus visibles sur le marché** que les investisseurs individuels ;
- ils permettent à des particuliers disposant de ressources financières, mais hésitant à investir seul, de se joindre à un groupe de financement ;
- **le volume accru des ressources disponibles ouvre la voie au financement de la croissance des entreprises**, après la phase de démarrage ;
- **l'éventail de compétences** que les membres des consortia mettent en commun **présente une valeur ajoutée** supérieure pour l'entreprise bénéficiaire du financement.

Au vu de ces atouts, comme pour les BANs, **une intervention publique dans les frais de lancement et de fonctionnement de tels groupes** semble pertinente.

Enfin, il apparaît que **les programmes de co-investissement Etat – *business angels*** (apport de fonds publics à hauteur de la mise des business angels) connaissent un succès croissant, en partie sous l'effet de la réussite du *Scottish Co-Investment Fund* (SCF). En Belgique, le Fonds de Participation applique depuis longtemps un modèle de co-investissement avec les *business angels* : le **Fonds de Participation** investit un maximum de 125.000 euros sous la forme d'un prêt subordonné, parallèlement à la mise d'un *business angel* accrédité. Les avantages du financement par les business angels, exposés précédemment, appellent **une poursuite du dispositif dans le cadre de la régionalisation du Fonds de Participation**. La possibilité de traiter avec des consortia de business angels (cible du SCF) peut être réfléchie en liaison avec la nécessité de soutenir la création et le développement de tels groupes (cf. *supra*).

Investisseurs professionnels en capital à risque

Le **marché européen du capital à risque, dans les segments initiaux de financement**, souffre depuis longtemps de **rendements faibles, insuffisants pour compenser les risques pris par les investisseurs**. **Deux facteurs** expliquent cette faiblesse des rendements :

- **le manque de marchés de sortie attrayants**, comme celui du Nasdaq aux Etats-Unis, où les investisseurs à risque, investisseurs professionnels ou *business angels*, peuvent revendre leurs participations dans des entreprises innovantes à des prix attrayants ;
- **la croissance intrinsèquement plus faible des entreprises européennes par rapport à leurs homologues américaines** ; le marché européen restant fragmenté par de multiples barrières juridiques, culturelles et linguistiques.

Tenant compte de ces constats, les pouvoirs publics s'efforcent à tous les niveaux – européen, fédéral et régional – de prendre des mesures favorables au développement de l'offre de capital à risque. Au niveau européen, la Commission européenne poursuit un objectif de **plus grande transparence des fonds de capital à risque**, ce qui pourrait augmenter les disponibilités financières sur le marché. Toujours à l'échelle européenne, de nouvelles initiatives doivent également être prises en faveur de la **mise en place de marchés de sortie paneuropéens pour les entreprises innovantes de tous les secteurs** (un exemple d'initiative fructueuse : Euronext Brussels, qui peut aujourd'hui être considéré comme un hub régional des nouvelles entreprises biotechnologiques).

Avant de clore cet axe relatif à la stimulation des différentes composantes de l'offre privée de capital à risque, il y a lieu d'insister sur la nécessité de **disposer d'un mix équilibré de sources de financement**, étant donné les comportements particuliers des différents types d'investisseurs, notamment en période de crise financière ou économique ; l'expérience récente nous l'a prouvé.

Axe 4 – L'action de l'Etat comme investisseur en capital à risque

Vu l'importance du marché du capital à risque pour le développement des jeunes entreprises innovantes et étant donné la difficulté d'assurer des rendements attrayants pour les investisseurs privés de capital à risque, de nombreux Etats ont fait leur entrée sur le marché du capital à risque dans le créneau du financement des entreprises à un stade précoce.

Les pouvoirs publics peuvent en effet exercer un rôle actif sur ce marché, par l'entremise d'**investissements directs** dans les entreprises ou d'**investissements indirects** dans celles-ci en tant qu'associés de fonds de capital à risque privés. Les programmes indirects comprennent notamment les investissements dans **les fonds de fonds** et **les fonds de co-investissement. Un fonds de fonds développe une stratégie d'investissement indirecte à travers la détention d'un portefeuille d'autres fonds d'investissement, plutôt que d'investir directement dans les entreprises soutenues par ces fonds**. **Quant aux fonds de co-investissement**, comme le programme Arkimedes en Flandre par exemple, **ils investissent un montant d'argent public correspondant à la mise du secteur privé**. Souvent, ces programmes de co-investissement ne sont pas seulement considérés comme **des instruments pour lever des fonds privés**, ils constituent également (i) **une approche pour amplifier et professionnaliser le marché de l'investissement aux stades initiaux** et (ii) **un outil d'attraction d'investisseurs étrangers**.

Selon la revue de la littérature académique réalisée, **les fonds publics de capital à risque exercent un rôle positif pour les entreprises financées et le marché du capital à risque dans son ensemble lorsqu'ils appliquent les principes suivants :**

- **ils limitent leur intervention aux segments de marché pour lesquels une imperfection est patente, à savoir le financement des premiers pas des entreprises**. Si les fonds publics de capital

à risque étendent leurs activités aux segments plus en aval, en s'adressant à des entreprises plus matures, cela a tendance à freiner l'intervention des investisseurs privés (effet d'éviction ou *crowding out* du capital à risque privé).

- **ils co-investissent avec des partenaires privés, en laissant le pouvoir de choix et de décision relatif aux investissements aux mains des partenaires privés.** Il apparaît en effet que les gestionnaires des programmes publics disposent de compétences professionnelles moins larges que leurs collègues privés en termes de sélection, de surveillance et de création de valeur. Lorsque les fonds publics sont seuls à investir dans une nouvelle entreprise, la littérature empirique met généralement en évidence un impact négatif sur les entreprises bénéficiaires de l'investissement, avec à la clé moins de croissance et moins de création d'emploi. Au contraire, quand les fonds publics de capital à risque investissent de concert avec des acteurs privés, ces partenariats génèrent des effets positifs significatifs au niveau des entreprises en portefeuille et du marché financier dans son ensemble.

Axe 5 – Le rôle de l'Etat dans l'accès au financement des nouvelles entreprises actives dans le secteur du *cleantech*

Les recommandations générales, exposées ci-dessus, visant à stimuler le marché du financement des entreprises innovantes, s'appliquent également au **secteur du *cleantech* ou des « technologies propres »**. Toutefois, les spécificités de ce secteur, qui regroupe **des entreprises actives dans les technologies visant à répondre au défi de la raréfaction des ressources, y compris les ressources énergétiques, et à diminuer l'impact environnemental négatif des activités productives, appellent des politiques publiques particulières.**

Premièrement, l'investissement dans ce secteur génère, outre **une valeur privée, une valeur sociétale**. Etant donné l'intérêt du secteur privé sur le premier type d'avantages, on peut s'attendre à **un sous-investissement dans ce domaine**. Cette situation justifie une action publique, notamment via **un soutien financier à la recherche fondamentale.** Cette mesure visant à soutenir le développement technologique du secteur (« ***technology push*** ») devrait avoir pour effet une stimulation de l'offre de capital à risque dans les branches d'activité en question.

Deuxièmement, de nombreux investissements nécessaires dans le cycle de vie des projets du secteur du *cleantech* se caractérisent par **un risque technologique important et une forte intensité en capital**. Il s'agit en particulier des installations de démonstration, nécessaires après la phase de prototypage, pour prouver que la technologie fonctionne à l'échelle réelle. Le risque technologique et l'intensité capitalistique limitent l'attrait pour les investisseurs privés, ce qui conduit à un investissement insuffisant. Au-delà du soutien à la recherche fondamentale (cf *supra*), l'intervention publique, est amenée à porter également sur **des investissements directs visant à faciliter la traversée de la « vallée de la mort »**.

Troisièmement, il semble que **peu de *business angels* ou investisseurs professionnels de capital à risque envisagent d'investir activement dans le secteur des *cleantech***. Cela s'explique par la **conjonction de plusieurs risques caractérisant ces marchés et** dont les principaux sont répertoriés ci-dessous :

- **le risque technologique** : comme déjà évoqué, le risque technologique est important à cause de l'intensité en capital et du long délai nécessaire entre le développement technologique et la mise sur le marché (comparable au délai constaté dans le secteur de la biotechnologie, sachant toutefois que dans celui-ci, les investisseurs disposent de voies de sortie plus précoces (cf. *infra*)) ;
- **le risque d'adoption du marché** : les marchés peuvent ne pas adopter les nouvelles technologies ou peuvent le faire lentement ; les acteurs en place hésitant devant les nouvelles solutions (tendance au conservatisme des ex-monopoles dans le secteur de l'énergie par exemple). A cela s'ajoute souvent le frein que constitue le peu d'avantages privés retirés par le consommateur final ;

- **le risque « humain »** : il n'existe pas (encore) d'écosystème avec, d'une part, des entrepreneurs expérimentés dans la gestion de *start-up* actives dans les technologies propres et, d'autre part, des *business angels* et des investisseurs professionnels spécialisés dans ce secteur particulier ;
- **le risque de sortie** : la possibilité de sortir d'un investissement est un facteur clé dans le bon fonctionnement des marchés de capital à risque. Les deux voies principales de sortie qui s'offrent aux investisseurs en capital sont d'une part l'entrée en bourse et d'autre part la vente commerciale. Actuellement, le fait de sortir d'une entreprise active dans les technologies propres semble délicat. Rares encore sont les exemples d'entrées en bourse réussies par ce type d'entreprises. Par ailleurs, on ignore encore si le marché des fusions et acquisitions d'entreprises de ce type va se développer, car les grands opérateurs en place (par exemple, les grands groupes actifs dans l'énergie électrique) semblent réticents à l'acquisition de jeunes entreprises des *cleantech* (contrairement aux grands groupes pharmaceutiques, par exemple, qui adoptent plus volontiers des stratégies d'innovation ouvertes).

Face à ces risques, les autorités publiques peuvent également **intervenir en développant les marchés des produits issus de ces technologies** par des initiatives favorisant la demande (« ***market pull*** ») : par exemple via des programmes de rachats avec une tarification garantie, comme la formule des « certificats verts ». Cette stimulation de la demande est de nature à rendre les investissements dans les technologies propres plus intéressants pour les investisseurs en capital à risque.

Au final, il ressort des analyses qu'**un dispositif public visant à faciliter l'accès des entreprises du secteur du *cleantech* au financement doit associer des instruments de type « technology push » et « market pull », en s'appuyant sur une politique environnementale stable et cohérente, pour éviter aux investisseurs de devoir ajouter le risque règlementaire aux risques technologiques et commerciaux** évoqués ci-dessus.

Après ce résumé des principales conclusions et recommandations tirées de la revue de la littérature relative au financement des jeunes entreprises innovantes, nous attirons l'attention du lecteur sur un dernier point.

Si la littérature académique voit dans la prise de participation le premier instrument de financement des jeunes entreprises innovantes, un autre mode de financement mérite de retenir l'attention : **l'emprunt subordonné**. Comparée à la participation, la créance subordonnée est moins risquée pour l'investisseur : en cas de liquidation, le prêteur est remboursé avant les actionnaires. En outre, le remboursement de la dette constitue une porte de sortie dont les modalités sont préalablement connues. Cette formule peut dès lors s'avérer séduisante pour les investisseurs. Pour les entrepreneurs également, la créance subordonnée peut se révéler plus attrayante que la participation : ils gardent le contrôle et cette formule de financement est moins coûteuse (mais plus cher, naturellement, qu'une dette bancaire). En conséquence, il est recommandé de ne pas tout miser sur le financement par capital à risque, et de prévoir une place à la formule de la créance subordonnée, comme s'est déjà le cas en Wallonie.

Rétroactes

Le Plan Marshall 2.Vert, présenté par le gouvernement wallon en décembre 2009, contient une mesure qui prévoit de « mener une évaluation globale du Plan de manière indépendante »[1]. Le gouvernement wallon a confié cette tâche à l'IWEPS, et cela en fonction de ses missions décrétales[2].

Deux étapes préliminaires ont précédé la réalisation des travaux d'évaluation proprement dits. La première a porté sur la reconstruction de la logique d'intervention du Plan Marshall 2.Vert et la seconde a consisté en l'élaboration d'un programme d'évaluation spécifique articulant évaluations thématiques et évaluation globale. Après exploitation et analyse de plusieurs sources (documents officiels, informations recueillies auprès des concepteurs du Plan, références théoriques et empiriques), l'IWEPS a donc proposé une structure hiérarchisée des objectifs poursuivis à travers les mesures prises dans le Plan Marshall 2.Vert. C'est ainsi qu'en septembre 2010, le gouvernement wallon a pris acte d'une logique d'intervention du Plan Marshall 2.Vert établie sur la base des travaux de l'IWEPS[3]. Cette arborescence a fourni un cadre conceptuel de référence pour l'élaboration du programme d'évaluation, tant au niveau des thèmes retenus que des questions évaluatives à propos des effets attendus des politiques menées.

Le programme d'évaluation[4], lancé en juillet 2011, comporte désormais dix évaluations thématiques et une évaluation globale à réaliser pour mars 2014[5] ; dont la présente évaluation portant sur le financement des jeunes entreprises innovantes.

Les travaux d'évaluation sont pris en charge par les chercheurs de l'IWEPS. Ceux-ci ont eu recours, selon les cas d'études et dans le cadre de la législation sur les marchés publics, à un accompagnement méthodologique et scientifique de leurs travaux et à des prestataires de services pour le recueil des données. En l'occurrence, il a été fait appel à une équipe universitaire pour réaliser une revue de la littérature relative au financement des jeunes entreprises innovantes.

Quant au suivi du processus d'évaluation, il est assuré par un Comité transversal d'encadrement, mis en place en début de processus. Ce Comité, qui regroupe une dizaine de personnes, est composé d'académiques, de représentants des partenaires sociaux et du Délégué spécial du gouvernement wallon. Il s'agit d'une instance d'accompagnement consultée à deux reprises pour chaque évaluation thématique : en début des travaux sur la base d'un rapport présentant le projet d'évaluation proposé par les chercheurs de l'IWEPS; en fin de travaux sur le rapport final d'évaluation.

En février 2014, les travaux qui font l'objet du présent rapport ont été présentés au Comité transversal d'encadrement de l'évaluation du Plan Marshall 2.Vert. Le texte qui suit prend en compte les remarques formulées et constitue le rapport final de l'évaluation thématique portant sur le financement des jeunes entreprises innovantes (évaluation thématique n° 4 du programme susmentionné) remis par l'IWEPS en février 2014 au Gouvernement wallon, commanditaire de l'évaluation.

[1] « Plan Marshall 2.Vert : Viser l'excellence » – mesure B.1.C. - http://planmarshall2vert.wallonie.be.
[2] Décret du 14 décembre 2003 portant création de l'Institut wallon de l'évaluation, de la prospective et de la statistique
[3] Voir l'article paru dans la revue Regards économiques « Comment évaluer les effets du Plan Marshall 2.Vert ? » (n°90, octobre 2011).
[4] Voir les notes au Gouvernement wallon du 20 juillet 2011, 6 juin 2013 et 28 novembre 2013.
[5] Les dix évaluations thématique sont les suivantes : pôles de compétitivité, programmes mobilisateurs, première alliance emploi – environnement, financement des jeunes entreprises innovantes , terrains mis à disposition du développement économique, soutien à l'investissement dans les zones franches urbaines et rurales, APE marchands, Plan langues, formation qualifiante dans les métiers en demande, identité wallonne, APE non marchands.

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Cadrage de l'étude

A. Un projet d'évaluation adapté

En avril 2012, l'IWEPS présentait aux membres du Comité transversal d'encadrement de l'évaluation du Plan Marshall 2.Vert (PM2.V) son projet d'évaluation visant à répondre à la question suivante : *« dans quelle mesure le soutien financier public, en complément de l'offre privée, répond-il aux besoins des spin-off et autres entreprises innovantes (dont les entreprises actives dans les technologiques environnementales) »*[6].

Lors de cette réunion, le débat s'est inscrit dans une logique de redéfinition de la question évaluative, plutôt que dans une critique de la démarche évaluative, telle que proposée dans le projet. En substance, le CTE souhaitait un élargissement du champ de l'évaluation (i) à l'ensemble des mesures publiques en faveur des *spin-off*, (ii) à la pertinence et à l'efficacité de l'ensemble du soutien financier public régional en faveur des entreprises, (iii) aux besoins financiers des entreprises à travers des enquêtes.

Si les propositions du CTE ouvraient des voies de recherches et d'études intéressantes, elles conduisaient l'IWEPS à s'éloigner de la question évaluative, telle que posée – et validée par le Gouvernement wallon, commanditaire de l'évaluation. Par ailleurs, l'ampleur des travaux impliqués par les suggestions du CTE apparaissait peu conciliable avec les contraintes de ressources et de calendrier de l'évaluation du PM2.V.

Par ailleurs, dès la conception du projet d'évaluation, les difficultés liées à la thématique de l'étude, à savoir la technicité et la disponibilité des données, avaient été mises en évidence. Le projet transmis au CTE précisait que, d'une part, « la technicité du thème impose la mobilisation de compétences spécialisées en finance, entrepreneuriat ou innovation, ainsi qu'en matière d'analyses basées sur des techniques de statistique multi-variée et d'économétrie financière » et, d'autre part, « les données quantitatives publiques de qualité sont rares et la contrainte d'une représentativité au niveau régional complique encore les choses. En ce qui concerne les gestionnaires publics d'outils financiers, ils se montrent stricts quant à la diffusion de leurs données et à l'usage qui peut en être fait » (LEFEVRE et LOUIS, 2012, p.21).

Au-delà des contraintes techniques et d'accès aux données, ce projet d'évaluation s'inscrivait dans un champ de recherche loin d'être en friche. Le projet d'évaluation énumérait plusieurs études récentes traitant du financement des entreprises innovantes, notamment dans le cadre wallon et/ou belge.

Dans ce contexte, le souci de développer une approche évaluative visant à répondre à la question du Gouvernement wallon, en fonction du portefeuille d'études existantes, des contraintes susmentionnées et des orientations données par le CTE, a conduit l'IWEPS à adapter son projet initial et à *évaluer indirectement la thématique du financement des jeunes entreprises innovantes en s'appuyant sur le riche référentiel théorique et empirique existant*. L'option prise s'est basée sur les éléments essentiels des trois volets d'étude initialement proposés par l'IWEPS (« synthèse structurée de l'existant », « benchmarking européen en matière d'offre » et « focus groupes sur le financement des entreprises actives dans les technologies environnementales ») pour en faire une synthèse empirique et critique.

B. Une étude s'appuyant sur une expertise académique externe

Pour ce faire, l'IWEPS a prévu la réalisation d'une large revue de la littérature scientifique récente, traitant du financement par capital-risque des jeunes entreprises innovantes. Le recensement devait respecter deux lignes de conduites fondamentales :

[6] Lefèvre, M. et V. Louis (2012), Soutien financier aux spin-off et autres entreprises innovantes, Projet d'évaluation thématique n°4, IWEPS, Direction Evaluation, avril, 25p.

- inclure des travaux empiriques, des analyses d'études de cas ou encore des études comparatives (*benchmarking*) des systèmes de financement étrangers, aussi bien publics que privés, donnant ainsi un éclairage sur les dispositifs mis en œuvre en Wallonie ;

- aboutir *in fine* à la mise en évidence des éléments de convergence ou de divergence entre les résultats des études analysées, afin de pouvoir dégager un ensemble de recommandations pour les décideurs.

Les travaux menés dans le cadre de la conception du projet initial d'évaluation et le débat mené avec les membres du CTE ont mis en évidence le vif intérêt du monde socio-économique pour les PME et la question de leur financement.

En Europe, le rôle des PME pour l'économie de l'Union a été reconnu à plusieurs reprises au niveau politique le plus élevé, intérêt qui s'est traduit par l'adoption, en 2008, de l'initiative globale visant à ancrer un principe de priorité aux PME, le "*Small Business Act for Europe (SBA)*"et dont un large pan est consacré au thème du financement. Les autorités publiques wallonnes s'inscrivent dans cette approche[7]. Déjà en 2004, au travers de sa Déclaration de politique régionale, sous le titre « politique de recherche efficace et intégrée », le Gouvernement wallon s'était engagé dans une politique de soutien financier spécifique à destination des entreprises issues des activités de recherche (notamment les spin-offs). Poursuivant le même raisonnement, la Déclaration de politique régionale wallonne de 2009, dans sa section « Stimuler l'intégration de la recherche dans la stratégie d'innovation des entreprises », faisait la proposition suivante : « évaluer et continuer à soutenir les sociétés innovantes issues des universités, hautes écoles et centres de recherche en distinguant les différentes étapes de la vie des spin-offs (création, développement, maturité) qui appellent des mécanismes de soutien spécifiques ». Les intentions exprimées dans les déclarations de politique régionale 2004 et 2009 se sont concrétisées essentiellement au travers de mesures prises en faveur des jeunes entreprises innovantes, dans le cadre du Plan Marshall 1.0, puis du Plan Marshall 2.Vert, qui accorde un intérêt particulier à celles actives dans les technologies environnementales.

