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## Essays on central banking in Vietnam

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## **Thèse de Doctorat en Sciences Economiques**

préparée et soutenue publiquement par

**Ngoc-Anh Lai**

2015

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## **ESSAYS ON CENTRAL BANKING IN VIETNAM**

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L'Université Paris I Panthéon-Sorbonne n'entend donner aucune approbation, ni improbation aux opinions émises dans cette thèse ; elles doivent être considérées comme propres à leur auteur.

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## RESUME

Au cours de sa transformation progressive d'une économie planifiée à celle de marché démarrant il y a près de trente ans, le Vietnam a connu des développements économiques significatifs. Des réformes structurelles y compris l'amplification de libéralisation et intégration au marché mondial ont apporté des taux de croissance élevés, et promu la distribution de prospérité et la réduction de pauvreté. Malgré des effroyables famines souffertes dans le passé, le Vietnam a obtenu depuis 2010 le statut de pays à revenu intermédiaire dans le classement de la Banque Mondiale. Qualifié d'une économie miraculeuse il y a quelques années, le pays a dû toutefois affronter de multiples instabilités macroéconomiques depuis le lendemain de la crise mondiale de 2008 jusqu'en 2012. Les taux de change étaient soumis à une pression constante de dévaluation, le niveau des réserves officielles restait faible, les primes sur les taux souverains et les swaps sur défaillance demeuraient autour des seuils critiques, et plus particulièrement l'inflation s'est envolée au-delà de 23% en 2008 et 18% en 2011. L'inflation élevée a été de longue date une préoccupation majeure des vietnamiens. L'hyperinflation historique dans les 1980s provoquerait encore des craintes tandis que les apogées récentes ont dramatiquement réduit le pouvoir d'achat des habitants même pour les biens les plus élémentaires. L'instabilité des prix pourrait en effet endommager les accomplissements économiques qu'a acquis le Vietnam jusqu'à présent. Avec les perpétuelles variations à deux chiffres des prix, la confiance des résidents dans le dong a été rarement forte, engendrant un degré important de dollarisation *de facto* et un marché domestique de l'or très dynamique.

Suite aux difficultés de la Banque d'Etat du Vietnam (SBV) dans le contrôle des prix et dans la réalisation de ses objectifs d'inflation, un débat vigoureux a été lancé sur l'adéquation subsistante de l'actuelle stratégie de politique monétaire de la banque. Adoptant le ciblage monétaire en 1992, la SBV a réussi à maintenir l'inflation à un niveau modéré jusqu'en 2004, sauf deux années déflationnistes après la crise asiatique de 1997. Néanmoins, la dernière décennie était un temps difficile pour la banque centrale où des grosses déviations de ses objectifs intermédiaires, la M2 et la croissance de crédits, ont causé des écarts de taille entre l'inflation effective et le cible. De nombreux changements de l'environnement économique, intrinsèques aussi qu'extérieurs, ainsi

que le lien plus étroit entre l'économie domestique et celle du monde auraient dû compliquer les tâches de l'autorité monétaire.

Dans ce contexte, une évaluation complète de la pertinence du ciblage monétaire est indispensable. Bien que le sujet a été adressé depuis plusieurs années et a capté beaucoup d'attention, la plupart des études ont focalisé uniquement sur la recherche d'une stratégie qui pourrait marcher mais négligé la question de savoir si le régime actuel est toujours ou n'est plus approprié pour l'économie du Vietnam. Visant à combler cette lacune et contribuer une réponse utile pour cette problématique, cette thèse présente deux travaux empiriques qui examinent les conditions que doit remplir une stratégie de ciblage de monnaie pour être efficace et y fournit une conclusion tranchée.

Le second objectif de la thèse consiste à proposer les indicateurs qui sont nécessaires pour la politique monétaire. Quel que soit la stratégie mise en œuvre, il est primordial que la banque centrale possède une série d'indicateurs monétaires qui peuvent offrir une vision globale de l'économie. Cette compréhension exhaustive permettra à la banque d'améliorer l'efficacité de sa politique et regagner la crédibilité. De plus, étant donné que le sujet a été mal exploré, il s'agit d'une contribution notable de la thèse pour la littérature.

Qui parle de la recherche sur les économies en développement et émergentes parle des difficultés concernant la collecte de données. Il y a non seulement moins de choix de variables, la durée plus courte des séries, mais également de la mauvaise qualité des données dans le sens où les données disponibles pourraient contenir des larges erreurs et/ou omissions dues aux normes statistiques inférieures ou l'existence des marchés parallèles des devises et des biens, et à l'usage d'espèces répandu. En dépit des efforts considérables consacrés à la mobilisation des données de qualité tout en étendant au mieux la longueur temporelle des séries, l'insuffisance de données est la principale limite de toutes les études dans cette thèse, ce qui peut dans certains cas altérer les résultats présentés. Par exemple, l'utilisation des taux de change du marché illégal, considérés un meilleur indicateur des tensions sur le marché des changes, révélerait un autre verdict à propos de la relation entre la demande de monnaie et le taux de change par rapport à celui communiqué dans Chapitre 3 où la parité officielle est employée. Il est donc nécessaire de prendre en compte cette faiblesse lors de l'interprétation des résultats.