Par ailleurs, l'intérêt des décideurs publics pour des analyses scientifiques offrant une perspective intégrée pour guider les choix de politique publique dans le domaine du financement et du développement des activités productives est également apparu.

Ces constats ont conforté l'IWEPS dans la détermination de sa nouvelle approche.

Mener un tel exercice implique des compétences pointues en finance, entrepreneuriat et innovation, ainsi que la compréhension des techniques d'économétrie financière. En fonction de l'ensemble de ces contraintes et dans le respect de la législation relative aux marchés publics, l'IWEPS a demandé au Professeur Sophie Manigart de la Vlerick Business School et à son équipe de conduire l'étude. De septembre à décembre 2013, les travaux, de la définition des axes de recherche à la formulation des recommandations, se sont déroulés en collaboration avec l'IWEPS.

C. Une démarche particulière

L'étude réalisée dans le cadre de *l'évaluation thématique n°4 relative au financement des jeunes entreprises innovantes* du PM2.V n'est pas une évaluation à proprement parler : elle ne se focalise pas directement sur la politique wallonne mise en œuvre. Toutefois, comme une évaluation, l'étude ambitionne de mettre à disposition des autorités régionales des recommandations susceptibles d'inspirer ou d'orienter les futures décisions de

[7] Voir SPW – DGO6 – Département de la Compétitivité et de l'Innovation (2012), Rapport annuel de l'envoyé PME wallon – Analyse de la mise en œuvre des recommandations du *Small Business Act* en Wallonie, 88p.

politique publique, que ce soit dans le cadre du Plan Marshall 2022 ou d'initiatives régionales de déclinaison du *Small Business Act*, par exemple.

Le texte qui suit constitue la revue de la littérature, telle que réalisée par l'équipe de la Vlerick Business School.

Executive Summary

This report provides an in-depth review of the recent academic and policy-oriented literature on the financing of innovative ventures, and more specifically on the potential role governments could play in stimulating access to finance. A special emphasis is put upon risk capital, as this is especially appropriate for innovative ventures. These ventures are typically confronted with negative cash flows, investments in intangible assets and a lack of tangible assets, which makes (bank) debt not accessible to them. Policy recommendations are made in five domains: institutional measures, stimulation of the demand for risk capital, stimulation of the private supply of risk capital (including business angel financing and crowd funding), the government as direct investor in risk capital, and more specifically the role of the government in facilitating access to finance of entrepreneurial companies active in the green industry.

A. Institutional measures

A country's institutional environment, including its legal environment, macro-economic policies and prevailing culture, strongly impacts both the demand for and the supply of risk capital. Most prominent are the following.

Stringent personal bankruptcy laws may deter entrepreneurs from raising external funding, either equity or debt. The availability of bankruptcy discharge for honest entrepreneurs should not be altered. However, the time elapsed from the bankruptcy event to the availability of discharge could be reduced considerably and more generous bankruptcy exemptions to failed entrepreneurs could be granted. A more debtor friendly corporate bankruptcy law which favours entrepreneurs at the expense of creditors in case of bankruptcy also stimulates the demand for external funding.

Current capital gains tax exemption makes equity investing attractive for entrepreneurs and external investors such as business angels and venture capital investors. This should hence not be altered. In contrast, corporate income and marginal income tax rates should be lowered to increase entrepreneurial activity and investors' return potential.

A flexible labour market organization allows entrepreneurial ventures to dynamically hire and fire employees, reducing their risk in hiring employees and making their ventures more attractive for external risk capital investors. The Belgian labour market is too rigid. For example, a shift from employment protection to labour market expenditures as the mechanism for providing worker insurance, as in the Danish flexicurity model, would increase the availability of risk capital.

An increase in public R&D spending leads to technology spill overs, spurring more entrepreneurial activity, and hence attracts more risk capital. Investing in R&D is warranted to further develop the risk capital market.

B. Stimulation of the demand for risk capital

In order to have a healthy financial market, both supply and demand issues should be addressed. The demand side, i.e. the entrepreneurs, seems to be deficient. Most entrepreneurs have a low financial literacy, lacking a basic knowledge of finance and different sources of finance, which, in turn, hampers their search for funding. This lack of knowledge cannot be fully compensated by relying on external advisors, such as accountants or lawyers. Hence, we strongly plead to increase the financial literacy of individuals in general, for example by making it a compulsory topic for all secondary school students.

More specifically, (aspiring) entrepreneurs would benefit from specific training and coaching on the different sources of financing and the functioning of risk capital, but also from "investor readiness" programmes once they have identified risk capital as an appropriate source of funding for their ventures. This entails specialist advice on how to structure business plans, how to present themselves to potential investors, which choices to make, etc., so as to maximize their chances to secure external equity finance.

Finally, accountants are the main advisors of entrepreneurs with respect to financing policies. Nevertheless, they also often lack specific knowledge about risk capital. A stronger emphasis on risk capital in the bachelor education of accountants and in their continued education is warranted. A stronger education of bankers and lawyers, other advisors to entrepreneurs on financial matters, is also warranted.

Focusing on entrepreneurial companies, governments could decrease hurdles for procurement contracts, which disproportionally hamper access of entrepreneurial ventures. Too many hurdles, such as the requirement to provide financial accounts over a number of years, to report profits or to have a minimum equity base, prohibit access for entrepreneurial ventures. Further, the requirement for an up-front deposit, together with often late payment by governments, puts a strong strain on the ventures' cash flows. This makes this important market often inaccessible for new ventures, further limiting their growth potential.

C. Stimulation of the private supply of risk capital

Risk capital for innovative ventures is typically provided by (i) the entrepreneur's own funds, family and friends, (ii) business angels, (iii) formal venture capital investors and, recently, (iv) crowd funding. The current Belgian capital gains taxation stimulates risk capital investments in entrepreneurial ventures, as capital gains are, under certain conditions, tax exempt. Should this come under pressure, then this would have a detrimental effect on the supply of risk capital, as all categories of risk capital providers would be negatively affected.

The supply of funds by family and friends could be stimulated with greater financial literacy (in the long term) and with tax policies (in the short term). For example, in Flanders, family and friends get a tax relief when providing a subordinated loan to a start-up company under certain conditions since 2006 (the so-called "win-winlening"). Up to now, some 3000 companies received together some € 100 million under this scheme.

Next, crowd funding in Belgium is hampered by a lack of a comprehensive legal framework. For example, specific rules could be developed for the requirement to prepare a prospectus. Currently, entrepreneurs have to prepare a prospectus when they expect to raise more than € 100.000 equity financing; in Italy and the U.K., this threshold has been raised to € 5 million for crowd funding initiatives (which is the maximum possible under European law).

Business angel financing could be stimulated by providing specific education for business angels. Currently, many wealthy private individuals (often former entrepreneurs) would like to invest in entrepreneurial companies, but lack the knowledge on the investment process and the skills needed to become an investor. Education would help to turn "virgin angels" into active investors.

Next, potential business angels still lack role models. Actively promoting success stories as well as failures of business angel investments could increase the visibility and legitimacy of this activity. It is hereby important to portray "average" business angels, and not "super heroes".

Finally, business angel networks bring together entrepreneurs searching for risk capital and private individuals interested in investing in entrepreneurial ventures. In many European regions, governments subsidise business angel networks to enable them to provide high quality services to entrepreneurs and investors, and to increase the probability of funding for entrepreneurial ventures.

The early stage venture capital industry in Europe is suffering from decades of low returns that do not compensate private investors for the risks they take. Two major factors explain the low returns: (i) the lack of attractive exit markets, such as Nasdaq, where venture capital investors might sell their shares at high valuations and (ii) the inherently lower growth of European ventures compared to U.S. ventures, driven by a European market that is still fragmented through legal, cultural and language barriers. This hampers European ventures' possibility to grow as fast and as large as their U.S. competitors. As a result, governments at all levels, including the European, federal and regional levels, are striving to stimulate the private venture capital

market. At the European level, the European Commission strives for greater transparency of venture capital funds. The stimulation of attractive exit markets should also be addressed at the European level. At the regional levels, many public investment schemes exist. These will be separately addressed hereafter.

D. The government as direct investor in risk capital

Given the low levels of early stage venture capital in Europe - driven by low returns for private investors - and given the overall positive impact of venture capital on the development of innovative ventures, governments have since long played an active role in this market through direct investments. Recent academic evidence suggests that public venture capital funds should limit their activities to these segments of the market where there is a real failure, namely the early stage segment focusing upon very young ventures. If public venture capital funds extend their activities to segments where there is less need for government intervention, such as the later stage venture capital market, then public venture capital funds tend to crowd out private investors.

Further, when public venture capital funds invest as sole investor in a venture, the empirical literature consistently shows a negative impact on the investee company, leading to lower growth and lower job creation. Nevertheless, when public venture capital funds co-invest with private venture capital investors, then these partnerships result in significant positive effects at both the portfolio firm and market level. This evidence shows that public venture capital funds can play a positive role, when limited to (i) early stage investments and (ii) co-investments with private investors. Importantly, to be successful the decision authority on investments should be transferred to the private partner.

E. The role of the government in facilitating access to finance of entrepreneurial companies active in the green industry

The general recommendations for stimulating the market of financing for innovative ventures, as outlined above, can be applied to the green industry. Nevertheless, the green industry has some specific characteristics that should be addressed by the appropriate policy measures. First, green investments benefit both private parties and the society as a whole. This might lead to underinvestment by private investors, as they do not capture the societal benefits but only the private benefits. This alone further warrants government subsidies for basic green R&D. This technology-push policy measure will further enhance the supply of risk capital to that industry.

Second, some investments required by the green industry, such as investments in demonstration plants, are characterised by a high technological risk and a high capital intensity. These characteristics make this type of investments unattractive for private investors, leading to underinvestments. Governments hence have a role in directly investing in this type of investments to bridge the “valley of death”.

Third, few business angels or venture capital investors are currently actively considering to invest in the green technology sector. This is driven by several causes:

- The long technology lead times increase the business and technology risk of green ventures;
- There is a high risk that the markets will not adopt the new technologies or will grow very slowly, given the reluctance of incumbents towards adopting innovative solutions in general and given the limited private benefits to end consumers;
- There is no entrepreneurial eco-system (yet), with experienced entrepreneurs, business angels and venture capital investors. This creates a lack of qualified entrepreneurs and investors;
- There is an important exit risk. It is unclear whether active M&A markets for green ventures will develop, as incumbents are reluctant to acquire innovative ventures (in contrast to, for example, pharmaceutical companies who adopt open innovation strategies). Further, there are few examples of successful IPOs of green ventures.

Governments may play a role in developing the markets for green products with market pull initiatives, such as feed in tariffs. This will expand the market for green products and thereby make green investments more appealing to risk capital investors. Most importantly, however, is that governments adopt a stable and consistent green (energy) policy, so that investors do not face a regulatory risk on top of the already high technology and market risks.

F. Subordinated debt

The academic literature focuses on equity financing as the major instrument to finance innovative ventures. We feel, however, that governments might explore stimulating the use of long-term subordinated debt. Compared to equity, subordinated debt is less risky for the investors as it is repaid before the shareholders in the case of liquidation and, probably more importantly, as there is a clear exit foreseen through the repayment of the debt. Hence, it might be easier to stimulate investors. Compared to equity, subordinated debt is also appealing for entrepreneurs, as it enables the entrepreneur to retain control and as it is cheaper than equity (but, of course, more expensive than bank debt). We therefore strongly recommend to not only focus on equity financing, but also on financing through subordinated debt.

1. Introduction

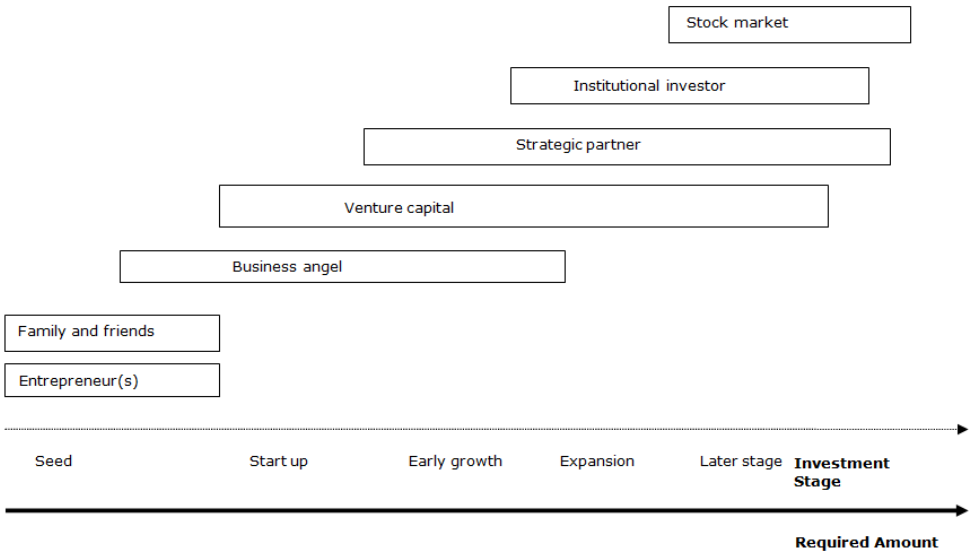
The purpose of this report is to provide a review of the academic literature, mainly in the fields of finance and entrepreneurship, on the financing issues of SMEs, and more specifically of young innovative ventures.

This report will be almost exclusively devoted to risk capital or equity capital, despite the fact that a more traditional SME is mainly financed through bank debt. Nevertheless, an innovative venture is often characterised by (i) a high level of risk and uncertainty; (ii) intangible investments in R&D and market development; (iii) a relatively high and certain need for cash in the startup phase, followed by highly uncertain revenues and a low probability of success (Vanacker, Manigart and Meuleman, 2013). The lack of early positive cash flows and of tangible assets that might serve as collateral makes that traditional financing sources, such as bank debt, are not appropriate to finance young innovative ventures. The financing of an innovative venture is therefore even more challenging compared to the financing of traditional SMEs (Vanacker and Manigart, 2010).

In order to finance these young innovative ventures, other financing modes have been developed, that are especially adapted to the specificities of this type of ventures. More specifically, business angels, venture capital and more recently crowd funding focus on these ventures. Their competencies and their financial models, including the provision of (quasi) equity or subordinated debt rather than senior debt, are a solution to the aforementioned problems associated with the financing of innovative ventures This explains the focus of this report on risk capital and equity financing.

Figure 1 depicts the typical sources of financing used by innovative ventures as they develop over time, thereby providing a financial life cycle approach. In the seed stage, when an opportunity is explored, funding is typically provided by the entrepreneurs' savings, their family and friends. Recently, crowd funding has emerged as a new alternative route to access funding. Business angels, which are wealthy individuals unrelated to the entrepreneurs, may provide external equity at start-up or in the early development phase. Only when the venture is more developed and when it requires higher amounts of funding will formal venture capital investors come into play. Venture capital investors are professional investors, raising funds from third parties and investing those funds in high growth oriented companies with the aim of realising capital gains when they exit or sell their shares after five to seven years. Strategic partners and institutional investors are only relevant when the ventures are already expanding, although especially biotechnology ventures might be able to attract the interest of strategic partners at much earlier stages. Finally, the stock market may provide funding through an Initial Public Offering, but this is only possible once the ventures have developed into more mature companies.

Figure 1: The financial life cycle of an innovative venture



Source : Adapted from Timmons et al. (1990) and Manigart et al. (1997)

Governments have an important task in creating an institutional framework that creates well-functioning financial markets. This report will therefore first explore how the institutional framework impacts either the supply of and the demand for risk capital by entrepreneurial ventures, focusing on the organization of financial and labour markets (see, for example, Manigart, Heughebaert, Devigne and Vanacker, 2011). Thereafter, the demand for risk capital will be analysed (Seghers, Vanacker and Manigart, 2012): how can entrepreneurs get a better understanding of how a financial strategy should be designed?

Next, this report will focus on the supply of risk capital: the different relevant sources of funding for innovative start-ups will be analysed, following a financial life cycle approach. First, the sources of risk capital that are most relevant for start-ups are discussed, being family and friends, crowd funding and business angel financing. Thereafter, venture capital funding, as an important source of risk capital for more developed innovative ventures, will be analysed.

Despite an institutional environment in which efficient financial markets can function optimally, market inefficiencies make that financial markets are not perfect. There is a major concern that especially the financial markets for young, innovative companies is not perfect and that hence valuable projects and companies may not find sufficient funding from private partners to develop their opportunities (Lerner, 1999; 2002; Lerner et al., 2005; Cumming et al., 2009). Therefore, governments worldwide do not only focus on optimizing the institutional context, but also intervene directly to stimulate the risk capital market. A special emphasis will therefore be put on venture capital initiatives initiated by governments, or so-called public venture capital funds. Finally, the financing specificities of ventures active in the environmental or green industries will be discussed.

A lexicon with the most important terms used in this report is provided at the end of the report.

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2. The institutional framework

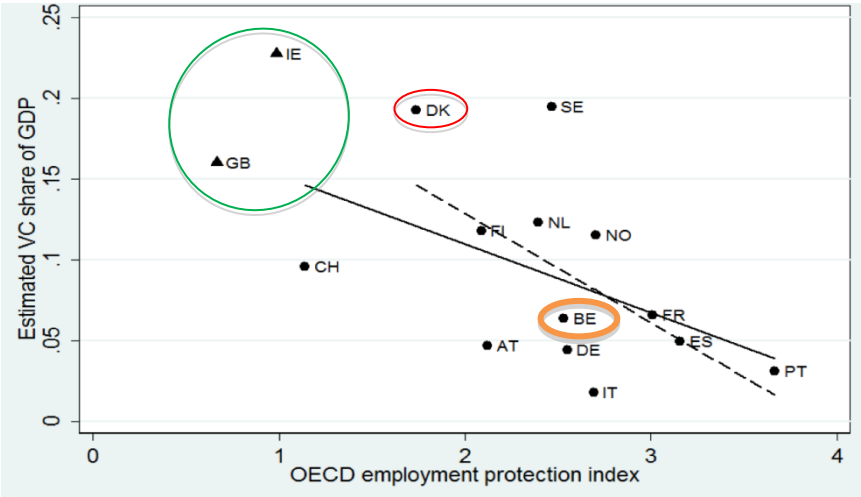
The institutional framework is important in stimulating or inhibiting both the supply of risk capital and the demand for risk capital. The supply of risk capital is impacted by framework conditions that affect the development potential of innovative ventures, such as the labour market regulation and investments in R&D. More directly, the supply of risk capital is also impacted by financial market regulations, such as investor protection regulation and the regulation concerning institutional investors such as pension funds or insurance companies. Other institutional framework conditions affect the demand of risk capital by entrepreneurs, such as personal and corporate bankruptcy laws. Finally, taxation affects both the supply of and demand for risk capital. These important dimensions of the institutional framework and their impact will be described hereafter. Each part ends with a concise overview of the most relevant academic papers in the domain. The Appendix provides an overview of important institutional parameters and how Belgium is positioned compared to other selected countries. This provides insight in which dimensions Belgium might particularly improve.

2.1. Labour market regulation

Labour market laws impact the availability of venture capital, as these impact how new ventures can grow efficiently. There is strong evidence that labour market rigidities, i.e. labour protection through hiring and firing restrictions, result in less developed venture capital markets (Jeng & Wells, 2000; Da Rin et al., 2006; Bonini & Alkan, 2011; Cumming & Li, 2013). Continental European nations generally provide greater worker insurance than Anglo-Saxon economies. Nevertheless, even Continental European countries differ substantially in whether they emphasize stronger employment protection versus greater labour market expenditures as techniques for providing worker insurance. While employment protection and labour market expenditures are substitutes for providing worker security, they have different implications for the costs firms face. Employment protection taxes the labour adjustments margins of firms; these adjustments costs deter venture capital investments. Given venture capitals' attraction to growing, volatile sectors, venture capital investors are seeking opportunities that are generally more sensitive to these taxes on labour adjustment. Figures 2 and 3 show how policy choices are correlated with venture capital investments in Continental Europe.

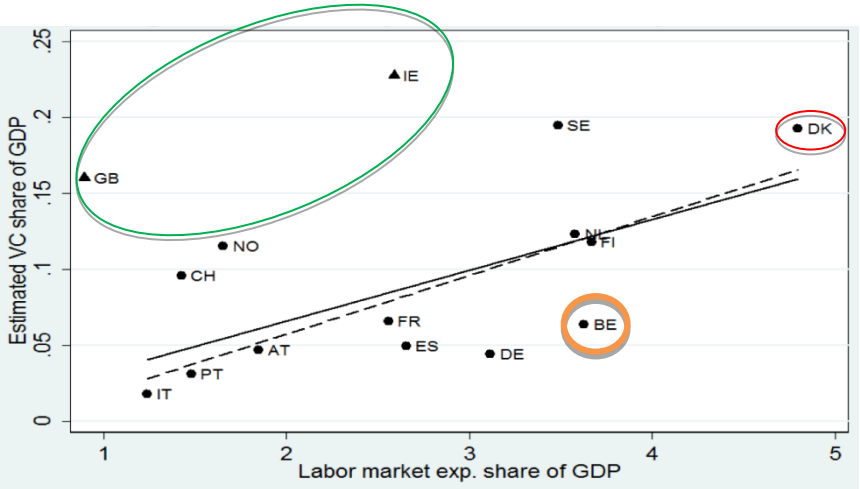
The figures show that while Belgium scores relatively high on labour market expenditures, which is positive, Belgium scores also high on labour market protection, which is negative as it hampers flexible labour adjustments by innovative ventures. A shift from employment protection to labour market expenditures as the mechanism for providing worker insurance in the economy is associated with an increase in venture capital investments (Bozkaya & Kerr, 2013).

Figure 2: Venture capital and employment protection



Source: Bozkaya & Kerr, 2013)

Figure 3: Venture capital and labour market expenditures



Source: Bozkaya & Kerr, 2013

The Danish flexicurity approach is hereby highlighted as a best practice (Bozkaya & Kerr, 2013).

The Danish flexicurity approach is a blend of a flexible labour market, generous social security and an active labour-market policy. Flexible rules for hiring and firing make it easy for the employers to dismiss employees. Unemployment security is offered in the form of a guarantee for a legally specified unemployment at a relatively high level. An active labour-market policy is an effective system to offer guidance, a job or education to all unemployed (Bozkaya & Kerr, 2013).

Table 1: Labour market regulation as a determinant of the development of venture capital markets

Author(s)	Sample	Independent variable	Level of venture capital investments
Jeng & Wells (2000)	(1986-1995) Austria, Australia, Belgium, Canada, Denmark, Finland, France, Germany, Ireland, Israel, Italy, Japan, the Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, the UK and the US	Rigidity in the market for skilled labour (average tenure of employees with some or completed tertiary education) Rigidity in the overall labour market (percent of labour force with a tenure greater than 10 years)	Labour market rigidities have a negative impact on the level of early stage venture capital investments.
Da Rin, Nicodano & Sembenelli (2006)	(1988-2001) Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, the Netherlands, Portugal, Spain, Sweden, and the UK	Flexibility of hiring and firing practices (World Competitiveness Yearbook)	A reduction in hiring and firing restrictions has a positive effect on the ratio of high tech investments to total venture capital investments
Bonini & Alkan (2011)	(1995-2002) Australia, Canada, Denmark, Finland, France, Germany, Ireland, Italy, Japan, New Zealand, Norway, Poland, Spain, Sweden, the UK and the US	Employment protection index (OECD)[8]	Increasing rigidity in labour market regulations have a negative impact on the level of early stage venture capital investments
Cumming & Li (2013)	(1995-2010) US	Labour Freedom Index (Economic Freedom of North America)[9]	Higher levels of Labour Freedom have a positive impact on venture capital investment levels
Bozkaya & Kerr (2013)	(1990-2008) Austria, Belgium, Denmark, Finland, France, Germany, Ireland, Italy, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the UK	Employment protection index (OECD)[10] Labour market expenditures [11] Mechanism Index[12] Levels Index[13]	Higher employment protection is associated with lower venture capital investment in volatile[14] sectors Higher labour market expenditures are associated with higher venture capital investment in volatile sectors Importance of the mechanisms used to provision insurance, with a shift towards more flexible policies associated with stronger venture capital development in volatile sectors Shifts in policies towards more flexible markets are associated with an increase in venture capital investment across all sectors (especially in more volatile sectors)

[8] The OECD indicators of employment protection legislation measure the procedures and costs involved in dismissing individuals or groups of workers and the procedures involved in hiring workers on fixed-term or temporary work agency contracts.

[9] Labour Freedom Index includes minimum wage legislation, government employment as percentage of total state/provincial employment and union density.

[10] The employment protection index factors in a wide variety of legislation concerning the individual and collective dismissals of both temporary and regular workers.

[11] Expenditures for active labour market programs. Unemployment insurance benefits are the majority of expenditures.

[12] The Mechanism Index of labour market insurance measures the extent to which a nation' policies favour labour market expenditures (e.g., unemployment insurance benefits) over employment protection as the mechanism for providing worker insurance in the economy.

[13] The Levels index measures the total insurance provided by these two policies.

[14] Volatility is defined as the mean absolute change in establishment employment from the previous year divided by the average employment in the current and previous years.

2.2. Public R&D spending

A second institutional framework condition is the investment by public policy in R&D. Public R&D expenditures give rise to technological spillovers, and in turn to valuable entrepreneurial opportunities (Gompers & Lerner, 1999). An increase in public R&D spending hence results in an increase in the level of venture capital investment (Da Rin et al., 2006; Bozkaya & Kerr, 2013), especially in more volatile (more risky) sectors (Bozkaya & Kerr, 2013).

While public spending on R&D amounts to 0,27% of GDP in EU20 and even 0,30% in the Euro zone in 2010, this ratio amounts to only 0,19% in Belgium (Eurostat, 2013). Belgium hence should aim for a dramatic increase in public R&D spending, which, in turn, will spur venture capital investments.

Table 2: Level of public R&D expenditures as a determinant of the development of venture capital markets

Author(s)	Sample	Independent variable	Level of venture capital investments
Da Rin, Nicodano & Sembenelli (2006)	(1988-2001) Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, the Netherlands, Portugal, Spain, Sweden, and the UK	Amount of public R&D expenditure	An increase in public R&D results in an increase in the level of venture capital investment
Bozkaya & Kerr (2013)	(1990-2008) Austria, Belgium, Denmark, Finland, France, Germany, Ireland, Italy, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the UK	Public R&D share of GDP	Public R&D expenditures are associated with higher venture capital investments, with extra tilt towards more volatile sectors

2.3. Investor protection

An important dimension for equity investors, among which venture capital and business angel investors is the level of legal protection they can expect as minority shareholders in their portfolio companies. La Porta et al. (1998) compared the level of investor protection in publicly traded companies in 49 countries, including voting rights attached to shares, protection of the shareholder voting mechanism against abuse by management, and remedial rights of minority shareholders. La Porta et al. (1998) observe that investor protection rules vary systematically by legal origin, distinguishing four major legal systems: English, French, German and Scandinavian. Common law countries, i.e. the English system, protect investors the most and tend to have the most effective enforcement of law, while French civil law countries (including Belgium) protect investors the least.

The pioneering research of La Porta et al. (1997) spurred a research stream on the influence of law on the development of public equity markets. In general, these studies find that public equity markets are more developed in countries with high levels of investor protection and legal enforcement, facilitating corporate equity financing. However, public capital markets are often not accessible for SMEs.

More recently, researchers have investigated the relationship between law and equity markets for SMEs. Leleux & Surlemont (2003) show that it is the very nature of the legal systems in terms of investor protection, more than the quality of the enforcement of these rules, that influences venture capital market size. Groh, von Liechtenstein & Lieser (2010) developed an index that specifically measures the relative attractiveness of a country for venture capital. They find that while the UK is similar to the European countries with respect to many criteria, investor protection ultimately affect its attractiveness for venture capital and makes that the UK

is associated with more developed venture capital markets. Again, they highlight that common law countries serve as best practice for developing venture capital markets (Groh et al., 2010).

Further, Djankov et al. (2008) have developed an investor protection index that focuses on the legal protection of minority shareholders against expropriation by controlling shareholders, which is more appropriate for SME equity financing. Better shareholder protection rights (measured with Djankov's index) increase European SMEs' probability of raising external equity financing and allow them to raise larger amounts of equity financing (Vanacker, Heughebaert & Manigart, 2013). Venture capital ownership strengthens this relationship.

Table 3: Level of investor protection as a determinant of the development of venture capital markets

Author(s)	Sample	Independent variable	Supply of VC	Level of venture capital investments
Leleux & Surlemont (2003)	(1990-1996) Austria, Belgium, Denmark, Finland, France, Germany, Ireland, Italy, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and UK	Legal system (La Porta et al., 1997)	Countries offering poor investor protection raise less venture capital funds per capita	
Groh, von Liechenstein & Lieser (2010)	(2000-2005) EU-25, Switzerland, Norway	Investor protection (Worldbank data)	VC's attractiveness for institutional investments is affected by a country's investor protection	
Vanacker, Heughebaert & Manigart (2013)	(1990-2008) Belgium, Finland, France, Italy, Spain and the UK	Anti-self-dealing index (Djankov et al., 2008)		The availability and use of external equity financing increases with better shareholder protections laws; venture capital ownership strengthens this relationship

2.4. Regulation of pension funds and other institutional investors

Important types of investors in the venture capital industry are pension funds, insurance companies and other institutional investors. The regulation of pension funds and other institutional investors hence has a strong impact on the supply of venture capital. Deregulation of investment activities by pension funds and other institutional investors has the potential to increase the cash available for venture capital firms to invest (Gompers & Lerner, 2004; Jeng & Wells, 2000). In addition, regulatory harmonization of institutional investors can increase the supply of venture capital (Cumming & Johan, 2007).

In Belgium, there is a pay-as-you-go public scheme for pensions, which makes that there are only very small pension funds. These institutional investors are hence largely absent and limit investments in the Belgian venture capital market. Insurance companies, on the other hand, are hampered to invest in venture capital due to the pending Solvency II regulations, which will regulate their investment strategies but which are, at present, still not finalized.

Given these difficulties, institutional investors are largely absent from investing in venture capital in Belgium. While 18% of all funds invested in European venture capital funds in 2012 came from pension funds, insurance companies and other asset managers, this was zero for Belgium in 2012 and in many years before (EVCA, 2013). Hence, these investors are largely absent from the Belgian venture capital market, decreasing the supply of risk capital dramatically.

Table 4: Regulation of pension funds and other institutional investors as a determinant of the development of venture capital markets

Author(s)	Sample	Independent variable	Dependent variable	Supply of VC
Gompers & Lerner (2004)	(1978-1994) US	ERISA clarification[15]	Commitments to independent venture capital partnerships	The easing of pension fund restrictions increased commitments to the venture capital industry
Jeng & Wells (2000)	(1986-1995) Austria, Australia, Belgium, Canada, Denmark, Finland, France, Germany, Ireland, Israel, Italy, Japan, the Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, the UK and the US	Private pension fund levels divided by GDP[16]	Private equity funds raised	Private pension fund levels have a positive and significant impact on PE funds raised
Cumming & Johan (2007)	2005 survey of Dutch institutional investors	Type of institutional investors Total assets managed by the institutional investor	Probability that an institutional investor will allocate capital to private equity in 2006-2010 Planned percentage of capital to be allocated to private equity funds in 2006-2010	Regulatory harmonization of institutional investors facilitates private equity investments[17] Larger institutional investors are more likely to invest in PE and invest a greater percentage of assets in private equity Pension funds are more likely to invest in PE than banks and insurance companies and invest a greater proportion of their assets in PE

2.5. Bankruptcy laws

Both personal and corporate bankruptcy laws have an important effect on the demand for risk capital. Personal bankruptcy law will first be analysed, followed by corporate bankruptcy law.

2.5.1. Personal bankruptcy law

Personal bankruptcy law deals with the entrepreneurs or managers as individuals after they have experienced a bankruptcy (Armour, 2004). Consequently, the treatment of individuals by personal bankruptcy law has an impact on the rate of entrepreneurial activity and demand for venture capital, and hence on the levels of venture capital investment observed across countries. Although limited liability through incorporation should shield the personal wealth of entrepreneurs from bankruptcy, and hence personal bankruptcy law might be deemed to be an unimportant determinant for the demand for risk capital, this reasoning ignores the potential financial burdens imposed on entrepreneurs prior to incorporation and the common incidence of personal guarantees of corporate debts. Thus the failure of an incorporated business may often result in the personal

[15] The clarification of the Employment Retirement Income Security Act's (ERISA) prudent man rule in 1979 allowed pension funds to invest in venture capital.

[16] Pension funds are regulated differently in countries. This individual country effect is picked up in a fixed effect regression.

[17] Regulatory harmonization can facilitate institutional investor investment in private equity in at least two ways. First, where different types of institutional investors have the same regulatory constraints, this enables different types of institutions to act as a limited partner on the same private equity fund. Second, where regulations are harmonized across countries, institutional investors from different countries are better able to act as institutional investors for the same private equity limited partnership.

bankruptcy of its founders. The treatment of individuals by bankruptcy law therefore has an ex ante impact on incentives to engage in entrepreneurship, and consequently on the demand for risk capital (Armour, 2004; Armour and Cumming, 2006). Furthermore, the treatment of individual bankrupts might also have an ex post effect. A harsh bankruptcy law may mean that entrepreneurs whose businesses fail through no fault of their own, and who often possess considerable human capital, are legally disabled from inclusion in the pool of talent in which venture capitalists seek to invest. Again this could be expected to have an impact on demand for venture capital.

Empirical research has confirmed that more stringent personal bankruptcy laws have a negative impact on self-employment and entrepreneurship (Armour & Cumming, 2008) and decrease venture capital investments (Armour & Cumming, 2006; Bozkaya & Kerr, 2013). The absence of a fresh start after bankruptcy also decreases the probability of raising external debt financing and the amount of debt raised, driven by a lower demand for debt (Vanacker, Heughebaert & Manigart, 2013). In Belgium, full discharge is available for honest bankrupt entrepreneurs (European Commission, 2011), which hence is beneficial for SME financing.

Further, bankruptcy exemptions, or the size of the personal items that bankrupt entrepreneurs can retain, vary over different countries. Most countries permit the debtor to retain only modest personal items, along with work tools and equipment. In the USA, debtors are allowed to retain an interest in their homes, although the maximum value of this “homestead exemption” varies from state to state. Generous bankruptcy exemptions may weaken the alignment between the venture capitalist and the entrepreneur. In the USA, it has been shown that the size of the homestead exemption has a negative impact of the availability of financing for SMEs, both on the availability of venture capital financing (Hasan & Wang, 2008) and of credit for small firms (Berkowitz and White, 2004). When loans are made to small firms in states with unlimited homestead exemptions, they are smaller and interest rates are higher (Berkowitz and White, 2004). Homestead exemptions hence strongly limit the supply of risk capital.

Table 5.1: Stringency of personal bankruptcy law as a determinant of the development of venture capital markets

Author(s)	Sample	Independent variable[18]	Entrepreneurship	Demand for VC	Supply of VC	Level of investments
Armour (2004)	(1997-2000) Belgium, Denmark, France, Germany, Ireland, Italy, the Netherlands, Spain, Sweden, the UK and the US	Length of time to discharge				Negative correlation between severity of personal bankruptcy law and levels of venture capital investment through lower demand for funding
Armour & Cumming (2006)	(1990-2003) Austria, Belgium, Canada, Denmark, Finland, France, Germany, Ireland, Italy, the Netherlands, Portugal, Spain, Sweden, the UK and the US	Length of time to discharge		More severe personal bankruptcy laws – in terms of a longer time to discharge – decrease the demand for venture capital		More severe personal bankruptcy laws restrain venture capital investment
Armour & Cumming (2008)	(1990-2005) Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Ireland, Italy, the Netherlands, Spain, Sweden, UK, and USA	Availability of discharge[19] Length of time to discharge Assets that are withheld from creditors (exemption)[20] Restrictions imposed on the debtor's civil and economic rights (disabilities) Level of difficulty debtors face in achieving a discharge by agreement with creditors	Higher levels of self-employment are associated with: - availability of discharge - shorter times to discharge - more generous exemptions			

[18] For an overview of the variables measuring personal bankruptcy stringency, see Appendix.

[19] The availability of a discharge from personal indebtedness for entrepreneurs after a bankruptcy, i.e. whether entrepreneurs are able or unable to obtain a fresh start after bankruptcy.

[20] Most countries permit the debtor to retain only modest personal items, along with work tools and equipment. In USA, debtors are also allowed to retain an interest in their homes, although the maximum value of this "homestead exemption" varies from state to state.

Table 5.1: (Continued)

Author(s)	Sample	Independent variable[21]	Entrepreneurship	Demand for VC	Supply of VC	Level of investments
Bozkaya & Kerr (2013)	(1990-2008) Austria, Belgium, Denmark, Finland, France, Germany, Ireland, Italy, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the UK	Availability of discharge Length of time to discharge Assets that are withheld from creditors (exemption) Restrictions imposed on the debtor's civil and economic rights (disabilities) Level of difficulty debtors face in achieving a discharge by agreement with creditors				More stringent personal bankruptcy laws reduce venture capital investments
Vanacker, Heughebaert & Manigart (2013)	(1990-2008) Belgium, Finland, France, Italy, Spain and the UK	Availability of discharge Time to discharge Minimum capital Exemption Disabilities Composition				The absence of a fresh start decreases the probability of raising external debt financing and the amount of debt raised
Hasan & Wang (2008)	(1984-2003) US	Sum of homestead exemption and personal property exemption			Negative impact of state exemptions on the availability of venture financing received by portfolio companies	

[21] For an overview of the variables measuring personal bankruptcy stringency, see Appendix.

2.5.2. Corporate bankruptcy law

Corporate bankruptcy law deals with the fate of the firms as a legal entity in relation to its stakeholders. Corporate bankruptcy law revolves around the 'creditor friendliness' or 'debtor friendliness' of bankruptcies (Lee, Peng & Barney, 2007). A corporate bankruptcy law can generate ex post barriers to exit. When these barriers are unfavourable to entrepreneurs (such as not being able to walk away from a heavy debt load) they may try, by all means, to avoid business exit. In addition, an entrepreneur-unfriendly bankruptcy law can, at the same time, create ex ante barriers to entry by discouraging entrepreneurs who are afraid of the damaging consequences of a possible bankruptcy to start their own firms. Conversely, a more entrepreneur-friendly bankruptcy law can facilitate more risk taking by encouraging the creation of more new firms; they are associated with a higher rate of new entry of firms (Lee et al., 2011).

More stringent corporate bankruptcy laws decrease the probability of raising external debt financing and the amount of debt raised (Vanacker, Heughebaert & Manigart, 2013), but not of venture capital supply (Armour, 2004).

Table 5.2: Stringency of corporate bankruptcy law as a determinant of the development of venture capital markets

Author(s)	Sample	Independent variable[22]	Entrepreneurship	Demand for VC	Supply of VC	Level of investments
Lee, Yamakawa, Peng & Barney (2011)	(1990-2008) 29 countries	The time spent on bankruptcy procedure The cost of bankruptcy procedure The opportunity to have a fresh start in liquidation bankruptcy The opportunity to have an automatic stay of assets The opportunity for managers to remain on the job after filing for bankruptcy	A higher rate of new firm entry is associated with - less time associated with bankruptcy proceedings - less costs associated with bankruptcy proceedings - higher recovery rates from bankruptcy by entrepreneurs (which would mean a fresh start) - no possibility for assets to stay			
Vanacker, Heughebaert & Manigart (2013)	(1990-2008) Belgium, Finland, France, Italy, Spain and the UK	Closing time Closing cost				The likelihood of raising debt and the amount of debt raised is positively impacted by - a shorter closing time - lower closing costs

[22] For an overview of the variables measuring personal bankruptcy stringency, see Appendix.