La thèse est structurée comme suit. Chapitre 1 introduit le contexte d'où vient le sujet de thèse et résume le contenu de tous les chapitres. Une brève présentation de l'économie du Vietnam est fournie dans Chapitre 2. Ensuite, le reste de la thèse est décomposé en deux parties, chacune contient deux chapitres. La première partie enquête sur les conditions approuvant l'actualité du ciblage monétaire, alors que la deuxième propose les indicateurs de politique monétaire à la banque centrale.

## **Chapitre 2 Economie du Vietnam – Une brève description**

Chapitre 2, où sont décrits les caractéristiques principaux de l'économie du Vietnam depuis les réformes de *Doi Moi* à la fin des années 1980s, présente le contexte dans lequel l'ensemble des études constituant cette thèse ont été menées. Nous nous intéressons tout d'abord à la situation macroéconomique du pays que nous analysons la performance en termes de croissance, emploi, stabilité des prix et équilibres extérieurs, et enquêtons sur le modèle économique en œuvre dans le pays. Par rapport aux pairs dans la région tels que l'Indonésie, la Malaisie, les Philippines et le Thaïlande, le Vietnam a enregistré un taux moyen de croissance du PIB<sup>1</sup> plus élevé et un taux de chômage plus faible durant ces 25 dernières années. Pourtant, la croissance a décéléré après la crise globale et il semble que le pays ait du mal à retrouver son miracle des années 1990s. En même temps, l'inflation a été non seulement plus élevée que celle des autres pays mais aussi plus persistante, ce qui détériore le pouvoir d'achat des résidents et leur confiance dans la monnaie locale. Le compte courant a été dans la plupart du temps déficitaire, résultant d'un compte commercial négatif et des entrées importantes de capitaux pour financer de nombreuses opportunités d'investissement. L'adoption de soi-disant « l'économie du marché à orientation socialiste » dès 1986 a emmené des changements socio-économiques profonds au Vietnam. En établissant l'accès à la concurrence équitable pour les secteurs privé et étranger, ce modèle permet à tout le dynamisme précédemment restreint d'être relâché, qui a pour résultat un développement économique impressionnant. Toutefois, le secteur étatique, traité comme la colonne vertébrale de l'économie, ne peut que rarement manifester sa supériorité par rapport aux autres et par conséquent doit traverser une restructuration prononcée. Par ailleurs, étant une économie hautement ouverte, le Vietnam repose également sur un modèle

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<sup>1</sup> Produit Intérieur Brut



de croissance conduite par l'exportation, profitant de la bonne performance du secteur extérieur jusqu'ici.

La seconde section du Chapitre 2 porte principalement sur les sources de financement pour l'économie du Vietnam et les points annexés tels que la soutenabilité de la dette et le développement du système financier. Parmi les financements externes, l'endettement extérieur reste le plus important, s'élevant à 30-40% du PIB. Il s'agit, pour la plupart des obligations, des dettes à long terme engagées par le secteur public, dont les prêts à conditions préférentielles dominant. En outre, les investissements directs étrangers étant stables et les transferts de fonds des travailleurs expatriés qui sont en hausse, dont la somme dépasse 10% du PIB, sont à la contribution active au stock national de capitaux. De manière plus importante, les paramètres de dette sont favorables, indiquant que le Vietnam ne supporte qu'un risque modéré de surendettement extérieur, ce qui est une amélioration spectaculaire comparée à la situation des années 1990s. Sur le côté domestique, la finance publique avec ses investissements de développement joue toujours un rôle vital pour l'expansion économique. Les investissements de construction fondamentale et ceux d'éducation et de santé publique, ayant été comparable avec ceux des pays de taille similaire, voient pourtant leur part dans les dépenses publiques diminuer afin de compenser les coûts de plus en plus onéreux du fonctionnement. Pendant ce temps, malgré son caractère naissant, le marché financier, où la présence des banques est significativement supérieure à celle des institutions non bancaires, apporte une assistance non négligeable pour le progrès au Vietnam. Or, assombri par le problème de créances douteuses, le secteur bancaire est soumis à présent à une réforme majeure.

Chapitre 2 se termine avec la présentation de la banque centrale et sa politique monétaire. La banque d'Etat du Vietnam est un corps ministériel en charge de la conduite de la politique monétaire. Ayant la stabilité des prix comme son objectif principal, le mandat de la banque centrale est en effet beaucoup plus large, couvrant aussi le soutien de la croissance et la stabilité financière. Ce mandat à multiple objectif auquel s'ajoute l'indépendance limitée de la banque a été cité parmi les entraves principales contre une mise en œuvre réussite de la politique monétaire. Appliquant la stratégie de ciblage monétaire, la SBV détermine les objectifs annuels de croissance de l'offre de monnaie (représentée par M2) et de celle du crédit afin d'atteindre son cible d'inflation d'IPC<sup>2</sup>,

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<sup>2</sup> Indice de Prix à la Consommation

en utilisant de plus en plus des instruments indirects comme les opérations d'open market. De plus, avec son régime d'ancrage au dollar américain à marge de fluctuation étroite et les contrôles de capitaux, il paraît que la SBV cible le taux de change USD/VND également. Cela n'est pourtant pas simple à cause de l'existence d'un marché parallèle de change très actif. Du côté du ciblage monétaire, des écarts considérables entre les objectifs et les taux de croissance effectifs sont souvent enregistrés. En conséquence, les prix à la consommation s'envolent, dépassant les cibles de la banque centrale. Des propositions concernant un régime alternatif à l'actuel ciblage monétaire ont alors prospéré, parmi lesquelles le ciblage d'inflation est le plus discuté ; mais toutes les recherches ont arrivé à la même conclusion que la commutation à cette stratégie n'est pas envisageable au moins dans le moyen terme.

## **Première Partie Le ciblage monétaire du Vietnam – Une évaluation**

Compte tenu de ce qui est abordé ci-dessus, les études dans la Première Partie examinent les deux conditions qui garantissent la pertinence de l'actuel cadre de politique monétaire de la SBV. La première condition, nécessitant qu'existe une fonction stable de demande de monnaie, est l'objet du Chapitre 3 ; alors que la deuxième – une relation significative entre la monnaie et l'inflation – est considérée dans le Chapitre 4. Seule la satisfaction de ces exigences nous autorise à conclure en faveur de la continuation du ciblage monétaire au Vietnam.

### **Chapitre 3 La demande de monnaie au Vietnam, est-elle stable?**

Les fonctions de demande de monnaie et leur stabilité ont été bien analysées dans la littérature pour un grand nombre de pays et sur les périodes diverses. L'on peut se référer à Knell et Stix (2004) pour un résumé pratique des résultats des travaux empiriques depuis les années 1970s sur les pays développés ainsi que de ceux en développement. En ce qui concerne la méthodologie d'estimation, les techniques de cointégration sont souvent employées. Parmi elles, la procédure des tests à seuils, ou l'approche autorégressive à retards échelonnés (ARDL), proposé par Pesaran et al. (2001) gagne sa popularité progressivement. Un avantage notable que porte cette approche consiste à être applicable même si la base de données contient un mélange des variables stationnaires et celles intégrées d'ordre 1,  $I(1)$ , et convenir à l'estimation d'un échantillon de petite taille.

Pour le Vietnam, il n'existe que trois études sur la demande de monnaie. Etant donné le niveau élevé de dollarisation au Vietnam, deux d'entre elles essaient d'en tenir compte. Adam et al. (2004) modélisent une fonction de demande de M1 avec l'élasticité de revenu dépendant du taux de dépréciation anticipée de la monnaie, et trouvent que à long terme les gens préfèrent utiliser une devise que l'autre pour le motif de transaction, mais à court terme, les effets de portefeuille prédominent. Entre-temps, Watanabe et Pham (2005) estiment séparément la demande de M2 domestique et celle des dépôts en devises étrangères sur la période de 1993Q1: 2004Q4. Le troisième papier, réalisé par Nguyen et Pfau (2010), ne considère la dollarisation mais examine la stabilité de la demande de monnaie, ce qui n'est pas trouvé dans les deux autres. Leur résultat démontre une fonction stable de demande de monnaie de 1999 à 2009.

Dans cette étude, la méthode ARDL est choisie pour estimer la fonction de demande de monnaie du Vietnam, de l'agrégat de M1 tant que de M2, sur la période de 1999-2014 pour capturer les développements économiques les plus récents et leurs effets sur la demande de monnaie. Nous procédons comme suit : étant donné la présence ou absence d'une relation de cointégration entre la monnaie et ses déterminants, nous pouvons conclure s'il existe ou non une relation de long terme entre ces variables. Si le premier cas est approuvé, la seconde étape consiste à estimer le modèle à correction d'erreur qui donne de l'information sur la vitesse d'ajustement et la dynamique à court terme. Enfin, la stabilité de la demande de monnaie est testée par l'intermédiaire des tests de CUSUM et CUSUM carré de Brown et al. (1975).