2.6. Taxation

Corporate taxation works on both the demand for and the supply of venture capital. Poterba (1989) and Gompers & Lerner (1999) suggest that that the effect of changes in the capital gains tax rate is likely to come through changes in the demand for venture capital. A higher capital gains tax rate has a negative impact on business creation and demand for venture capital (Poterba, 1989; Bruce & Gurley, 2005; Armour & Cumming, 2006). Nevertheless, venture capital investment activity is neither correlated with corporate tax rates nor with capital gains taxes (Groh, Liechtenstein & Lieser, 2011). This is explained as venture capital firms typically rely on tax transparent fund structures that neutralize the differentials across tax regimes. Therefore it is recommended to focus on corporate income tax rates to stimulate venture capital activity (Groh, Liechtenstein & Lieser, 2013; Bonini & Alkan, 2011).

In Belgium, there is a capital gains exemption under certain circumstances, but the corporate income tax rate is 33,99% (higher than Finland (24,5%), the Netherlands (20-25%) and Sweden (22%)) and the marginal personal income tax rate for highest incomes is 54,5% (comparable with Finland (53,75%), the Netherlands (52%) and Sweden (60%). Decreasing these tax rates may also spur risk capital investments.

Table 6: Taxation as a determinant of the development of venture capital markets

Author(s)	Sample	Independent variable	Dependent variable	Entrepreneurship	Demand for VC	Supply of VC	Level of venture capital investments
Poterba (1989)	Theoretical model			A larger difference between the personal income tax rate and the capital gains tax rate makes leaving a job and becoming an entrepreneur more attractive	A reduction in the personal capital gains tax rate could stimulate the demand of venture funds by entrepreneurs		
Gompers & Lerner (1999)	(1972-1994) US	Top marginal capital gains tax rate	Commitments to the venture capital industry			Increases in capital gains tax rates have a negative effect on contributions to the venture industry, although the effect is only significant for contributions to the entire industry	
Bruce & Gurley (2005)	(1979-1990) US	Personal income marginal tax rate Corporate income marginal tax rate Tax rate differential (personal income MTR - corporate income MTR)	Presence of one or more forms of entrepreneurial income, such as income from a sole proprietorship, partnership, or small business corporation	Increase in the probability of entry in entrepreneurial activity with - increases in marginal tax rates on wage income - decreases in marginal tax rates on corporate income			
Armour & Cumming (2006)	(1990-2003) Austria, Belgium, Canada, Denmark, Finland, France, Germany, Ireland, Italy, the Netherlands, Portugal, Spain, Sweden, the UK and the US	Capital gains tax rate	Early stage VC/GDP Expansion stage VC/GDP		Capital gains tax rates are negatively correlated with venture capital demand	Capital gains tax rates are negatively correlated with venture capital supply	Levels of capital gains taxes are negatively related to venture capital activity

Table 6: (Continued)

Author(s)	Sample	Independent variable	Dependent variable	Entrepreneurship	Demand for VC	Supply of VC	Level of venture capital investments
Bonini & Alkan (2011)	(1995-2002) Australia, Canada, Denmark, Finland, France, Germany, Ireland, Italy, Japan, New Zealand, Norway, Poland, Spain, Sweden, the UK and the US	Corporate income tax rate	Total venture capital investments Early stage venture capital investments				Corporate income tax rate has a significant negative impact on total and early stage venture capital investments
Da Rin, Nicodano & Sembenelli (2006)	(1988-2001) Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, the Netherlands, Portugal, Spain, Sweden, and the UK	Corporate capital gains tax	High-tech investments/total venture investments (high-tech ratio) Early stage investments/total venture investments (early stage ratio)				A reduction of the corporate capital gains taxation has a positive effect on the high-tech ratio and early stage ratio

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3. Stimulation of the demand for risk capital

As every market is characterized by both a supply and demand side, weaknesses on the demand side may restrain innovative ventures from raising risk capital. A first problem identified through the literature is that most individuals in general have a low financial literacy, or "expertise pertaining to how one manages one's financial affairs successfully" (Fernandes, Lynch & Netemeyer, 2013), especially in the light of the increasing complexity of the financial world. In particular, entrepreneurs often have limited knowledge of the various financing alternatives available to them (Seghers, Manigart & Vanacker, 2012). Entrepreneurs with either education or experience that is relevant for finance decisions in the entrepreneurial venture or with good relationships in the financial community have a greater knowledge of financing alternatives (Seghers et al., 2012).

Entrepreneurs' limited knowledge of financing alternatives negatively impacts their financing choices, as it limits the set of finance options that they consider (Van Auken, 2001; Vanacker, Manigart & Meuleman, 2013). This leads to suboptimal choices in the financing strategies of innovative ventures, including financing sources and types of financing used. Further, they tend to limit the number of investors they approach during their search for early finance to those investors located within their institutional context because of institutional norms (Vanacker, Manigart & Meuleman, 2013). For example, university spin-offs often only search for finance from university funds.

Entrepreneurs' deficiency in knowledge of finance further hampers them when negotiating and pricing investments and may result in being unsuccessful in raising capital, raising inappropriate levels and combinations of capital (Van Auken, 2001), or decreasing the likelihood of obtaining follow-on financing (Vanacker et al., 2013). For example, a lot of ventures looking for investment from business angels suffer from missing information in the business plan and poorly developed ideas about the business model, markets, route to market and unrealistic expectations about investor requirements, often accompanied by poor presentation skills (Mason, 2007). There is hence a strong need to help entrepreneurs to become 'investment ready' (Mason & Harrison, 2001). As a result, several countries have implemented investment readiness programmes which aim to help entrepreneurs develop their business plans and presentation skills to a level which answer the most pertinent questions from investors (Mason & Kwok, 2010; OECD, 2011).

Further, a significant knowledge gap of publicly sponsored financing alternatives is persistent (Van Auken, 2001; Seghers et al., 2012). This observation emphasizes that a clear communication of newly developed policy initiatives with the target group is needed.

While entrepreneurs lack financial literacy, intermediaries and advisors might help in overcoming this knowledge gap (Seghers et al., 2012). Especially accountants, but also bankers and lawyers, are the main advisors of entrepreneurs with respect to financing policies. Nevertheless, they may also lack specific knowledge about risk capital. A stronger emphasis on risk capital in the education of these intermediaries and in their continued education is hence warranted (Mason, 2009).

In conclusion, the findings above highlight the importance of education on financing alternatives, for individuals at large, for entrepreneurs specifically, but also for intermediaries such as accountants. Basic education in financial literacy is warranted, although the long term impact thereof might be limited as this knowledge tends to decay rapidly (Fernandes et al., 2013). Rather, specific training when needed seems more effective (Fernandes et al., 2013). Hence, 'investment readiness' programmes for entrepreneurs may be especially important (Mason & Harrison, 2001), next to specific training for accountants, lawyers and bankers (Mason, 2009). These tasks should not be the exclusive domain of specialist services such as business angel networks and business incubators, but also of business education (Mason & Harrison, 2001).

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4. Stimulating the private supply of risk capital

4.1. Introduction

Innovative ventures often follow a life cycle approach to finance their ventures. Before formal start-up, they typically rely on the funds of the entrepreneurs, or of family and friends. At start-up, they may search for business angel funding, and venture capital funding may become available when they are more developed.

The argument that small business finance is highly and disproportionately affected by macroeconomic conditions (Berger & Udell, 1998) can be illustrated by the occurrences during the recent financial crisis. Banks' willingness to provide SMEs with loan financing was exacerbated by the poor economic prospects of SMEs, stagnation in inter-bank lending and increased cost of capital, and the implementation of regulation requiring banks to rebalance their balance sheets (OECD, 2009). At the same time the venture capital industry, facing a reduction in exit opportunities as a result of a worsened economic climate, was suffering from a serious decline in funds raised (EVCA, 2013). Interestingly, business angel financing seems to suffer less from cyclicality (Mason & Harrison, 2013). Further, during the financial crisis crowd funding has emerged as novel way for entrepreneurial ventures to secure funds without having to seek out venture capital or other traditional sources of venture investment (Schwienbacher & Larralde, 2010). This type of funding is also especially relevant for the seed or start-up phase. The behavior of various types of investors during the recent financial and economic crisis highlights that having a healthy mix of different sources of risk financing is important.

We will discuss how public policy may stimulate the private supply of risk capital, following a financial life cycle approach. We start with crowd funding, thereafter business angel financing will be discussed and finally, venture capital funding will be addressed. It is important to note, however, that direct government investments in the venture capital industry will be discussed in a separate chapter.

4.2. Crowd funding

Crowd funding refers to the efforts by entrepreneurial individuals and groups to fund their ventures by drawing on relatively small contributions from a relatively large number of individuals using an Internet-based platform, without standard financial intermediaries (Mollick, 2013). As such, crowd funding is a highly democratic tool that creates opportunities to turn larger groups of people, who otherwise would not have access to traditional channels of finance, into small-scale entrepreneurs. Crowd funding developed primarily in the arts and creativity-based industries (e.g., recorded music, film, video games) (Agrawal et al., 2013). Nowadays, crowd funding is used as a financing source for projects and ventures in various industries (Schwienbacher & Larralde, 2010).

The funding process on most crowd funding platforms is similar. It begins with a fundraiser initiating a request for funding, typically by indicating what the target amount of funding is, what the money is needed for, and what, if anything, is offered in exchange. Potential investors can browse the offers, and, if interested, invest a small amount toward the target amount. The crowd funding website provides the technical platform for the exchange of funds, voting rights, and so on.

4.2.1. Crowd funding types

The literature identifies four main types of crowd funding, where the principle distinction among each type of model is based on what investors receive in return for their contributions, if anything (Agrawal et al., 2011, 2013; Ahlers, Cumming, Günther & Schweizer, 2012; Mollick, 2013):

- In donation-based crowd funding, funders donate to causes they want to support, with no expectation of monetary or other material compensation. This can also be considered a philanthropic or sponsorship-based incentive;
- Reward-based crowd funding offers funders a non-financial benefit in exchange for their investment;
- In lending crowd funding, funders receive fixed period income and expect repayment of the principal amount invested;
- In equity crowd funding, investors receive some form of equity or equity-like arrangements (e.g., profit sharing) in the venture they support.

While donation and reward based approaches are targeting smaller campaigns, they are also focused more on societal, health and environmental issues as well as on education, community and religion (De Buysere et al., 2012). Reward based approaches are used frequently for product finance or creative projects, especially within film and music, but also for technology products. Lending and debt based approaches are usually peer-to-peer platforms, where individuals can lend each other money for specific purposes at better lending rates than banks offer. Equity based approaches are still rare. They focus on start-up companies or small and medium sized companies, where equity stakes in the tens of thousands of euros makes economic sense. This is especially true for software and Internet-related businesses, but also in computer and telecommunications related areas, in consumer products, media and the environment (De Buysere et al., 2012).

4.2.2. The legal environment of crowd funding

Donation and reward-based crowd funding models usually fall well outside the definition of financial services, financial or investment instruments and the Prospectuses Act. They therefore fall outside the most restrictive aspects of Belgian financial regulation, provided due attention is paid to the collection of public savings issue (European Crowdfunding Network, 2013).

Although the share of equity crowd funding in total crowd funding is still relatively small, this crowd funding type registers the highest growth (Crowdsourcing.org, 2012). This explains why equity crowd funding has recently attracted attention of policy makers worldwide. First, the equity crowd funding market is substantially influenced by the legislative environment of its country. Because it involves the sale of a security and is thus subject to various regulatory issues, equity crowd funding has been restricted until now in many countries, such as the USA. However, on April 5, 2012 President Obama signed the JOBS Act, legalizing crowd funding for equity by relaxing restrictions concerning the sale of securities to non-accredited investors and the number of shareholders a company may have while remaining private (Stemler, 2013). With the JOBS Act waiting for implementation, Italy surpassed the USA by enacting the first dedicated equity crowd funding law in the world (Aschenbeck-Florange et al., 2013).

Legislation on equity and lending crowd funding is contained in multiple legislative instruments on the European and federal levels. An overview of the legislative instruments that are applicable to equity or lending crowd funding initiatives is given in the "Cadre réglementaire applicable aux opérations de crowd funding" (FSMA, 2012). Regulation on the offering of financial services and products is largely set at the European level. For example, the European Prospectus Directive sets the threshold above which companies issuing equity or loans through a public offering have to publish a prospectus at 5 million euros. Member states can, however, lower this threshold. Publishing a prospectus imposes significant costs on the entrepreneur; lowering the threshold hence makes this type of funding more attractive for smaller ventures. In Belgium, private placements, i.e. offerings where the global amount is less than 100.000 euros, are exempt from the obligation to publish a prospectus. This is hence the threshold that applies to crowd funding initiatives. There are several European countries that apply higher thresholds: for example, 1,5 million euros in Finland; 2,5 million euros in the Netherlands; and 5 million euros in Italy and the United Kingdom.

Up until now, a legal framework specifically tailored to equity or lending crowd funding is absent in Belgium. Crowd funding investors are still not able to obtain a direct equity participation in a venture (European Crowdfunding Network, 2013). Instead, equity crowd funding happens indirectly through specialized investment vehicles, increasing transaction costs. These investment vehicles issue hybrid securities – so-called "Notes" – indexed on the economic performance of shares issued by the entrepreneurial venture to the crowd. As such, the benefit for the individual crowd funding investors is to have the same gross return as if (s)he were a shareholder of the venture. However, the crowd is no shareholder and hence has no say in the funded venture.

In order to stimulate crowd funding, an appropriate legal framework is hence needed in Belgium, following examples in countries like Italy and the USA.

4.3. Business angels

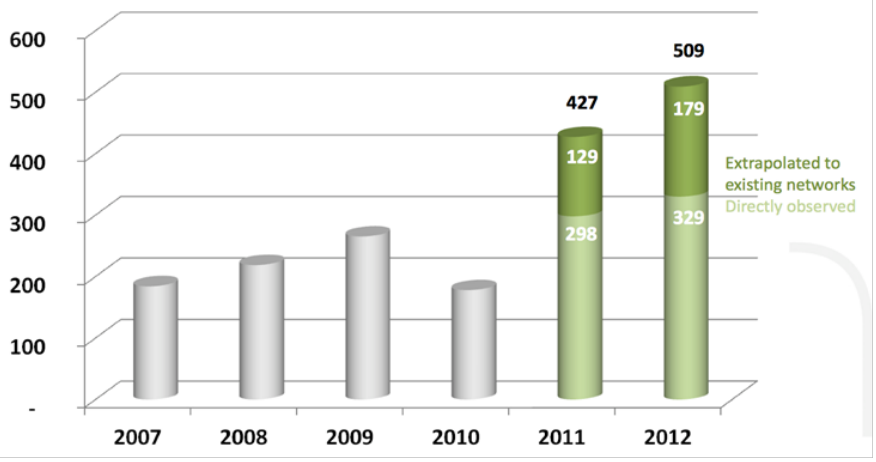
According to the Global Enterprise Monitor methodology, informal investors are all individuals who personally invested in a business start-up that was not their own, excluding stocks and mutual funds. Informal venture capital can be further divided into equity financing provided by family and friends – so-called "love" money – and other individuals who do not have a pre-existing relationship with the entrepreneur, referred to as business angels. In this section we will focus on the latter group. Consequently, business angels are high net worth individuals who invest their own money, either alone or with others, directly in unquoted businesses in which there is no family or friend connection, in the hope of achieving a significant financial return (Mason, Botelho & Harrison, 2013).

4.3.1. The importance of business angel finance

Worldwide, business angels have been shown to be the main non-family or non-friend source of equity finance for businesses at their start-up and early growth stages, investing in significantly more businesses than institutional venture capital investors (Sohl, 2012). In Europe in 2012, venture capital investors invested 1.9 billion euros in seed and start-up capital (of which 61 million euros in Belgium) in 2243 companies (of which 65 in Belgium) (EVCA, 2013). While this is more than the visible European business angel market which amounts to 0.51 billion euros, it is less than the total business angel market which is estimated at 5.1 billion euros (EBAN, 2013). At the seed and start-up stage of the market, business angels appear to be the major source of risk capital, driven by two main causes. First, institutional venture capital investors have shifted their investment focus on later stage investments, because the costs involved in investment appraisal and monitoring are fixed regardless of the size of investment. Therefore, small investments in companies in the seed or start-up stages are uneconomic for this type of investors (Mason, 2007). Second, business angels are more geographically spread than institutional venture capital investors and prefer to invest locally, which makes them able to address regional gaps in the availability of finance for early stage companies.

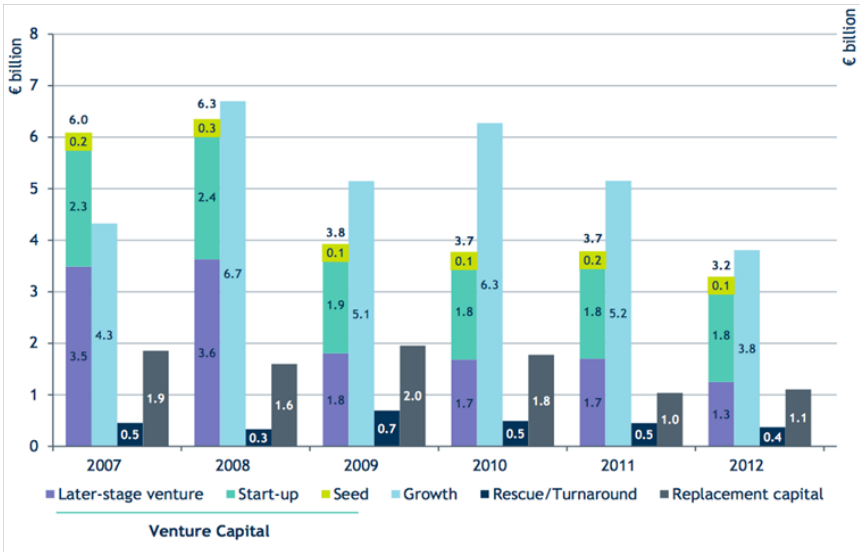
Business angels do not just provide seed and start-up companies with money. Instead they are typically 'hands on' investors who seek to contribute their experience, knowledge and contacts to the benefit of their investee business, their financial contribution. As a result, they are often called 'smart money' (Mason, 2007). Further, business angels might open doors for SMEs to second round financing by institutional venture capitalists by providing the latter with an interesting set of investment opportunities. This highlights the complementary between business angel and institutional venture capital finance (Mason, 2000). Finally, business angels tend to be less sensitive to market cycles than institutional venture capital investors (Mason & Harrison, 2013). Although the total amount invested by members of European business angel networks showed an important decrease in 2010 (see Figure 4), the business angel market has rapidly recovered with investment levels exceeding those of pre-crisis years. In contrast, venture capital investment levels in seed and start-up stages still fall short of those of pre-crisis years (see Figure 5).

Figure 4: Amount invested by members of European business angel networks (in millions of euros)



Source: EBAN, 2013

Figure 5: European venture capital investments by stage focus



Source: EVCA, 2013

The importance of business angels to SMEs in seed and start-up stages, combined with the fact that investment activity in Europe still represents only 30% of that in the United States (EBAN, 2013), provides a strong rationale for governments to support the business angel market. In the following section, we give an overview of the various policies governments might pursue to stimulate the supply of business angel financing.

4.3.2. Tax incentives

The longest established approach to stimulate the informal venture capital market has been tax incentives (Mason, 2009). Typically, under such schemes private individuals receive a tax relief for specific types of investments in specified types of businesses. This includes tax relief on investment, capital gains and losses (including write-offs and roll-overs). The aim of such schemes is to improve the risk-reward ratio and thereby increase both the supply of both angel investors and invested capital. However, tax incentives are a blunt

instrument (OECD, 2011), difficult to target, subject to potentially high deadweight, distort behavior and are at risk of being compromised by financial intermediaries as low risk tax avoidance schemes. The design of such schemes and subsequent monitoring and evaluation is therefore critical. Furthermore, tax incentives are less effective in countries that do not have capital gains tax such as Belgium. Finally, providing tax incentives for wealthy individuals is a hot political topic, particularly in today's difficult economic environment.

4.3.3. Business angel networks

The fragmented nature of the market and the invisibility of business angels arising from their strong desire for anonymity, leads to high search costs for both entrepreneurs and angels as they try, often unsuccessfully to find one another (Collewaert, Manigart & Aernoudt, 2010). This has resulted in the establishment of what has come to be known as business angel networks (BANs). The main function of these organizations – which can be thought of as being similar to 'dating agencies' – is to improve the efficiency of information flow in the market by providing a channel of communication which enables entrepreneurs seeking finance to come to the attention of business angels and at the same time enables business angels to receive information on investment opportunities without compromising their privacy (Mason & Harrison, 1996; Collewaert et al., 2010). As such, BANs stimulate the supply of finance by alleviating informational deficiencies.

In many countries, public subsidies have been provided for the creation and operation of business angel networks (BANs). It was initially assumed that BANs could become financially self-supporting by relying on a range of income sources, notably fees from investors and entrepreneurs, sponsorship and success fees from investments which occur. However, these income sources are generally insufficient to cover operating costs, even in the longer term. Hence most business angel networks have not become self-supporting and continue to depend on the public sector for their ongoing existence (Aernoudt, San José & Roure, 2007). Consequently, there is a debate whether BANs should be supported with public money (Knyphausen-Aufsess & Westphal, 2008; Christensen, 2011).

When evaluating the effectiveness of subsidies for BANs, one needs to take into account both direct and indirect effects of BANs (Collewaert et al., 2010; Christensen, 2011). The direct effect is related to the ability of BANs to alleviate information deficiencies and hereby facilitate investments, which in turn create jobs, innovation and economic growth. Positive indirect effects of BANs may include the enhancement of overall awareness for business angel financing, the education of entrepreneurs and investors or the access to other types of financing.

An assessment of the public support for Flemish business angel networks (Collewaert et al., 2010) provides support for the effectiveness of Flemish BANs in reducing information problems between business angels and entrepreneurs. Also, Flemish BANs succeeded in stimulating economic development and employee growth. Surveys with business angels and entrepreneurs highlighted the additional positive indirect effects of the government initiative.

4.3.4. Angel groups or syndicates

With fewer institutional venture capitalists investing at the seed and start-up stage, the equity gap between individual angel investment and formal venture capital has grown dramatically. The amount of money an individual business angel is able to invest is limited, while venture capital investors tend to focus on ever larger investments. Angel investors have sought to fill this gap by investing with other angel investors through groups or syndicates, increasing the total deal size for companies seeking early-stage financing. The emergence of these angel groups or syndicates – angels who invest together rather than as individuals or small ad hoc groups - has been one of the most significant structural changes in the informal venture capital market (Mason, 2007). Next to being able to fill the widening equity gap, angel groups have other characteristics that could increase the supply of financing for SMEs (Mason, Botelho & Harrison, 2013). First, like business angel

networks, angel groups are more visible and therefore easier for entrepreneurs to approach compared to individual angel investors. Second, in some cases angel groups allow high net worth individuals, who would not otherwise invest in SMEs, to invest alongside the angel group. Third, as a consequence of their greater financial resources, angel groups have the ability to provide follow-on funding. Furthermore, the broader range of business expertise that is found amongst angel syndicate members means that they are able to contribute much greater value-added to investee business than an individual business angel. In conclusion, one can argue that a recognition of the importance of angel groups justifies the need for governments to provide financial support to angel groups to offset their start-up and running costs (Mason, 2009).

4.3.5. Co-investment schemes

Co-investment schemes provide public money to match investments made by business angels on a one-to-one basis (Mason, 2009). This type of government programme has become increasingly popular in recent years, due in part to the perceived success of the Scottish Co-Investment Fund (SCF) (Harrison, 2009), which some countries have used as a model for creating co-investment schemes in their country. In Belgium, the "Fonds de Participation" has since long developed the Business Angel + loan, where this government agency co-invests a maximum of 125.000 euros as a subordinated loan in case an accredited business angel invests. This responsibility has recently been transferred to the regions. Above mentioned advantages of business angel financing warrant a further support for this measure.

A peculiarity of the SCF is that it targets angel groups, benefiting from the advantages of groups compared to single business angels. A challenge for launching co-investment funds with angel groups is that angel groups need to already exist or be created so that the co-investment fund can work with an entity of some form, with one lead investor serving as the contact point, rather than dealing with a set of individual investors themselves.

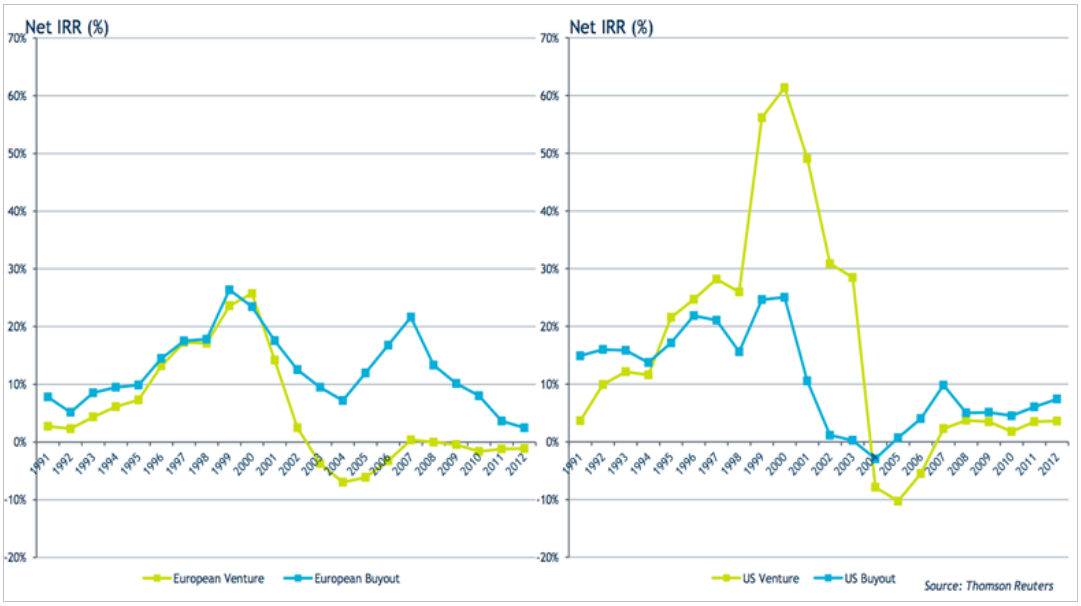
4.3.6. Business angel education

Even if individuals have funds, time and experience – the three main ingredients to become a business angel – the majority is reluctant to make an initial angel investment. Moreover, many BANs observe that many of their members, who have an initial interest in becoming an active business angel, never invest and drop out after a couple of years. In order to increase the investment activity of potential business angels, so-called “virgin angels”, specific training oriented towards virgin angels can have a significant impact (Aernoudt, 2005). Active business angels can also benefit from specialized training to improve their investment skills (San José et al., 2005). Indeed, training of (active) angel investors is an area often overlooked by policymakers (OECD, 2011). Because angel investors are typically experienced entrepreneurs and business people, it is assumed that they also know how to invest. However, investing in start-ups differs greatly from being a financial investor or building a company in a particular sector. It requires a combination of both skills sets as well as specific technical skills, such as conducting due diligence and determining company valuations. Would-be business angels do not necessarily possess these specific skills (Aernoudt, 2005).

4.4. Formal venture capital

Formal venture capital refers to investments by professional investors in young, growth oriented ventures. In Europe, independent venture capitalists largely refrain from investing in very young, small, seed-stage companies (Cumming, Fleming & Schwienbacher, 2009; Bertoni, Colombo & Quas, 2012; see also figure 5), favouring later stage private equity and buyout investments. This is partly driven by the fact that returns to early stage venture capital investments have been consistently very low in Europe. Despite the higher risk associated with investing in venture capital compared to investing in buyouts (a form of private equity), returns to venture capital investments have consistently been lower than returns to buyout investments in Europe. Figure 6 gives a comparison of VC returns in Europe and the USA.

Figure 6: Five-year rolling IRRs for European and US venture and buyout funds



Source: EVCA, 2013

Two major factors may explain the low returns of European venture capital investors compared to US venture capital investors: (i) the inherently lower growth of European ventures compared to US ventures, driven by a European market that is still fragmented through legal, cultural and language barriers. This hampers the possibility of European ventures to grow as large as their U.S. competitors. (ii) The lack of attractive exit markets, such as Nasdaq, where venture capital investors might sell their shares at high valuations. As a result, governments at all levels, including the European, federal and regional levels, are striving to stimulate the private venture capital market.

The lack of an attractive exit market is important, as venture capital and business angel investors aim to earn a return on their investment through selling their shares in an exit event. The most lucrative exit type is selling the shares in an initial public offering (IPO). The presence of a developed stock market, especially for IPOs, creates an attractive exit route and hence increases the return potential of risk capital investors, including venture capital and business angel investors. It is hence not surprising that the presence of a well-developed financial market has a positive impact on both the level of venture capital funds raised (Jeng & Wells, 2000; Groh et al., 2010) and the level of venture capital investments (Black & Gilson, 1998; Jeng & Wells, 2000; Da Rin et al., 2006).

While Euronext Brussels has developed itself as a regional hub for entrepreneurial ventures active in biotechnology, it has not attracted many innovative ventures active in other industries. Initiatives to mimic a Nasdaq-type of stock market in Europe, which is very interesting for exiting risk capital investments, has so far been unsuccessful. This calls for further initiatives at the European level to stimulate a pan-European stock market for innovative ventures. In our view, a local market for these ventures does not make sense given the limited scale that this market place could attain, limiting its attractiveness for financial analysts and investors.

It is further believed that regulation of venture capital and private equity funds might increase the supply of funding to the venture capital industry. More specifically, more disclosure would bring in more money from institutional investors into private equity (Cumming & Johan, 2007). In Europe, the Alternative Investment Fund Managers (AIFM) Directive aims at greater transparency and, as such, should enhance the availability of

venture capital. Venture capital investors, in contrast, fear that a higher transparency of venture capital may limit the demand of entrepreneurs for venture capital.

Given the importance of a venture capital market for early stage companies, and given the difficulty of realizing attractive returns for private investors in venture capital, many governments have entered the early stage venture capital market as investors. This will be thoroughly discussed in the following chapter.

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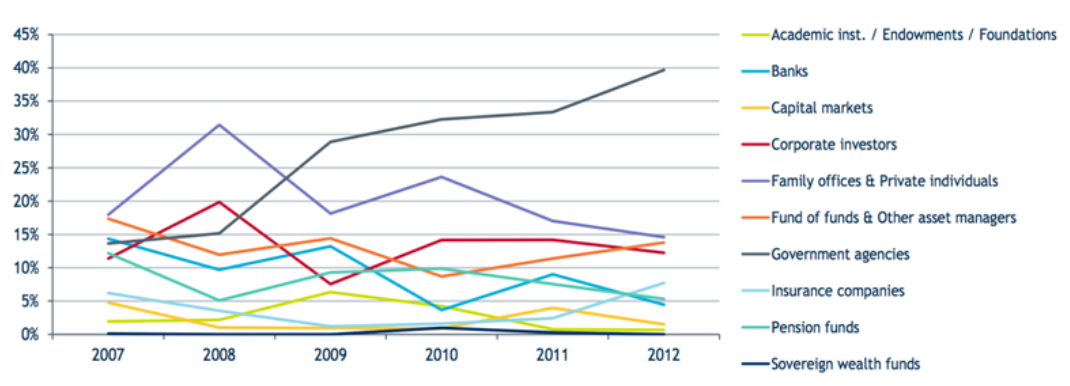
5. The government as venture capital investor

5.1. Introduction

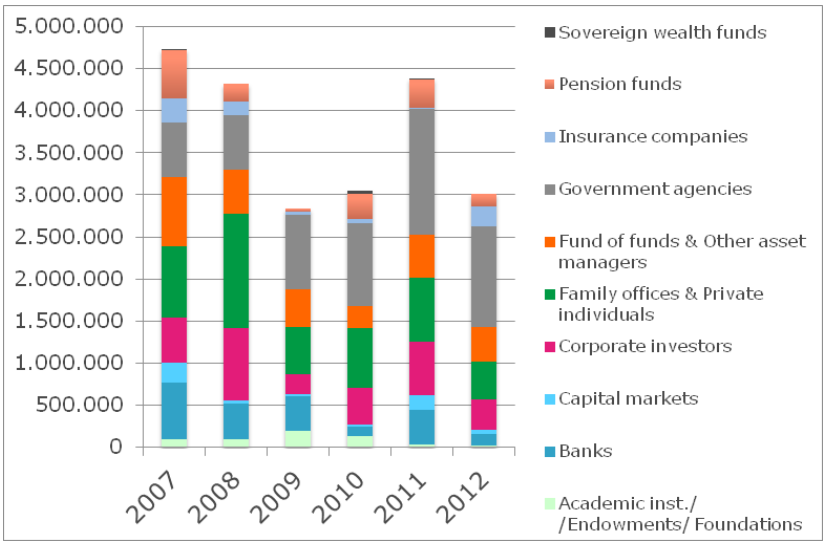
As an answer to the gap left by private venture capital investors in the seed and early stage market, most European governments have actively intervened by setting up publicly funded schemes. Such schemes can either invest directly in small and medium enterprises, or be indirectly channelled through private venture capital firms. In this latter case, indirect support occurs since the government (or other regional or local public authorities) invests as a limited partner in one or more independent venture capital funds. As a result of these government venture capital (GVC) programmes, governments have become the most important investors in terms of venture funds raised in Europe, with "venture funds" defined as investment funds targeted towards seed, start-up or other early stage investments (see Figures 7 and 8).

Figure 7: Venture funds raised by type of investor during the years 2007-2012 as % of total amount



Source: EVCA, 2013

Figure 8: Venture funds raised by type of investor during the years 2007-2012 (amounts in thousands of euro)



Source: EVCA, 2013

While government investments accounted for 10% to 15% of all venture funds raised in Europe in the pre-crisis years, this percentage has increased to 40% in 2012 (Figure 7). This dramatic increase is driven by an increase in the amount invested by government agencies on the one hand together with a decrease of other sources of funding on the other hand (Figure 8).

In the following section, the literature of direct as well as indirect government VC programmes will be analysed. Indirect government VC programmes include fund of funds, co-investment funds and syndicates of GVC and IVC. A fund of funds is an investment strategy consisting of holding a portfolio of other investment funds rather than investing directly in companies. Co-investment funds use public money to match private investments. These programmes typically work by matching public funds with those of private investors, who are approved under the co-investment scheme. The Flemish Arkimedes co-investment scheme, managed by Participatie Maatschappij Vlaanderen (PMV), is an example of a government support to the venture capital industry. Co-investment schemes are often seen not only as a way to leverage private money but also as a driver in building, growing and professionalizing the seed and early stage investment market by providing a more structured investment process. Co-investment schemes can also be an effective way to attract foreign investors (OECD, 2013).

The early literature on government VC did not distinguish between direct and indirect GVC (Leleux & Surlemont, 2003; Armour & Cumming, 2006; Da Rin et al., 2006). We hereafter assume that the government VC programmes in these studies are mainly direct investment programmes, as indirect GVC programmes became more prevalent in later years. More recent studies have distinguished between direct and indirect GVC (Cumming, Grilli & Murtinu, 2013; Brander, Egan & Hellmann, 2010; Brander, Du & Hellmann, 2013; Bertoni & Tykvová, 2012; Grilli & Murtinu, 2013). However, the type of indirect GVC scheme in these studies (fund of funds, co-investment funds or syndicates) is unfortunately never specified. This leaves room for further analysis.

5.2. Direct versus indirect government VC (GVC) investment

5.2.1. Pitfalls related to direct GVC investment and comparison with indirect GVC investments

While GVC programmes are developed to address the equity gap left unserved by private VC investors, they are prone to many challenges, including the crowding out of private VC funds, regulatory capture and inferior skills. These will be addressed consecutively.

GVC funds have different objectives compared to independent venture capital funds, including employment, regional development or stimulating environmental changes. Therefore, GVC funds may forego financial returns to reap policy objectives. This may entice them to finance projects at below-market rates. As a result, they may end up attracting the best projects, leaving only “lemons” for private VC firms to fund and making the entry of new, independent VC funds more difficult (Leleux & Surlemont, 2003). In this situation, public money is crowding out private money. In contrast, Heughebaert and Manigart (2012) argue that public VC funds target niches with low competition, not served by independent VC investors – such as seed projects – and thereby even negotiate lower valuations (and hence higher return potential) compared to independent VC investors.

Evidence on the existence of crowding out is mixed. On the one hand, the results of Armour & Cumming (2006), Cumming & MacIntosh (2006) and Da Rin et al. (2006) are consistent with a crowding out effect in Europe, the United States and Canada. On the other hand, Leleux & Surlemont (2003), Cumming (2011), del-Palacio, Zhang & Sole (2012), Cumming & Li (2013) and Brander, Du & Hellmann (2013) show that GVC has had a positive effect on the development of private VC markets in Europe and the United States.

Next, government involvement may be distorted by the desire of interest groups – or the politicians themselves – to maximize their own private benefits (Lerner, 2002). For example, some companies have demonstrated an

ability to capture a disproportionate number of SBIR awards (a US government programme), as shown by Lerner (1999). This would make GVC programmes less effective compared to independent VC investors.

Finally, there are multiple reasons to believe that GVC managers have, on average, lower screening, monitoring and value adding skills than their private counterparts, including:

- Public fund managers are often civil servants and government employees, and as such may not have the experience nor the drive necessary to select and support entrepreneurial companies (Leleux & Surlemont, 2003).
- The incentives public venture capital managers face often differ markedly from the traditional private fund arrangement, where partners share in the profits through a predefined formula (the "carry"), a performance-linked bonus. A fee-based compensation package, common in public institutions, creates different incentives than the profit-based incentives of private venture capital funds (Leleux & Surlemont, 2003). This may make that the best and most able venture capital managers are willing to run the risk of profit-based incentives available in private venture capital, so that GVCs are left with the less able venture capital managers.

5.2.2. Findings on screening, monitoring and value adding by direct and indirect GVC

Much research has been done on the effects of GVC programmes compared to independent venture capital investments. GVC investors certify their portfolio companies and hereby enhance high-tech entrepreneurial ventures' access to private VC financing by reducing the information asymmetries surrounding them, both in the USA (Lerner, 2002) and in Europe (Guerini & Quas, 2012). For example, SBIR awardees in the USA are more likely to receive venture financing (Lerner, 1999).

Especially portfolio firms backed by a mix of GVC and IVC are more likely to obtain later round IVC funding (Munari & Toschi, 2011; Brander, Du & Hellmann, 2013). Further, mixed GVC-IVC investments are better able to involve investors in syndication, which is suggestive of superior screening and selection (Cumming, 2007; Munari & Toschi, 2011). In mixed syndicates, GVC may hence benefit from the superior screening, monitoring and value adding abilities of the IVC.

Following post-investment outcomes for the portfolio companies have been empirically observed:

- The aggregate valued added of GVC-backed is comparable to that of IVC-backed firms in Europe; however, IVCs generally give more support than GVCs in professionalization and exit orientation (Luukkonen, Deschryvere & Bertoni, 2013);
- SBIR awardees in the USA experience higher sales growth compared to non-awardees (Lerner, 1999). However, GVC funds only have a positive impact on sales growth if they co-finance with private VC funds (Grilli & Murtinu, 2013);
- SBIR awardees in the USA experience higher employment growth (Lerner, 1999);
- The portfolio firms of Belgian GVC (Sowalfin, SRIB & LRM) have a lower efficiency compared to portfolio firms of IVC in Belgium (Alperovych, Hübner & Lobet, 2011);
- Companies backed by GVC only have a lower propensity to patent than IVC-backed companies (Brander, Egan & Hellmann, 2010) and do not increase their patent stock more than non-VC-backed companies active in biotech and pharma (Bertoni & Tykvová, 2012). However, privately-led syndicates of IVC and GVC investors are the most beneficial form of VC for promoting innovation, leading to higher patent levels (Bertoni & Tykvová, 2012).

Fund return and exit

- Canadian and European companies backed by GVC only have a lower likelihood to reach a positive exit (IPO or trade sale) than IVC-backed companies (Brander et al., 2010; Cumming, Grilli & Murtinu, 2013). However, companies backed by mixed GVC-IVC syndicates have a higher likelihood of a positive exit than those backed by a IVC or GVC alone (Cumming et al., 2013; Brander et al., 2013);
- The returns of the Canadian LSVCC GVC programme have been extremely poor, greatly lagging not only a benchmark of US private funds returns, but also pertinent Canadian stock indices and even short-term treasury bills (Cumming & MacIntosh, 2006).