L'étude empirique met en évidence une relation de long terme entre la demande de monnaie, quel que soit l'agrégat considéré, et le revenu, l'inflation anticipée, le taux de change et le prix de l'or. Le taux de change s'avère être la variable explicative la plus importante de la demande de monnaie, ce qui est compatible avec le niveau très élevé de dollarisation dans le pays et le degré conséquent de l'ouverture. Le prix de l'or, qui est introduit pour la première fois dans une fonction de demande de monnaie, manifeste clairement sa pertinence. Les élasticités de revenu avoisinent 1,8 – considérablement inférieurs à ceux trouvés dans les travaux précédents sur le Vietnam. De l'autre côté, l'estimation du modèle à correction d'erreur indique que la vitesse du retour à la moyenne est relativement faible, surtout pour le M1. Plus particulièrement, le résultat du test de stabilité révèle une demande stable de M1 ainsi que de M2, ce qui est la première condition nécessaire du cadre de ciblage monétaire.

#### **Chapitre 4 Le contenu d'information de la monnaie dans la dynamique d'inflation**

Comme ce que Svensson (1999 et 2000) et Rudebuschan et Svensson (2002) ont démontré, le pouvoir prédictif de la monnaie pour l'inflation *ne* dépend de l'existence d'une fonction stable de demande de monnaie. Par conséquent, le remplissage de la première condition du ciblage monétaire trouvé au Chapitre 3 ne garantit nécessairement pas l'actualité d'un tel régime de politique monétaire. C'est pourquoi nous considérons dans ce chapitre le contenu d'information concernant des mouvements futurs des prix que la monnaie transporte. Un volume important d'information indique alors la validation du deuxième critère et la pertinence de l'actuelle stratégie de la SBV.

La relation entre la monnaie et l'inflation au Vietnam demeure un sujet capital en raison des expériences du passé de l'inflation galopant. Toutefois, à mes meilleures connaissances, aucune étude a focalisé sur le rôle spécial de la monnaie mais l'a plutôt traité de la même manière que les autres déterminants de l'inflation. Les recherches existantes comptent principalement sur les modèles vectoriels autorégressifs (VAR) ou modèles vectoriels à correction d'erreur (VECM) afin de déduire l'influence de la monnaie sur l'inflation. Les auteurs ne peuvent pourtant pas être unanimes sur les résultats : les uns trouvent que la croissance de monnaie impacte significativement l'inflation (IMF 2006, Bhattacharya 2013) tandis que les autres ne découvrent que des effets modérés ou non-significatifs que la monnaie porte sur la dynamique d'inflation (Camen 2006, Le et Pfau 2009, Nguyen et Nguyen 2011).

Dans cette recherche, l'usage du modèle de la courbe de Phillips augmentée à la monnaie proposé par Gerlach et Svensson (2003) est favorisé pour examiner le contenu d'information des agrégats monétaires dans la prévision d'inflation. En tant qu'un modèle à l'équilibre partiel, celui-ci n'est pas compliqué techniquement mais reste efficace tout de même à décrire les forces économiques derrière la dynamique d'inflation. Le modèle implique l'utilisation de l'écart d'encaissements réelles et de l'écart de croissance monétaire ainsi que de l'écart de production et la dépréciation de change comme les prédicteurs de l'inflation. A propos de l'écart d'encaissements réelles, il s'agit de la différence entre les encaissements réelles effectives et celles d'équilibre estimées dans Chapitre 3. L'écart de croissance monétaire, quant à lui, est calculé par le biais des taux de changement en glissement annuel des deux types d'encaissements réelles.

Les résultats clairement indiquent que les deux mesures monétaires toutes contiennent du pouvoir prédictif substantiel de l'inflation future à l'horizon d'une à deux années,

bien que c'est plus largement le cas pour l'écart d'encaisses réelles. L'écart de croissance monétaire est presque autant informatif que celui de production ou l'évolution du taux de change, servant un point d'appui pour l'actuel objectif intermédiaire de la SBV. Par ailleurs, la crédibilité de la banque centrale se révèle assez faible car cette dernière ne peut corriger sur deux ans qu'approximativement 72% de la déviation d'inflation par rapport à l'objectif.

Pour résumer, il est convenable de conclure que le ciblage monétaire est toujours approprié pour le Vietnam car il n'existe aucun signe d'instabilité de la demande de monnaie mais il y a bel et bien une relation significative entre la monnaie et l'inflation. Néanmoins, il est essentiel que la SBV renforce son efficacité, ce qui peut se réaliser en incluant la mesure des encaisses réelles dans sa fonction de décision parmi d'autres.

## **Deuxième Partie Les indicateurs de la politique monétaire**

L'efficacité de la politique monétaire peut être améliorée de nombreuses façons. Cette partie de la thèse propose deux indicateurs qui peuvent aider le renforcement de l'efficacité de la politique de la banque centrale. Chapitre 5 calcule et évalue plusieurs mesures de l'inflation structurelle afin de suggérer celle la plus éminente pour l'autorité monétaire. Chapitre 6 présente un indicateur de court terme s'appuyant sur les informations des marchés financiers domestique et mondial – l'Indice de Conditions Financières.