5.3 Summary

The literature review shows a dual picture on the efficiency and effects of GVC programmes, suggesting that programme effectiveness depends on programme design. Pure GVC investments tend not to be efficient, but if GVCs co-invest with private VCs, effects tend to be very positive. Nevertheless, there are examples of successful GVC programmes, such as the Small Business Innovation Research (SBIR) program in the USA (Lerner, 1999). SBIR awardees have significantly higher sales and employment rates than matched firms; however, the superior performance of awardees is confined to firms in regions with substantial VC activity and is especially pronounced in high-tech industries. No increase of performance was associated with multiple awards, however. This suggests that distortions of the award process have occurred. Furthermore, SBIR awards do not appear to have crowded out private investors, particularly since the funding is based on research potential. Indeed, Cumming & Li (2013) show that the SBIR programme has had a positive effect on VC investment levels.

In contrast, the Canadian Labour Sponsored VC Corporation (LSVCC) programme seems to have been less successful. The generous tax subsidies underlying the LSVCC programmes lower the LSVCCs' required rate of return, allowing LSVCCs to out-bid other types of funds, drive up deals prices and lower returns in the market. Consistent with this argument, Cumming & MacIntosh (2006) find that the introduction of the LSVCC programme has resulted in no overall increase in the pool of venture capital in Canada; in contrast, it has led to a reduction in the overall size of the venture capital pool. In addition, while many of the funds operate on a purely for-profit basis the returns generated by LSVCCs have been poor. As a result, the crowding out of private VC funds by LSVCCs appears to have weakened, rather than strengthened, the Canadian venture capital industry by effectively transferring control of the supply of venture capital to an inferior organizational form (Cumming & MacIntosh, 2006).

There is strong empirical evidence that the effects of GVC investments are more positive when GVC investors team up with IVC investors. Cumming (2007) and Cumming & Johan (2009) assess the performance of the Australian Innovation Investment Fund (IIF) and Pre-seed Fund (PSF) programmes. These programmes operate in a manner that is somewhat similar to the US SBIC programme, based on a competitive selection process for licences to operate funds partly provided by the Government. IIFS are more likely to finance seed, early stage and high-tech companies than other private funds. In addition, IIFs show superior screening and value adding provided to the investee firms compared to other private funds. PSFs have also significantly contributed to the financing of seed stage firms; however, they have been less successful than the IIF programme in stimulating high-tech investments. It should be noted that the PSF programme has diminished the incentives for IIFS to invest in seed stage ventures. This finding confirms the need for a complementary design of GVC programmes, and not similar programmes with competing objectives. Also, attention should also be paid to the selection of the venture capital managers in charge of the investment process.

Further research finds evidence on the superior performance of mixed GVC-IVC funding relative to purely GVC in terms of enterprise-level investments (Brander, Du & Hellmann, 2013), sales growth (Grilli & Murtinu, 2013), patenting (Bertoni & Tykvová, 2012) and exits (Cumming, Grilli & Murtinu, 2013; Brander et al., 2013).

Finally, when public investors wish to utilize a private venture capital fund to channel funds to an area with a perceived market failure, a structure where the public and private investors invest under identical conditions may be unattractive for the private investors (Jääskeläinen, Maula & Murray, 2013). Asymmetrically timed public and private investments, i.e. when the public investor's committed capital is fully drawn down before calls on the private investors, offer the greatest incentives for private investors to participate in syndicates of GVCs and IVCs.

Table 7: Government VC and crowding out of private VC funds

Author(s)	Sample	Independent variable	Dependent variable	Government programme	Findings
Armour & Cumming (2006)	(1990-2003) Austria, Belgium, Canada, Denmark, Finland, France, Germany, Ireland, Italy, the Netherlands, Portugal, Spain, Sweden, the UK and the US	The amount of government private equity in the country year divided by the total amount of private equity in the country year (expressed in percentages)	Investments in early stage VC/GDP Supply of early stage VC/GDP Supply of expansion stage VC/GDP		The investment of government funds does not increase the overall amount of VC investment in a particular country: rather, public funds crowd out private funds such that there is no overall change in the total amount invested
Cumming & MacIntosh (2006)	(1977-2001) Canada	Adoption of provincial LSVCC legislation Adoption of federal LSVCC legislation	Number of investments (supply/demand) Dollar value invested (supply/demand)	Labour Sponsored VC Corporation (LSVCC)	Both provincially and federally incorporated LSVCCs have crowded out other forms of VC funds, resulting in no overall increase in the pool of VC in Canada[23]; moreover, federally LSVCCs have led to a reduction in the overall size of the VC pool LSVCCs have higher agency costs than private funds and thus lower returns (many of the funds operate on a purely for-profit basis) Tax breaks to particular types of VC funds may exacerbate, not mitigate, capital gaps The crowding out of private funds by LSVCCs appears to have weakened, rather than strengthened the Canadian VC industry by effectively transferring control of the supply of VC to an inferior organizational form

[23] The reason why LSVCCs crowd out other funds is that LSVCCs are able to give investors generous tax benefits that are not available to non-LSVCC investors. As a result, the required rate of return on LSVCC capital will be lower than the comparable rate for private funds. This allows an LSVCC to pay more for a deal than a fund with taxable investors, while still meeting the LSVCC's required rate of return. This will result in LSVCCs bidding up deal prices and reducing returns to funds with taxable investors, resulting in less willingness of taxable investors to contribute funds.

Table 7: (Continued)

Da Rin, Nicodano & Sembenelli (2006)	(1988-2001) Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, the Netherlands, Portugal, Spain, Sweden, and the UK	Amount of government funds	High-tech investments/total venture investments (high-tech ratio) Early stage investments/total venture investments (early stage ratio)		An increase in the supply of government funds has no effect on the high-tech ratio and early stage ratio
Leleux & Surlemont (2003)	(1990-1996) Austria, Belgium, Denmark, Finland, France, Germany, Ireland, Italy, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and UK	Percentage of VC investments done by public VCs	Cumulative VC funds raised in each country Cumulative VC fund raised, standardized by the country's GDP Total new funds for VC investments		The hypothesis that heavy state intervention causes smaller VC industries is not supported. In other words, there is no evidence to support the hypothesis that public VCs chase-out or "crowd-out" private VCs from the industry. The relative size of the VC market causes a larger participation by public VCs into the industry (no support for the seeding hypothesis) Public sector participation in the VC industry causes larger amounts of money to be raised for VC investments overall (no support for crowding out hypothesis) Public VCs tend to be associated with later-stage deals
Cumming (2011)	(1988-2001) Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, the Netherlands, Portugal, Spain, Sweden, and the UK	Amount of government funds	Level of VC investments - high-tech - low-tech - early stage - late stage		The impact of government supply of VC has had a positive and significant impact on the levels of VC investments (no support for crowding out hypothesis)

Table 7: (Continued)

del-Palacio, Zhang & Sole (2012)	(1997-2008) Spain		Number of early-stage investments Number of high-tech investments		VCists who are recently actively investing made more early-stage and high-technology investments than these venture-capital firms who were more active before or around 2001; public intervention has positively contributed to fostering private venture-capital market in Spain
Cumming & Li (2013)	(1995-2010) US	Number of SBIR awards/Population	Establishment births VC deals/population VC dollars/population	Small Business Innovation Research (SBIR)	SBIR awards show a positive effect on entrepreneurship (through new establishment births) and VC investment levels There does not appear to be an crowding out of private investment with SBIR awards, particularly since the funding is based on research potential, and facilitates signals of quality that private sector investors can use to make more informed investment decisions
Brander, Du & Hellmann (2013)	(2000-2008) US, the UK, South Korea, China, India, Japan, France, Australia, Germany, Canada, Israel, Sweden, Spain, Finland, Brazil, Denmark, Singapore, Belgium, Ireland, the Netherlands, Italy, Hong Kong, New Zealand, Switzerland, Malaysia	Government VC Mix of government and private VC Aggregate GVC investment	Enterprise-level investment Market level investment		<u>Enterprise-level</u> Enterprises with mixed (GVC and IVC) funding receive more financing than enterprises supported only by IVCs Enterprises with pure GVC funding receive much less total investment than those with pure IVC funding The presence of GVC funding in the first round has a strong positive effect on later round IVC funding → Enterprises that receive both IVC funding and GVC funding end up with significantly more funding in total than other enterprises. This finding is consistent with the hypothesis that GVC funding adds to the total funding pool rather than just displacing private investment

Table 7: (Continued)

					Market level Markets with more GVC investment also have more IVC investment There is a positive relationship between GVC investment and the number of IVC-backed enterprises → The evidence at the market level does not support the crowding out hypothesis, but instead favours the additionality hypothesis Cross country comparisons Mixed funding has a stronger positive effect on both investment and exit in civil law regimes than in common law regimes. Correspondingly, pure GVC funding has a less negative effect in civil law regimes. GOVC[24] versus GSVC[25] Enterprises backed by GOVCs receive significantly less funding Mixed funding has a more positive effect on total investment when the GVC component is due to GSVCs than when it is due to GOVCs → Mixed GOVC-IVC funding still generates more investment than pure IVC financing, while pure GOVC funding generates less. The main difference is that mixed GOVC-IVC funding does not generate better exit performance

[24] Government-owned VCists (GOVCs) are VC funds owned outright by government entities
[25] Government-supported VCists (GSVCs) are privately owned venture funds in which a limited partner or other significant investor is a government entity.

Table 8: Screening, monitoring and value adding of direct and indirect GVC

Author(s)	Sample	Independent variable	Dependent variable	Government programme	Findings
Lerner (1999)	(1985-1995) US	SBIR Phase II Awardee	Sales growth Employment growth Probability of VC financing	Small Business Innovation Research (SBIR)	SBIR awardees have significantly higher sales and employment rates than matched firms; however, the superior performance of awardees is confined to firms in regions with substantial VC activity and is pronounced in high-tech industries. No increase of performance was associated with multiple awards. This suggests that distortions of the award process occur. SBIR awardees are more likely to receive venture financing
Guerini & Quas (2012)	(…-2010) Belgium, Finland, France, Germany, Italy, Spain and the UK	Receipt of GVC Cumulated amount invested by GVC	Hazard of receiving a first round of IVC Hazard of IVC-backed firms of receiving a second round of IVC Hazard of IVC-backed firms of achieving a IVC successful exit		Receipt of GVC increases firms' likelihood of receiving a IVC investment, even after controlling for the amount invested by GVC → GVC effectively certifies the firms they back to IVC investors IVCs are more likely to invest in a second round of financing and to achieve a successful exit if the investment was originated by the GVC certification → Support for the idea that GVC is able to screen the market correctly and that their portfolio firms may originate successful IVC investments

Table 8: (Continued)

Munari & Toschi (2011)	(1998-2007) UK	Hybrid VC fund	Seed/start-up High-tech sector Staging Syndication Foreign syndication Corporate syndication IPO/acquisition Failure		Hybrid funds are more likely to - finance seed stage companies, especially in low-tech regions - invest more in high-tech sectors, but only in low-tech regions compared to private funds The ability to involve other investors in syndication is greater for companies in high-tech regions backed by hybrid VC funds than those backed by private VC funds Hybrid VC funds tend to have a greater performance in terms of staging when they operate in high-tech regions, but not when they operate in low-tech regions
Brander, Du & Hellmann (2013)	(2000-2008) US, the UK, South Korea, China, India, Japan, France, Australia, Germany, Canada, Israel, Sweden, Spain, Finland, Brazil, Denmark, Singapore, Belgium, Ireland, the Netherlands, Italy, Hong Kong, New Zealand, Switzerland, Malaysia	Government VC Mix of government and private VC Aggregate GVC investment	Successful exit (IPO or third party acquisition)		Mixed funding is associated with a higher probability of successful exit; however, this effect is due largely to the additionality effect (more funding) associated with mixed funding The performance of pure GVC investments in terms of successful exits differs significantly across regions, with a much better relative performance in Europe than elsewhere.

Table 8: (Continued)

Cumming (2007)	(1982-2005) Australia	Innovation Investment Fund Innovation Investment Fund Affiliate	Stage of development at first investment Industry Staging Syndication Portfolio size/manager Exit outcome	Innovation Investment Fund (IIF)	IIFs established in 1997 are more likely to finance seed stage entrepreneurs, IIFs established in 2001 are more likely to finance early stage entrepreneurs, and all IIFS generally are more likely to finance seed and early stage entrepreneurs than other private funds IIFs have significantly contributed to the financing of high-tech firms Managers that operate IIFs have developed expertise in financing high-tech firms, in that their other funds are also more likely to finance high-tech firms than other types of private funds IIFs and funds affiliated with an IIF - stage more frequently - are likely to have more syndicated investors for each investee - finance fewer firms per manager compared to other types of private funds More frequent staging and syndication are consistent with the notion of better screening and value-added provided to the investee firms. Similarly, fewer portfolio firms per manager are also consistent with the notion of greater value-added advice provided to each investee. No statistically significant difference in the exit outcomes for IIFs, funds affiliated with IIFs and other types of funds (preliminary result)

Table 8: (Continued)

Luukkonen, Deschryvere & Bertoni (2013)	(1994-2004) Belgium, Finland, France, Germany, Italy, Spain and the UK	GVC/IVC	Total value-adding Strategy Technology position Market position Professionalization Financial function Quality Internationalization Exit orientation		The aggregate average value added of GVC-supported is not lower than that of IVC-supported firms However, IVC firms generally give more support than GVC firms in professionalization and exit orientation
Grilli & Murtinu (2013)	(1992-2009) Belgium, Finland, France, Germany, Italy, Spain and the UK	Public VC fund Private VC fund Co-financing	Sales growth		Private VC funds positively and significantly affect the sales growth rate of NTBFs[26], independently of the firm's age at the time of the first VC investment Public VC funds do not have any statistically significant impact on the sales growth of NTBFs Public VC funds only have a positive impact on sales growth if they co-finance with private VC funds by targeting relatively young NTBFs
Alperovych, Hübner & Lobet (2011)	(1998-2007) Belgium	Type of investor (public/private)	Operating efficiency	SRIW, Sowalfin, SRIB, LRM	Entrepreneurial firms backed by private VC investors show greater efficiency levels than their publicly-backed counterparts There is a strong, negative, and statistically significant impact of the Sowalfin and SRIB & LRM investors on the efficiency of their portfolio firms with respect to other VC-backed firms

[26] New Technology-Based Firms.

Table 8: (Continued)

Bertoni & Tykvová (2012)	(1994-2004) Belgium, Finland, France, Germany, Italy, Spain and the UK	Investor type	Increase in patent stock		GVC-backed companies do not increase their patent stock more than non-VC-backed companies Privately-led heterogeneous syndicates are the most beneficial form of VC for promoting innovation in biotech and pharmaceuticals Governmental VC should not invest alone but should syndicate with private partners. In addition, private VC investors should be allowed by their governmental partners to lead the syndicate
Brander, Egan & Hellmann (2010)	(1996-2004) Canada	Private VC Government-sponsored VC Mixed VC	Successful exit (IPO or third-party acquisition) Exit value Investment from US investors Number of Canadian patents		Enterprises that received VC only from GVC are associated with: - a lower probability of successful exit - lower exit values - a smaller likelihood to attract US investors - a lower propensity to patent than enterprises sponsored by private VCs Suggestive evidence that the poorer performance of the GVC-supported enterprises is due to treatment rather than selection

Table 8: (Continued)

Cumming, Grilli & Murtinu (2013)	(1991-2010) Belgium, Finland, France, Germany, Italy, Spain and the UK	IVC (independent VC) GVC (governmental VC) SYND (mixed IVC-GVC syndicate)	Exit type - IPO or trade sale (positive exit) - Liquidation (negative exit)		IVC-backed companies have a higher likelihood to reach a positive exit than GVC-backed ones in the European VC market Mixed IVC-GVC syndicated investments lead to a higher likelihood of a positive exit than that of IVC-backing (and GVC-backing). This positive impact of IVC-GVC syndicates is not found to be influenced by the composition of the syndicate in terms of size (number of VC investors backing the company) and institutional heterogeneity (affiliation)[27]

[27] Independent, corporate, bank-affiliated, university-sponsored, governmental VC

Table 9: Successful indirect GVC programmes in Australia

Author(s)	Sample	Independent variable	Dependent variable	Government programme	Findings
Cumming (2007)	(1982-2005) Australia	Innovation Investment Fund Innovation Investment Fund Affiliate	Stage of development at first investment Industry Staging Syndication Portfolio size/manager Exit outcome	Innovation Investment Fund (IIF)	IIFs established in 1997 are more likely to finance seed stage entrepreneurs, IIFs established in 2001 are more likely to finance early stage entrepreneurs, and all IIFS generally are more likely to finance seed and early stage entrepreneurs than other private funds IIFs have significantly contributed to the financing of high-tech firms Managers that operate IIFs have developed expertise in financing high-tech firms, in that their other funds are also more likely to finance high-tech firms than other types of private funds IIFs and funds affiliated with an IIF - stage more frequently - are likely to have more syndicated investors for each investee - finance fewer firms per manager compared to other types of private funds More frequent staging and syndication are consistent with the notion of better screening and value-added provided to the investee firms. Similarly, fewer portfolio firms per manager are also consistent with the notion of greater value-added advice provided to each investee. No statistically significant difference in the exit outcomes for IIFs, funds affiliated with IIFs and other types of funds (preliminary result)

Table 9: (Continued)

Cumming & Johan (2009)	(2002-2005) Australia	Pre-seed Fund Affiliated Pre-seed Fund[28]	Stage of development at first investment Industry Staging Syndication Portfolio size/manager Location	Pre-seed Fund (PSF)	Pre-seed Funds have significantly contributed to the financing of seed stage firms The PSF program has been less successful than the IIF program in stimulating high-tech investment in Australia PSFs - do not stage more frequently - are not more likely to have syndicated investors - finance fewer firms per manager - are less likely to invest in a firm that is not based in the same state relative to other types of funds The PSF program diminishes the incentives for IIFs to invest in seed stage ventures and hence different government programs appear to compete for deal flow The impact of government-sponsored VC funds depends not only on the design of the program but also on the selection of the VC managers carrying out investments

[28] An affiliated Pre-seed Fund is one which is part of a VC organization that has a companion fund that is a Pre-seed Fund, but the particular fund investing is not the companion Pre-seed Fund, but rather the companion fund.

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6. Risk capital for green ventures

6.1. Introduction

Policy makers around the world are recognizing the challenge of addressing climate change. More than 80% of the energy supply worldwide is generated based on either fossil fuels, which are considered to be one of the main reasons for global warming, or nuclear energy, which involves security concerns and hazardous waste issues (Wüstenhagen & Teppo, 2006). In addition, energy resources are unevenly distributed across world regions, creating significant energy security challenges. Increased investments in renewable energy technologies in combination with energy efficiency – together 'cleantech' – can help to meet future energy demand while at the same time minimizing the risks of conventional energy supply.

This chapter will focus on risk capital investments in cleantech. We refer to cleantech as any product, service, or process that delivers value using limited or zero nonrenewable resources and/or creates significantly less waste than conventional offerings (Pernick & Wilder, 2007).

One particularity of sustainable energy technologies and services is that they create both private and societal benefits. In terms of their private value, they compete directly with conventional energy sources. The societal value – avoiding emissions and reducing import dependence – is what makes them attractive for governments. Venture capital investors, unlike governments, look for investments that create private rather than societal value. In the next section, we present the challenges of financing cleantech in general. Thereafter, we focus on the risks related to cleantech from a venture capital perspective.

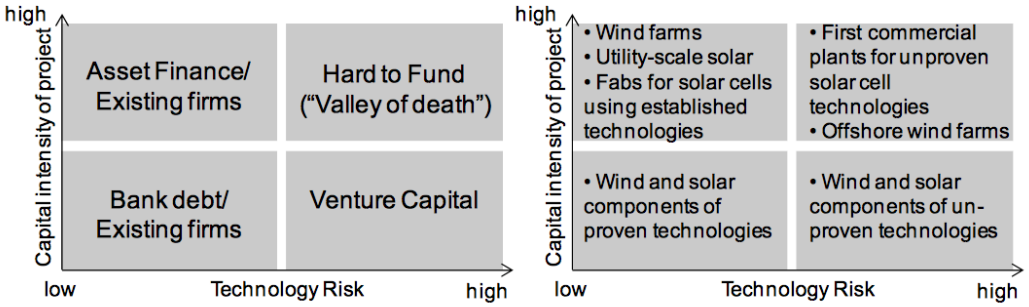
6.2. Financing of cleantech projects

Cleantech projects have different financing needs and financing sources along their development life cycle (OECD, 2011). In the first development stage – "Basic Technology Research" – new and emerging technologies are typically financed by public and private R&D funding as well as additional grants. As a cleantech project moves further downstream the development life cycle, its technology risk decreases and it may attract other financing sources.