### **Chapitre 5 Quelle mesure de l'inflation structurelle pour le Vietnam?**

Les banques centrales doivent toutes distinguer des changements permanents de prix à des changements transitoires dans le but de réagir dans un délai convenable à un choc de prix ayant des impacts durables sur l'inflation, maintenir donc la stabilité des prix sans atténuer pour autant la croissance économique. Elles comptent en conséquence sur l'inflation structurelle, une série qui contient uniquement les changements permanents de prix. Il existe de nombreuses techniques pour exclure les composants transitoires de l'inflation globale, des approches purement statistiques jusqu'à des méthodes avec plus de théorie à l'appui, à chacune ses propres avantages et faiblesses.

Bien qu'un indicateur de l'inflation structurelle ait été présenté au Vietnam depuis Janvier 2015 par l'Office des Statistiques Générales (GSO), il est toujours souhaitable de

considérer d'autres mesures car il est courant que la banque centrale compare les différentes séries afin de renforcer sa prise de décision. La série de la GSO est calculée en enlevant de l'inflation globale l'inflation de l'alimentation et de l'énergie, et les changements de prix des biens et services administrés (santé et services de l'éducation). L'insuffisance de données ne nous permet malheureusement pas à inclure celle-ci dans l'exercice d'évaluation.

Dans ce chapitre, cinq mesures de l'inflation structurelle sont examinées pour le Vietnam. Leur utilité pour la politique monétaire est ensuite enquêtée pour savoir s'il y a une ou plusieurs mesures qui sont admises. Il s'agit de ces mesures : l'inflation hors alimentation (initiée par Gordon, 1975), la moyenne tronquée et la médiane pondérée (Bryan et Cecchetti 1994), la série lissée exponentiellement à la Cogley (2002), et l'inflation neutre à la production de Quah et Vahey (1995).

Le raisonnement derrière la première mesure est qu'en enlevant les composants qui sont volatiles historiquement ou contrôlés rigoureusement, l'on peut se débarrasser des changements transitoires de prix mais retenir seulement la tendance sous-jacente de l'inflation. Nous pouvons en fait exclure les prix alimentaires (ce qui est effectué dans cette étude), et/ou ceux d'énergie, et/ou ceux de biens administrés (comme la mesure de la GSO). Par contre, Bryan et Cecchetti (1994) proposent des mesures de l'inflation structurelle à influence limitée. La méthode est plutôt simple : pour chaque période mettre les changements des prix composants de l'inflation globale en ordre croissante, tronquer les queues de la distribution transversale, et faire la moyenne pondérée des changements de prix des éléments restant. Si le pourcentage d'élagage est inférieur ou égal à 49% (là, c'est 25%), il s'agit de l'inflation à moyenne tronquée, tandis que l'inflation à médiane pondérée prend sa valeur du changement de prix du premier composant ayant le poids cumulé supérieur ou égal à 50%. L'inflation lissée à la Cogley est calculée en appliquant un filtre passe-bas sur un seul côté aux mouvements courants et passés (de 36 mois dans cette recherche) de l'IPC. Enfin, sur la base d'une courbe de Phillips verticale à long terme, Quah et Vahey (1995) définissent l'inflation structurelle comme le mouvement sous-jacent de l'inflation qui est neutre à la production dans le (moyen à) long terme et utilisent un modèle vectoriel autorégressif structurel (SVAR) à deux variables de la croissance et l'évolution de l'inflation (nous utilisons ici l'inflation) pour la construire.

Toutes les cinq mesures sont ensuite évaluées, tout d'abord sur leur capacité de capturer l'inflation tendancielle, représentée par la moyenne mobile centrée sur 36 mois de l'inflation de l'IPC. Là, la mesure lissée exponentiellement réalise de meilleure performance que celle des autres. Le deuxième exercice consiste à comparer leur pouvoir de prévision de l'inflation globale où l'inflation neutre à la production avec ses statistiques de R-carré dans toutes les estimations étant les plus élevés fait sentir sa dominance. La dernière évaluation examine la relation de coïntégration entre l'inflation structurelle et l'inflation globale. De plus, le test impose un mécanisme de correction d'erreur à direction unique qui ne vient de la mesure structurelle qu'à l'inflation globale. Bien que tous les cinq candidats passent la première partie du test, seule la mesure basée sur le SVAR remplit la seconde exigence.

En gros, les résultats citent l'inflation neutre à la production comme un indicateur de l'inflation structurelle utile pour la politique monétaire. En même temps, la banque centrale peut faire aussi confiance à l'inflation lissée exponentiellement pour communiquer avec le public grâce à sa performance relativement bonne et sa construction simple. Il est souhaitable toutefois que les études futures reviennent sur ce sujet quand assez de données de l'inflation structurelle de la GSO sont ramassées pour comparer sa performance avec celle des autres.

## **Chapitre 6 Un indice de conditions financières pour le Vietnam**

La connexion étroite entre la sphère monétaire–financière et l'économie réelle est bien mentionnée dans la littérature. Selon le sens commun, être capable à mesurer d'une manière quantitative l'information de l'activité économique contenue dans les variables financières est précieux pour les décideurs politiques. Grâce à la nature prospective du marché financier, les conditions financières actuelles peuvent jouer un rôle crucial dans les modèles de prévision macroéconomique. D'ailleurs, comme plusieurs canaux de transmission sont capturés dans les changements des conditions financières, la quantification de ces mouvements est utile pour la conduite de la politique monétaire. Il y a récemment une grande variété de propositions des indices de conditions financières (ICF) qui synthétisent l'information compressée dans de nombreuses variables financières dans un indicateur unique, facilitant donc l'usage.

Ce chapitre a pour but de construire un indice de conditions financières pour le Vietnam. Bien que le marché financier du Vietnam soit encore sous-développé, celui-ci a connu des progressions remarquables ces dernières années. Cela nous permet donc de

croire qu'une fois construit, un tel indice pourrait servir d'indicateur utile à la disposition de la banque centrale.

Il existe deux méthodologies principales de calculer les ICF : l'approche de la somme pondérée et celle du modèle à facteur. Pour la première approche, l'ICF est la somme pondérée d'une sélection des variables financières dont les poids sont équitablement attribués ou résultent des régressions (Rosenberg 2009, Hatzius et al. 2010). De l'autre côté, l'approche du modèle à facteur est inspirée par le fait que les variables financières s'évolueraient ensemble, les auteurs utilisent donc différentes techniques pour extraire des variables financières un facteur commun (inobservable) qui renferme ce co-mouvement (Stock et Watson 2010). Notre ICF pour le Vietnam est construit en employant le modèle à facteur dynamique généralisé (GDFM) proposé par Forni et al. (2000, 2005), avec un set de données contenant treize variables domestiques et extérieures. L'on peut dire que le facteur estimé en empruntant cette méthode sera capable de saisir toute la structure dynamique du panel transversal tout en préservant la consistance d'un modèle à facteur standard.

L'ICF est défini comme le facteur commun qui capte au mieux la variation partagée dans les variables financières. En effet, chaque variable peut être décomposée en deux parties orthogonales : un composant commun et un élément idiosyncratique. Le composant commun est conduit par un certain nombre de facteurs communs dynamiques, parmi lesquels le premier facteur retient la part la plus grande de la variance totale. Ce facteur dynamique est ensuite constitué par un ou quelque facteurs statiques qui sont des combinaisons linéaires concomitantes des variables financières.

En outre, comme les variables financières reflètent souvent les développements économiques cycliques avec leur propre évolution, tandis qu'un ICF ne devrait résumer que les informations extraites des variables financières hors de toute influence des cycles économiques, après être estimé le facteur commun est calculé par régression en fonction des écarts de production courante et retardée. Le terme d'erreur obtenu à partir de cette régression représente donc l'ICF (purgé) qui contient seulement des mouvements exogènes des conditions financières.

Notre ICF réalise de bonnes performances tant qu'indicateur précurseur de l'activité économique en capturant, avec 9 à 12 mois par avance, tous les développements significatifs au cours de la période examinée. Plus particulièrement, l'ICF fournit de meilleures prévisions de l'écart de production que le fait le modèle autorégressif, quelle que



soit l'horizon de prévision. Les tests de robustesse accèdent également l'ICF pour sa performance supérieure par rapport à celle des autres variantes qui sont les variables constituant l'ICF ou d'autres indicateurs financiers. Il s'avère bénéfique pour la SBV de considérer cette mesure des conditions financières lors de la prise des décisions de politique à court terme.

Pour la période à venir, avec l'amélioration des conditions financières, l'ICF indique que l'économie du Vietnam progressivement reprend son expansion, si aucun incident percutant ne surgit.

*to my beloved grandmothers*

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## ABBREVIATIONS

AIC	Akaike's Information Criteria
ADF	Augmented Dickey-Fuller
ARDL	Autoregressive Distributed Lag
ASEAN	Association of South-East Asian Nations
BIC	Schwarz's Bayesian Information Criteria
CPI	Consumer Price Index
GDFM	General Dynamic Factor Model
ECM	Error Correction Model
FCD	Foreign Currency Deposits
FCI	Financial Conditions Index
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
GMM	Generalized Method of Moment
GNI	Gross National Income
GSO	General Statistics Office of Vietnam
IFS	International Financial Statistics
IMF	International Monetary Fund
JSBs	Joint-stock Banks
MNCs	Multinational companies
MoF	Ministry of Finance
NPLs	Non-performing Loans
ODA	Official Development Assistance
OLS	Original Least Square
OMOs	Open Market Operations
REER	Real Effective Exchange Rate
PPG	Public and Publicly Guaranteed (debt)
PPP	Purchasing Power Parity
SBV	State Bank of Vietnam
SOEs	State-owned Enterprises
SOCBs	State-owned Commercial Banks
USD	United States Dollar
UNCTAD	United Nation Conference on Trade and Development
VECM	Vector Error Correction Model
VND	Vietnam Dong
WB	World Bank