Depending on a project's technology risk and capital intensity, different funding sources will be available (Figure 9). Projects with low technology risk and low levels of capital intensity, such as the manufacturing of wind and solar components of proven technologies, are often incremental innovations being undertaken within existing companies. Often bank funding will be available for these projects. Projects with low technology risk but high capital intensity will mainly invest in assets which makes them attractive for asset financing. Examples include firms active in wind farms or fabricants of solar cells.

Projects with high capital intensity but low technology risk include the manufacturing and deployment of more mature energy production technologies. The technology risk is minimal after the equipment has been commercially proven at scale, but yet is extremely expensive to finance. Asset based investors are willing to invest large sums of money once technologies have been tried and tested over a period of a few years.

Figure 9: Focus of venture capital investments



Source: Ghosh & Nanda, 2010

Projects with low capital intensity but high technology risk include energy production and transportation, energy-storage and energy-efficiency, or the development of wind and solar components using unproven technologies. These ventures may be able to raise venture capital for their commercialization (Ghosh & Nanda, 2010). As venture capital investors have gained extensive experience in information technology investments, ventures that focus on the intersection between information technology and renewable energy may be another sweet spot for venture capital investors (Marcus, Malen & Ellis, 2013).

Ventures in the upper-right hand box are focusing on renewable energy production technologies. As these technologies are capital intensive, these ventures are unable to attract venture capital investors. The financing needs of energy production technologies often exceed the size of a typical venture capital fund. On the other hand, these startups are still too risky for debt and project finance investors. Debt investors are able to deploy large sums of capital, but require commercial viability to have been established well before they make their investments. Consequently, for these companies a funding gap at the demonstration and commercialization stage arises; successful prototypes have been developed but it is not clear if the technology will work at scale. Consistent with the existence of a financing gap, governments worldwide grant subsidies for demonstration plants as a technology-push policy (Bürer & Wüstenhagen, 2009). This analysis suggests that government support should indeed extend beyond merely funding basic R&D.

6.3. Risks related to cleantech investments

Despite the fact that ventures developing projects with high technology risk but with low capital intensity have been identified as good candidates for venture capital financing (Ghosh and Nanda, 2010), the venture capital industry still does not invest strongly in the cleantech industry. Wüstenhagen & Teppo (2006) suggests that specific risks associated with venture capital investments in cleantech inhibit the development of a strong cleantech venture capital industry. These risks are described hereafter.

- **Technology risk** is high for renewable energy technologies due to *capital intensity* and long *technology lead times*. Venture capital investors prefer to invest in less capital-intensive sectors or at stages of the product cycle where capital requirements are lower. Any individual venture capital investment cannot be too capital intensive relative to the size of the fund. While the biotechnology sector is equally capital intensive as the cleantech industry, there is an established 'early' exit route for ventures (see below). Second, venture capital investors have a bias towards investing in projects where the commercial viability is established within a three to five year period, so that they can exit trough an acquisition or through an IPO within the life of a fund (Gompers & Lerner, 1999). Compared to the IT and software sector, renewable energy technologies have much longer development cycles.

As such, a radical reworking of venture capital fund structures and terms is required to match the specific nature of cleantech investments; venture capital investors should raise larger and longer-life funds and spend significantly longer with individual portfolio companies (Ghosh & Nanda, 2010). Of course, these changes will have an impact on the economics of the fund and the returns to individual VC investors.

- Given the *limited history* of cleantech investments, and in contrast with more mature industries such as IT or biotech, it is still unclear what will be promising customers segments and what is the best way of addressing them. This **market adoption risk** is exacerbated by the uncertain advantages of renewable energy from the consumer's point of view. Much of the value of renewable energy lies in its societal value, without generating extra private benefits for the end user.
- Recently, liberalization of the energy market has made it easier for new entrants to compete with the former monopolists. Nevertheless, the **conservatism** of incumbents in the electric utility industry is perceived as slowing down adoption of innovative technologies, further increasing market adoption risk.
- **Regulatory risk** results from government regulation of the end markets that the cleantech ventures aim to serve and from public policies to support cleantech investments, which is important given the uncertain private benefits and the more important societal benefits. Policies to promote sustainable energy innovation include technology-push and market-pull policies. Technology-push policies (such as innovation policies like government-funded research and development) increase the amount of technology "supply", while market-pull policies (such as public procurement or production tax credits (PTC)) increase "demand" for new technologies and provide firms and consumers with economic incentives to apply them (Bürer & Wüstenhagen, 2009). Although a healthy policy mix should include both technology-push and market-pull instruments, venture capital investors in Germany seem to prefer market-pull policies to technology-push policies for stimulating venture capital investments in cleantech, with feed-in tariffs being the most effective (Bürer & Wüstenhagen, 2009; Hofman & Huisman, 2012). Feed-in tariffs reduce investment risk due to fluctuating market prices, which is the weak point of trading mechanisms such as renewable portfolio standards or green certificates. Finally, policy stability and consistency is key to promoting investments in this industry.

Until recently, there seemed to be no threat to the success and the stability of feed-in tariffs. However, the financial crisis has forced the governments of several countries which apply feed-in tariffs (i.e. Germany, Greece, Spain and Italy) to cut their subsidies since the costs of these policies have become too large and government deficits have become too high. These subsidy cuts in combination with the financial crisis might have changed the preferences of investors regarding renewable energy and climate policies. Not only is the decrease in the level of feed-in tariffs detrimental for this industry from a venture capital return perspective, but the instability of government policies has dramatically increased the perception of the riskiness of investing in this industry as well.

- The limited history of cleantech leads also to **people risk**, which is an issue due to a lack of qualified venture capital and entrepreneurial energy management teams. Where will managers for cleantech ventures be recruited from? In other venture capital-backed industries, venture capital managers are often recruited from large incumbents, but the lack of innovativeness in the utility hampers this recruitment route. Managers' expertise is in running large, established firms that do not face much competitive pressure and have large cash flows, which is not consistent with entrepreneurial ventures. Another option is to recruit successful managers from startups in other industries, but cleantech startups have different business models and challenges which makes that experience less relevant.

- The opportunity to exit investments after some years is a key part of the venture capital cycle, because it allows the venture capital fund to reapply its competencies to an early stage in the life cycle of a company's development where it adds most value (Black & Gilson, 1998). The two most important exit routes for venture capital investors are IPOs and trade sales. However, exiting cleantech ventures is still challenging, resulting in a significant **exit risk**. The number of success stories in terms of renewable energy IPOs is limited so far. As for trade sales - the expected dominant exit route -, the industry's most visible companies, electric utilities, are not perceived as likely candidates for acquiring venture capital-backed entrepreneurial energy firms given their lower innovativeness than their counterparts in pharma/biotech or IT. For example, in the biotechnology industry, the venture capital model has evolved so that pharmaceutical companies step in to buy promising startups even before commercial viability has been proven. Power technology manufacturers might constitute an alternative route to exit (Wüstenhagen & Teppo, 2006).

6.4. Conclusions

The societal benefits generated by investments in cleantech, which are not captured by private market participants and investors, together with the large investments needed in some types of cleantech niches, warrant specific government programmes to promote investments in this industry.

To promote venture capital investments in cleantech, the literature suggests following public policy initiatives:

- Government subsidies for basic cleantech R&D;
- Government grants for demonstration plants to bridge the 'valley of death' associated with projects with high technology risk and high capital intensity (Bürer & Wüstenhagen, 2009);
- Feed-in tariffs to reduce the risks associated with cleantech investments (Bürer & Wüstenhagen, 2009; Hofman & Huisman, 2012);
- A strong need for energy policy stability and consistency (Bürer & Wüstenhagen, 2009; Ghosh & Nanda, 2010).

Further, radical changes in venture capital fund structures and terms are needed. More specifically, venture capital funds focusing on cleantech should be larger and longer-life funds, enabling them to spend more time with portfolio companies (Ghosh & Nanda, 2010).

Table 10: Investing in green ventures

Author(s)	Sample	Independent variable	Dependent variable	Findings
Wüstenhagen & Teppo (2006)	(2003-2004) 23 interviews with vcists			The energy industry suffers from a lack of R&D that could be an important input to the energy vc sector Europe has (more than) enough good engineers but not enough business people capable of managing growth for energy ventures Exit through trade sale is expected to be much more frequent in the renewable energy sector in Europe than in the US. In terms of possible trade sale buyers for VC-backed energy technology companies, electric utilities seem to be a natural option. However, the electric utility industry does not enjoy a reputation of being overly innovative. Utilities may not be the only, and in fact perhaps not the most likely trade sale buyers in the energy vc sector. Instead, power technology manufacturers constitute an alternative route to market.

Bürer & Wüstenhagen (2009)	(2007) survey among 60 European and North American private equity investors	Technology-push policies (basic R&D funding, market engagement programs…) Market-pull policies	Effectiveness of policy options in terms of stimulating VC firms' interest to invest in clean energy technology PE or VC investments	Feed-in tariffs are perceived to be the most effective renewable energy policy. This supports previous research suggesting that feed-in tariffs tend to be an effective way to reduce investment risk – a feature that seems to be the weak point of trading mechanisms such as renewable portfolio standards or green certificates Market-pull policies get higher scores than technology-push policies. This seems to indicate that market-pull policies seem to be at least as important as technology-push policies when it comes to promoting private investment in clean energy technologies, while governments may often be inclined to focus on technology-push policies It is not a matter of replacing one set of policies by another. Instead, those interviewed believed that a policy mix should include both technology-push and market-pull instruments The highest preference for technology-push policies is for government grants for demonstration plants. This observation gives support to "technology valley of death"[29] hypothesis that the hardest part of the innovation chain is right in the middle between laboratory and market, and that hence government support should extend beyond just funding basic R&D Most of the investors interviewed mentioned the importance of policy consistency
Hofman & Huisman (2012)	(2011) 32 of the 60 investors interviewed by Bürer & Wüstenhagen (2009)	Market-pull policies[30]	Effectiveness of policy options in terms of stimulating VC firms' interest to invest in clean energy technology PE or VC investments	Feed-in tariffs are still the most popular policy among cleantech vc and private equity investors. As opposed to that trade-based mechanisms score significantly lower. The authors assume this is explained by the uncertainty these mechanisms cause for investors because of fluctuating market prices, since in times of a financial crisis investors are more risk averse

[29] The middle phase of the innovation chain where successful prototypes have been developed but the commercializing firm is facing the tough challenge of successful market introduction. It is in this middle part between government-funded R&D and self-sustaining funding from customers where innovative technology firms struggle most.

[30] Focus on market-pull policies as the authors believe that the financial crisis might have affected primarily market-pull policies as opposed to technology-push policies.

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Appendix 1– Figures and tables

Figure A.1: Personal bankruptcy indices

Table 1. Summary Statistics for Bankruptcy Indices

This table summarizes the bankruptcy indices used in the empirical analyses in the subsequent tables for each country and each years. Sources: compiled from the bankruptcy statutes from each country, as presented in Armour and Cumming (2008).

	Discharge: Concerns discharge from prebankruptcy indebtedness available for an entrepreneur who has either been trading as a sole proprietor or guaranteed debts of a closely-held private company.		**Minimum capital** to form private company, in 2005 Euros (1/E).	**Exemptions**: This relates to prebankruptcy assets which are exempted from the bankrupt estate and so retained by the debtor. Takes value 1 if exemptions of assets from the bankruptcy estate cover only personal items, tools of trade, etc. Takes value 0 if exemptions are more generous. Takes value 2 if exemptions are 'negative', i.e. spousal property can be pulled into the estate.	**Disabilities**: This relates to restrictions on the debtor's civil and economic rights related to bankruptcy. Takes value 0 if no disabilities other than loss of power to deal with assets in bankrupt estate; Takes value 1 for civic disabilities (i.e. loss of right to vote, hold elected office, membership of professional groups); Takes value 2 for economic disabilities (i.e. restrictions on obtaining credit, being involved in the management of a company); Takes value 3 for interference with mail and/or travel (i.e. prohibition on travel without consent, mail opened by trustee); Takes value 4 if debtor may be incarcerated for non-payment of debts.	**Composition:** This relates to the possibility of agreeing a composition with creditors as a means of terminating an existing bankruptcy proceeding. The variable takes a value between 0 and 2, and is the sum of (v + c), where v is proportion of face value of existing creditors' claims and c is proportion of number of creditors, who must vote in favour to effect a compromise.
	Discharge Available? Takes value 0 if discharge available, 1 if not available.	**Discharge Years:** If discharge available, value is number of years until typical discharge; if discharge unavailable, value is life expectancy minus 40.				
Austria	1990-1994: 1; 1995-2005: 0	1990-1994: 37; 1995-2005: 7	1990-2005: €35000	1990-2005: 2	1990-2005: 0	1990-2005: 1.25
Belgium	1990-1997: 1; 1998-2005: 0	1990-1997: 37; 1998-2005: 0	1990-1998: €6174; 1999-2005: €18500	1990-2005: 1	1990-2005: 3	1990-1997: 1.25; 1998-2005: 1
Canada	1990-2005: 0	1990-1992: 1; 1993-2005: 0.75	1990-2005: €0	1990-2005: 0	1990-2005: 2	1990-2005: 1.16
Denmark	1990-2004: .5; 2005: 0	1990-2004: 5; 2005: 3	1990-1991: €10732; 1992-1996: €26831; 1997-2005: €16769	1990-2005: 1	1990-2005: 3	1990-2004: 1.4; 2005: 1.35
Finland	1990-1992: 1; 1993-2005: 0	1990-1992: 37; 1993-2005: 5	1990-2005: €2500	1990-2005: 1	1990-2005: 3	1990-2005: 0.8
France	1990-1993: 0; 1994-2005: .5	1990-2005: 0	1990-2002: €7500; 2003-2005: €0	1990-2005: 2	1990-1994: 1; 1995-2005: 2	1990-2005: 0
Germany	1990-1998: 1; 1999-2005: 0	1990-1998: 37; 19992000: 7; 2001-2005: 6	1990-2005: €25000	1990-2005: 0	1990-1998: 3; 1999-2005: 1	1990-1998: 1.25; 1999-2005: 1
Greece	1990-2005: 1	1990-2005: 20	1990-1992: €587; 1993-1998: €8804; 1999-2002: €17608; 2003-2005: €18000	1990-2005: 1	1990-1997: 4; 1998-2005: 3	1990-2005: 1.46
Ireland	1990-2005: 0	1990-2005: 12	1990-2005: €0	1990-2005: 1	1990-2005: 2	1990-2005: 1
Italy	1990-2005: 1	1990-2005: 38	1990-2003: €10300; 2004-2005: €10000	1990-1992: 2; 1993-2005: 1	1990-2005: 3	1990-2005: 1.16
Netherlands	1990-1998: 1; 1999-2005: 0	1990-1998: 38; 1999-2005: 3	1990-2005: €18000	1990-2005: 2	1990-2005: 0	1990-1994: 1.46; 1995-2005: 1
Spain	1990-2005: 1	1990-2005: 15	1990-2005: €3000	1990-2005: 1	1990-2005: 3	1990-2003: 1.1; 2004-2005: 0.5
Sweden	1990-2005: 1	1990-2005: 10	1990-2005: €10749	1990-2005: 1	1990-2005: 2	1990-2005: 2
UK	1990-2005: 0	1990-2003: 3; 2004-2005: 1	1990-2005: €0	1990-2005: 1	1990-2005: 2	1990-2005: 1
USA	1990-2005: 0	1990-2005: 0	1990-2005: €0	1990-2005: 0	1990-2005: 1	1990-2005: 1

Source: Cumming, 2011

Figure A.2: Discharge availability for honest entrepreneurs

ISSUES RELATED TO HONEST AND DISHONEST BANKRUPTCY			
COUNTRIES	Separate liquidation proceedings exist for liquidation firms when frauds have been committed	Special "fast track" liquidation proceedings exist in the case of an honest bankruptcy	Special discharge proceedings exist for honest bankrupt entrepreneurs*
Austria	2	2	3
Belgium	1	1	1
Bulgaria	2	2	3
Croatia	2	2	2
Cyprus	3	2	3
Czech Republic	2	2	2
Denmark	2	2	4
Estonia	1	3	3
Finland	2	1	2
France	1	1	1
Germany	2	2	1
Greece	2	2	3
Hungary	1	2	1
Iceland	2	2	3
Ireland	2	2	3
Italy	2	2	1
Latvia	2	2	3
Lithuania	1	1	3
Luxembourg	2	1	1
Malta	2	2	1
Montenegro	2	2	3
Netherlands	1	3	4
Norway	1	2	4
Poland	2	2	3
Portugal	2	2	2
Romania	2	1	1
Serbia	2	2	4
Slovakia	2	2	3
Slovenia	1	2	3
Spain	1	1	3
Sweden	2	2	3
Turkey	2	1	2
United Kingdom	1	2	3

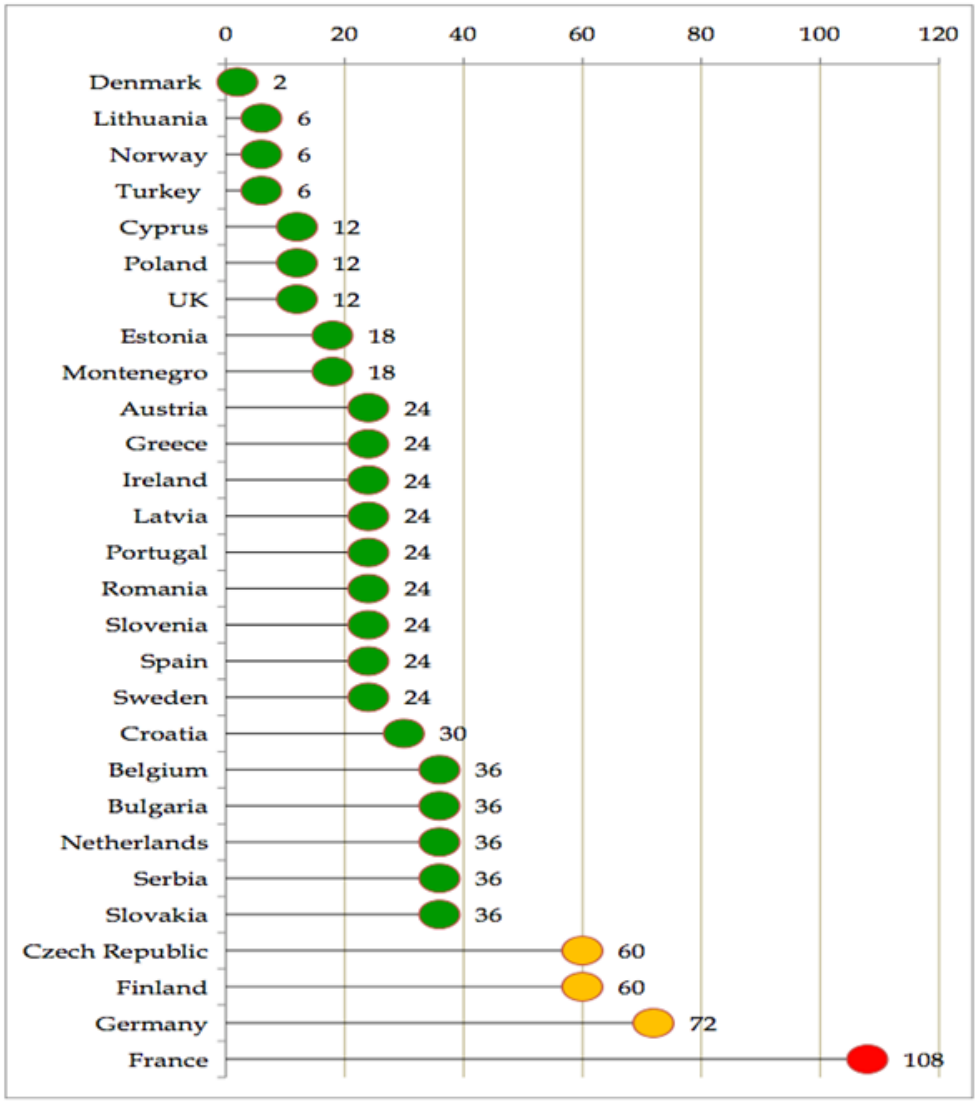
Legend	
1	Yes
2	No
3	Uncertain / Not Available

Legend*	
1	Yes. Full discharge (all debts)
2	Yes. Partial discharge
3	No
4	Uncertain / Not Available

Source: Business Dynamics Survey 2010
Note: Data is based solely on the views and perceptions of the survey's respondents

Source: European Commission, 2011

Figure A.3: Maximum time typically elapsed from the finalization of the liquidation proceedings to a discharge of the bankruptee (in months)



Source: Business Dynamics Survey 2010
Note: Data is based solely on the views and perceptions of the survey's respondents. No data available for Hungary, Iceland, Italy, Luxembourg and Malta.