# CHAPTER 1

## GENERAL INTRODUCTION

During its gradual transformation from a planned to a market economy starting almost thirty years ago, Vietnam has achieved significant economic development. Structural reforms including increasing liberalization and integration into the global market have brought in high growth, and helped distribute prosperity and reduce poverty. From a country struggling with famine, Vietnam has obtained since 2010 the middle income status in World Bank classification. Referred to as a miracle economy a couple of years ago, the country did however have to face with multiple macroeconomic instabilities from the aftermath of 2008 global crisis until 2012. Exchange rates were under constant devaluation pressures, the stock of reserves remained low, sovereign spreads and country default swaps stayed at risky levels, and particularly inflation soared to above 23% in 2008 and 18% in 2011. High inflation has been for long a major preoccupation of Vietnamese. Historical hyperinflation in the 1980s continues to be somewhat frightening while recent peaks did cut down the purchasing power of inhabitants even for the most basic goods. Price instability could effectively damage the economic accomplishments that Vietnam has acquired so far. With perpetual double-digit price changes, residents' confidence in dong has hardly been high, leading to a consequential degree of *de facto* dollarization and a very dynamic domestic market for gold.

Difficulties of the State bank of Vietnam in controlling price evolution and securing its inflation goals have raised a vigorous debate on whether the bank's current monetary policy framework is still appropriate. Starting its monetary targeting strategy in 1992, the SBV succeeded to keep inflation at a moderate level until 2004, except two

deflationist years after the 1997 Asian crisis. Nevertheless, the last decade has been much tougher for the central bank as large deviations of its intermediate targets, M2 and credit growth, have caused big misses in CPI inflation objective. Various changes in economic environment, both intrinsic and external ones, as well as deeper connection between domestic and global economy must have complicated the monetary authority's tasks.

In this context, a thorough assessment of the money targeting relevance is indispensable. Although the topic has been addressed for several years already and attracted much attention, most studies have focused only on finding the other strategy that can work but ignored the question of whether the present regime is always or no longer suitable for the economy of Vietnam. Aiming to fill in this gap and contribute a valuable answer to the problem, this thesis presents two empirical works examining the conditions that an effective money targeting strategy requires and providing a clear-cut conclusion.

The second objective of the thesis is to propose some indicators which are useful for policy making processes. No matter which strategy is implemented, it is primordial for the central bank to have a comprehensive set of monetary indicators that can deliver a complete picture of the economy. That exhaustive understanding allows the bank to improve the efficiency of its policies and regain credibility. Moreover, given the fact that the subject has been poorly explored, the thesis's contribution to the literature is noteworthy.

Who says working on developing and emerging market economies says difficulties in collecting data. There are not only few choices of variables, limited time span, but also poor quality of data, i.e. reported data may bear large errors and/or omissions due to low statistic standards or the existence of parallel markets for currencies and goods and widespread usage of cash. Despite a lot of efforts to gather quality data while extending the period length as much as possible, the major limit of all researches in this thesis is data insufficiency which could in some cases alter the results presented. For instance, the use of black-market exchange rates, considered a better indicator of the forex market tensions, may bring in another finding about the money demand – exchange rate relationship compared to the one disclosed in Chapter 3 where the official parity is employed. This weakness should therefore be taken into account when interpreting results.



The thesis is structured as follows. Apart from this introductory chapter and 0 which provides a brief presentation of the economy of Vietnam, the rest of the thesis is divided into two parts, each containing two chapters. Part one examines the conditions that approve the pertinence of the monetary targeting while Part two recommends some monetary policy indicators to the central bank.

## **Chapter 2 Economy of Vietnam – An overview**

Chapter 2, where the main features of the economy of Vietnam since the *Doi Moi* reform program in late 1980s are described, presents the context within which all studies constituting this thesis are carried out. We are first interested in the macroeconomic situation of the country that we analyze the performance in terms of growth, employment, price stability and external balances, and investigate the economic model operated in the country. In comparison with regional peers such as Indonesia, Malaysia, Philippines and Thailand, Vietnam has recorded higher average GDP growth and lower unemployment rate over the last 25 years. However, growth has decelerated after the global crisis and it seems hard for the country to regain its 1990s miracle. At the same time, inflation has not only been higher than in other countries but also more persistent, which deteriorates residents' purchasing power and their confidence in the local currency. Current account balance has been most of the time in deficit, resulting from a negative trade balance and important capital inflows to finance numerous investment opportunities. The adoption of the so-called "socialist-oriented market economy" since 1986 has brought profound socio-economic changes into Vietnam. By opening the playing field for private and foreign sectors, this model allows all the previously confined dynamism to be released, resulting in impressive economic development. Nevertheless, the state sector, treated as the backbone of the economy, can hardly manifest its superiority over the others and therefore undergoing a pronounced restructuring. On the other hand, being a highly opened economy, Vietnam has also relied on an export-led growth model, enjoying great performance of the external sector so far.