Source: European Commission, 2011

Table A.1: Corporate bankruptcy law: closing time. Closing time refers to the average time (in years) to complete a bankruptcy procedure within a country. The data are obtained from the World Bank (Djankov et al., 2008).

Rank	Country	Time (years) spent on bankruptcy
1	Ireland	0,4
2	Japan	0,6
3	Canada	0,8
3	Singapore	0,8
4	**Belgium**	**0,9**
4	Finland	0,9
4	Norway	0,9
5	Australia	1,0
5	Spain	1,0
5	United Kingdom	1,0
6	Austria	1,1
6	Hong Kong	1,1
6	Netherlands	1,1
7	Germany	1,2
8	Italy	1,3
8	New Zealand	1,3
9	South Korea	1,5
9	United States	1,5
10	France	1,9
11	Greece	2,0
11	Portugal	2,0
11	Sweden	2,0
12	Thailand	2,7
13	Argentina	2,8
14	Switzerland	3,0
15	Peru	3,1
16	Denmark	3,2
17	Turkey	3,3
18	Chile	5,5

Table A.2: Corporate bankruptcy law: closing cost. Closing cost represents the cost of the bankruptcy proceedings (% of estate). Data are provided by the World Bank to measure the cost associated with bankruptcy filings (Djankov et al., 2008).

Rank	Country	Cost (% of estate) of bankruptcy
1	Norway	1,0
1	Singapore	1,0
2	Germany	2,2
3	**Belgium**	**4,0**
3	Canada	4,0
3	Denmark	4,0
3	Finland	4,0
3	Japan	4,0
3	Netherlands	4,0
3	New Zealand	4,0
3	South Korea	4,0
3	Switzerland	4,0
4	United Kingdom	6,0
5	Peru	7,0
5	United States	7,0
6	Australia	8,0
7	France	9,0
7	Greece	9,0
7	Hong Kong	9,0
7	Ireland	9,0
7	Portugal	9,0
7	Sweden	9,0
8	Argentina	14,6
9	Spain	15,0
9	Turkey	15,0
10	Chile	17,5
11	Austria	18,0
12	Italy	18,7
13	Thailand	36,0

Table A.3: Corporate bankruptcy law: opportunity to have a fresh start. Lee et al. (2011) use the rate of recovery from a closing to measure the degree of an entrepreneur's fresh start as specified by the bankruptcy laws. Consequently, fresh start is calculated as one dollar (100 cents) minus the rate of recover as cents per dollar by others such as credits, tax authorities, and employees. Data are obtained from the World Bank.

Rank	Country	Fresh start (recovery rate: cents/$)
1	Turkey	88,3
2	Chile	79,8
3	Argentina	75,9
4	Peru	69,8
5	Thailand	59,4
6	France	53,9
7	Switzerland	53,5
8	Greece	53,3
9	Italy	52,4
10	Germany	44,2
11	Denmark	35,0
12	Sweden	28,3
13	Austria	26,9
14	Portugal	26,6
15	Spain	22,6
16	New Zealand	21,2
17	United States	20,1
18	Australia	19,9 26,9
19	Hong Kong	19,1
20	South Korea	18,9
21	United Kingdom	14,7
22	**Belgium**	**13,9**
23	Netherlands	12,5
24	Ireland	12,3
25	Finland	11,6
26	Canada	10,4
27	Singapore	8,7
28	Japan	7,4
29	Norway	6,5

Table A.4: Corporate bankruptcy law: automatic stay of assets. The dummy variable in this table is created in La Porta et al. (1998) and shows whether or not the reorganization procedure imposes an automatic stay on the assets, thereby preventing secured creditors from getting possession of loan collateral.

Country	Automatic stay of assets (1: stay: 0: no stay)
Argentina	1
Australia	1
Austria	0
Belgium	**0**
Canada	1
Chile	1
Denmark	0
Finland	1
France	1
Germany	0
Greece	1
Hong Kong	0
Ireland	1
Italy	1
Japan	1
Netherlands	1
New Zealand	0
Norway	1
Peru	1
Portugal	1
Singapore	0
South Korea	0
Spain	0
Sweden	1
Switzerland	1
Thailand	0
Turkey	1
United Kingdom	0
United States	1

Lexicon

Term	Definition	Source
Acquisition	The obtaining of control, possession or ownership of a company	EVCA
Added value	A private equity management team's exceptional experience, know-how or valuable business contacts which constitute a vital input for the growth of investee companies.	EVCA
Business Angel	A private investor who provides both finance and business expertise to an investee company.	EVCA
Business Angel Network	An organization that aims to bring together new or growing SMEs with private, informal investors (Business Angels). The main activity of a BAN is to match the capital seeking entrepreneur with the informal investor	EBAN
Business Incubators	Business incubators are programs designed to support the successful development of entrepreneurial companies through an array of business support resources and services, developed and orchestrated by incubator management and offered both in the incubator and through its network of contacts.	EuropeanCommi-ssion
Business plan	A document which describes a company's management, business concept and goals. It is a vital tool for any company seeking any type of investment funding, but is also of great value in clarifying the underlying position and realities for the management/owners themselves.	EVCA
Buyback	A corporation's repurchase of its own stock or bonds.	EVCA
Buyout	A buyout is a transaction financed by a mix of debt and equity, in which a business, a business unit or a company is acquired with the help of a financial investor from the current shareholders (the vendor).	EVCA
Capital gains	If an asset is sold at a higher price than that at which it was bought, there is a capital gain.	EVCA
Capital Intensity	Capital intensity is the term for the amount of fixed or real capital present in relation to other factors of production, especially labor. At the level of either a production process or the aggregate economy, it may be estimated by the capital/labor ratio, such as from the points along a capital/labor isoquant.	Thomson Reuters
Capital markets	A market place in which long-term capital is raised by industry and commerce, the government and local authorities. Stock exchanges are part of capital markets.	EVCA

Capital under management	This is the total amount of funds available to fund managers for future investments plus the amount of funds already invested (at cost) and not yet divested.	EVCA
Carried interest	A share of the profit accruing to an investment fund management company or individual members of the fund management team, as a compensation for the own capital invested and their risk taken. Carried interest (typically up to 20% of the profits of the fund) becomes payable once the limited partners have achieved repayment of their original investment in the fund plus a defined hurdle rate.	EVCA
Civil Law	The most widespread type of legal system in the world, applied in various forms in approximately 150 countries. Also referred to as European continental law, the civil law system is derived mainly from the Roman *Corpus Juris Civilus*. The major feature of civil law systems is that the laws are organized into systematic written codes. In civil law the sources recognized as authoritative are principally legislation – especially codifications in constitutions or statutes enacted by governments – and secondarily, custom.	CIA World Factbook
Cleantech	Any product, service, or process that delivers value using limited or zero non-renewable resources and/or creates significantly less waste than conventional offerings.	Pernick & Wilder (2007)
Collateral	Assets pledged to a lender until a loan is repaid. If the borrower does not pay back the money owed, the lender has the legal right to seize the collateral and sell it to pay off the loan.	EVCA
Common Law	A type of legal system, often synonymous with “English common law”, which is the system of England and Wales in the UK, and is also in force in approximately 80 countries formerly part of or influenced by the former British empire. The foundation of English common law is “legal precedent” – referred to as *stare decisis*, meaning “to stand by things decided”. In the English common law system, court judges are bound in their decisions in large part by the rules and other doctrines developed – and supplemented over time – by the judges of earlier English courts.	CIA World Factbook
Cost of Capital	Term used in the field of financial investment to refer to the cost of a company's funds (both debt and equity), or, from an investor's point of view "the shareholder's required return on a portfolio company's existing securities". It is used to evaluate new projects of a company as it is the minimum return that investors expect for providing capital to the company, thus setting a benchmark that a new project has to meet.	Thomson Reuters

Crowdfunding	Crowdfunding refers to the efforts by entrepreneurial individuals and groups to fund their ventures by drawing on relatively small contributions from a relatively large number of individuals using an Internet-based platform, without standard financial intermediaries	Mollick (2013)
Debt financing	Financing by selling bonds, notes or other debt instruments.	EVCA
Derivative or derivative security	A financial instrument or security whose characteristics and value depend upon the characteristics and value of an underlying instrument or asset (typically a commodity, bond, equity or currency). Examples include futures, options and mortgage-backed securities	EVCA
Due diligence	For private equity professionals, due diligence can apply either narrowly to the process of verifying the data presented in a business plan/sales memorandum, or broadly to complete the investigation and analytical process that precedes a commitment to invest. The purpose is to determine the attractiveness, risks and issues regarding a transaction with a potential investee company. Due diligence should enable fund managers to realise an effective decision process and optimise the deal terms.	EVCA
Early Stage	Seed and start-up stages of a business.	EVCA
Equity	Ownership interest in a company, represented by the shares issued to investors.	EVCA
Exit	Liquidation of holdings by a private equity fund. Among the various methods of exiting an investment are: trade sale; sale by public offering (including IPO); write-offs; repayment of preference shares/loans; sale to another venture capitalist; sale to a financial institution.	EVCA
Exit Strategy	A private equity house or venture capitalist's plan to end an investment, liquidate holdings and achieve maximum return.	EVCA
Exiting climates	The conditions which influence the viability and attractiveness of various exit strategies.	EVCA
Expansion capital	Also called development capital. Financing provided for the growth and expansion of a company, which may or may not break even or trade profitably. Capital may be used to: finance increased production capacity; market or product development; provide additional working capital.	EVCA

Feed-in Tariff	A feed-in tariff is a policy mechanism designed to accelerate investment in renewable energy technologies. It achieves this by offering long-term contracts to renewable energy producers, typically based on the cost of generation of each technology. Rather than pay an equal amount for energy, however generated, technologies such as wind power, for instance, are awarded a lower per-kWh price, while technologies such as solar PV and tidal power are offered a higher price, reflecting costs that are higher at the moment.	NREL
Follow-on investment	An additional investment in a portfolio company which has already received funding from a private equity firm.	EVCA
Fund	A private equity investment fund is a vehicle for enabling pooled investment by a number of investors in equity and equity-related securities of companies (investee companies). These are generally private companies whose shares are not quoted on any stock exchange. The fund can take the form either of a company or of an unincorporated arrangement such as a limited partnership. See limited partnership.	EVCA
Fund focus (investment stage)	The strategy of specialisation by stage of investment, sector of investment, geographical concentration. This is the opposite of a generalist fund, which does not focus on any specific geographical area, sector or stage of business.	EVCA
Fund of Fund	A fund that takes equity positions in other funds. A fund of fund that primarily invests in new funds is a Primary or Primaries fund of funds. One that focuses on investing in existing funds is referred to as a Secondary fund of funds.	EVCA
GDP	Gross domestic product is the market value of all officially recognized final goods and services produced within a country in a year, or other given period of time. GDP per capita is often considered an indicator of a country's standard of living.	IMF
General Partner	A partner in a private equity management company who has unlimited personal liability for the debts and obligations of the limited partnership and the right to participate in its management.	EVCA
Hands-on	A private equity investment in which the venture capitalist adds value by contributing capital, management advice and involvement.	EVCA
Holding Period	The length of time an investment remains in a portfolio. Can also mean the length of time an investment must be held in order to qualify for Capital Gains Tax benefits.	EVCA
Independent VC	VC in which the main source of fundraising is from third parties.	EVCA

Index	A benchmark against which financial or economic performance is measured, (eg S&P 500, FTSE 100).	EVCA
Institutional Framework	The systems of formal laws, regulations, and procedures, and informal conventions, customs, and norms, that shape socioeconomic activity and behaviour.	Bruton, Fried & Manigart (2005)
Institutional Investor	An organization such as a bank, investment company, mutual fund, insurance company, pension fund or endowment fund, which professionally invest, substantial assets in international capital markets.	EVCA
Interbank lending market	The interbank lending market is a market in which banks extend loans to one another for a specified term. Most interbank loans are for maturities of one week or less, the majority being overnight. Such loans are made at the interbank rate (also called the overnight rate if the term of the loan is overnight). Low transaction volume in this market was a major contributing factor to the financial crisis of 2007.	OECD
Initial Investment	First private equity-backed investment made in an investee company.	EVCA
IP (Intellectual property)	Patents, copyrights, trademarks, trade secrets and similar rights in ideas, concepts, etc.	EVCA
IPO	Initial Public Offering. The sale or distribution of a company's shares to the public for the first time. An IPO of the investee company's shares is one the ways in which a private equity fund can exit from an investment.	EVCA
Later Stage	Expansion, replacement capital and buyout stages of investment.	EVCA
Lead Investor	Investor who has contributed the majority share in a private equity joint venture or syndicated deal. See syndicated deal, syndication.	EVCA
Limited Liability	Limited liability is where a person's financial liability is limited to a fixed sum, most commonly the value of a person's investment in a company or partnership. If a company with limited liability is sued, then the plaintiffs are suing the company, not its owners or investors. A shareholder in a limited company is not personally liable for any of the debts of the company, other than for the value of their investment in that company.	Thomson Reuters
Limited Partner	An investor in a limited partnership (ie private equity fund).	EVCA

Limited partnership	The legal structure used by most venture and private equity funds. The partnership is usually a fixed-life investment vehicle, and consists of a general partner (the management firm, which has unlimited liability) and limited partners (the investors, who have limited liability and are not involved with the day-to-day operations). The general partner receives a management fee and a percentage of the profits. The limited partners receive income, capital gains, and tax benefits. The general partner (management firm) manages the partnership using policy laid down in a Partnership Agreement. The agreement also covers, terms, fees, structures and other items agreed between the limited partners and the general partner.	EVCA
Liquidation	The sale of the assets of a portfolio company to one or more acquirors where venture capital investors receive some of the proceeds of the sale.	EVCA
Listed Company	A company whose shares are traded on a stock exchange.	EVCA
M&A	Mergers and acquisitions are both an aspect of corporate strategy, corporate finance and management dealing with the buying, selling, dividing and combining of different companies and similar entities that can help an enterprise grow rapidly in its sector or location of origin, or a new field or new location, without creating a subsidiary, other child entity or using a joint venture.	Thomson Reuters
Macroeconomics	A branch of economics dealing with the performance, structure, behavior, and decision-making of an economy as a whole, rather than individual markets. This includes national, regional, and global economies. Macroeconomists study aggregated indicators such as GDP, unemployment rates, and price indices to understand how the whole economy functions. Macroeconomists develop models that explain the relationship between such factors as national income, output, consumption, unemployment, inflation, savings, investment, international trade and international finance.	Thomson Reuters
Market liquidity	Is an asset's ability to be sold without causing a significant movement in the price and with minimum loss of value.	Thomson Reuters
Market Pull	An innovation based upon market pull has been developed in response to an identified market need.	Bürer & Wüsten-hagen (2009
Minority share/ interest	The ownership of a company, where the owner holds less than 50% of the total shareholding.	EVCA

Portfolio Company	The company or entity into which a private equity fund invests directly.	EVCA
Pre- seed stage	The investment stage before a company is at the seed level. Pre-seed investments are mainly linked to universities and to the financing of research projects, with the aim of building a commercial company around it later on.	EVCA
Private Equity	Private equity provides equity capital to enterprises not quoted on a stock market. Private equity can be used to develop new products and technologies (also called venture capital), to expand working capital, to make acquisitions, or to strengthen a company's balance sheet. It can also resolve ownership and management issues. A succession in family-owned companies, or the buyout and buy-in of a business by experienced managers may be achieved by using private equity funding.	EVCA
Prospectus	A document which must be delivered to recipients of offers to sell securities and to purchasers of securities in a public offering and which contains a detailed description of the issuer's business. In the USA, it is included as part of the registration statement filed with the SEC and with documents required by stock markets, stock exchanges and national competent authorities.	EVCA
Prospectus Directive	A Directive of the European Commission requiring the implementation of a set of common standards for securities prospectuses into the national law of all member states of the European Union. A key feature of this Directive is that of mutual recognition (a prospectus that has been approved by the appropriate competent authority of one member state is mutually recognised by the competent authorities of all other member states).	EVCA
R&D	The research and development is a specific group of activities within a business. The activities that are classified as R&D differ from company to company, but there are two primary models. In one model, the primary function of an R&D group is to develop new products; in the other model, the primary function of an R&D group is to discover and create new knowledge about scientific and technological topics for the purpose of uncovering and enabling development of valuable new products, processes, and services.	Thomson Reuters
Renewable Energy	Renewable energy is derived from natural processes that are replenished constantly. In its various forms, it derives directly from the sun, or from heat generated deep within the earth. Included in the definition is electricity and heat generated from solar, wind, ocean, hydropower, biomass, geothermal resources, and biofuels and hydrogen derived from renewable resources.	EuropeanCommi-ssion Eurostat

Rounds	Stages of financing of a company. A first round of financing is the initial raising of outside capital. Successive rounds may attract different types of investors as companies mature.	EVCA
Security	A tradable asset of any kind. Securities are broadly categorized into: debt securities (such as banknotes, bonds and debentures); equity securities, e.g., common stocks; and, derivative contracts, such as forwards, futures, options and swaps. The company or other entity issuing the security is called the issuer.	Thomson Reuters
Seed Stage	Financing provided to research, assess and develop an initial concept before a business has reached the start-up phase.	EVCA
SME (small and-medium sized enterprises)	According to the European Commission definition, “Small and medium-sized enterprises (SMEs) are those businesses which employ fewer than 250 persons and which have an annual turnover not exceeding EUR 50 million, and/or an annual balance sheet total not exceeding EUR 43 million”.	EVCA
Stakeholder	An accountant, group, organization, member or system who affects or can be affected by an organization's actions.	World Bank
Start Up	Companies that are in the process of being set up or may have been in business for a short time, but have not sold their product commercially.	EVCA
Stock market	A stock market or equity market is the aggregation of buyers and sellers of stocks (shares).	Nasdaq
Stock market index	A method of measuring the value of a section of the stock market. It is computed from the prices of selected stocks (typically a weighted average). It is a tool used by investors and financial managers to describe the market, and to compare the return on specific investments.	Thomson Reuters
Syndication	A group of venture capitalists jointly investing in an investee company.	EVCA
Technology Push	A technology push implies that a new invention has been developed first, while next a user need has to be created to push it onto the market.	Bürer & Wüsten-hagen (2009)
Trade Sale	The sale of company shares to industrial investors.	EVCA

Treasury bill	Marketable securities directly issued by the United States Government which mature in one year or less. Like zero-coupon bonds, they do not pay interest prior to maturity; instead they are sold at a discount of the par value to create a positive yield to maturity. Many regard Treasury bills as the least risky investment available to U.S. investors.	Thomson Reuters
Venture Capital	Professional equity co-invested with the entrepreneur to fund an early-stage (seed and start-up) or expansion venture. Offsetting the high risk the investor takes is the expectation of higher than average return on the investment. Venture capital is a subset of private equity.	EVCA
Venture Capitalist	The manager of private equity fund who has responsibility for the management of the fund's investment in a particular portfolio company. In the hands-on approach (the general model for private equity investment), the venture capitalist brings in not only moneys as equity capital (ie without security/charge on assets), but also extremely valuable domain knowledge, business contacts, brand-equity, strategic advice, etc.	EVCA
Write Off	The write-down of a portfolio company's value to zero. The value of the investment is eliminated and the return to investors is zero or negative.	EVCA