The second section of Chapter 2 focuses on the financing sources for Vietnam economy and related issues such as debt sustainability and financial system development. Among external funding sources, external debt is the most important one, amounting to 30-40% of GDP. Most of the debts are long-term and incurred by public sector, of

which concessional loans dominates. Besides, stable foreign direct investment and increasing workers' remittance, whose sum exceeds 10% of GDP, are contributing actively to the national capital stock. More crucially, various debt sustainability ratios show that Vietnam contains low risk of external debt distress, which is a spectacular improvement compared to the situation in 1990s. On the domestic side, public finance with its development investment is always vital for the economic expansion. Capital construction investment and that for education and health care which have been in line with comparable countries, are however seeing their share in total public expenditure diminishing to compensate higher costs of functioning. Meanwhile, regardless of its nascent characteristics, financial market where banks outweigh non-bank institutions has played a non-negligible role in assisting the development of Vietnam. Still, shadowed by a severe non-performing loan problem, the banking sector is experiencing a major reform.

Chapter 2 closes with a presentation of the central bank and its monetary policy. The State bank of Vietnam is a ministerial body in charge of implementing monetary policy. Despite having price stability as its primary target, the central bank's mandate is in fact quite large, also covering growth support and financial stability. This multi-goal mandate together with the bank's limited independence has been cited among principal impediments to an efficient monetary policy conduct. Following a money targeting strategy, the SBV sets targets for money (represented by M2) and credit growth annually to attain its CPI inflation objective, by making use of more and more indirect instruments such as the Open market operations. In addition, with its narrow band US dollar peg regime and capital controls, the SBV seems to target the USD/VND exchange rate as well. This is however not simple due to the existence of an active parallel foreign currency market. On the money targeting side, big gaps between targets and realized numbers are often recorded. As a result, consumer prices soar, outstripping the central bank's objective. Proposals of an alternative regime to monetary targeting have therefore flourished, among which inflation targeting is the most discussed; but all researches have come to the same conclusion that switching to this strategy is not feasible at least in the medium run.

### **Part One Monetary targeting in Vietnam – An evaluation**

Given this background, studies in Part One examine the two conditions that guarantee the relevance of the SBV's actual framework. The first one, requiring a stable money

demand function to exist, is the subject of Chapter 3; while the second condition – a significant relationship between money and inflation – is considered in Chapter 4. Only the satisfaction of these requirements allows us to conclude in favor of the continuation of money targeting in Vietnam.

### **Chapter 3 Is money demand in Vietnam stable?**

Money demand functions and their stability have been well documented in the literature for a great number of countries and time periods. One can refer to Knell and Stix (2004) for a useful summary of findings in empirical works on both developed and developing countries since the 1970s. Regarding estimation methodology, cointegration techniques are often used. Among them, the bounds testing procedure, or the Autoregressive Distributed Lag (ARDL) approach, proposed by Pesaran et al. (2001) has progressively been employed. This approach has the advantage of being applicable even if the dataset contains a mixture of stationary and I(1) variables, and also suitable for small sample estimation.

For Vietnam, there are only three studies on money demand. Given the high level of dollarization in Vietnam, two of them try to account for this phenomenon. Adam et al. (2004) model a M1 demand function with income elasticity depending on expected rate of currency depreciation and find that in long run, people switch from one currency to another for transaction motive but in short run, portfolio effects dominate. Meanwhile, Watanabe and Pham (2005) estimate demand for M2 domestic and FCD separately over 1993Q1: 2004Q4 period. The third paper by Nguyen and Pfau (2010) does not consider dollarization but tests for money demand stability, which cannot be found in the other two. Their result points to a stable money demand function from 1999 to 2009.

In this present study, the ARDL method is chosen to estimate Vietnam money demand function, of both M1 and M2 aggregates, for the period of 1999-2014 to capture the most recent economic development and its effects on money demand. The procedure is that given the presence or absence of cointegration between money and its determinants, we can conclude on the existence of a long-run relationship between these variables or not. If the former case is approved, the second step consists in estimating the error-correction model which gives information about the adjustment speed and short-run dynamic. The money demand stability is finally tested using Brown et al. (1975)'s CUSUM and CUSUM squared test.

The empirical study finds evidences for a long-run relationship between money demand, regardless of which monetary aggregate is considered, and income, expected inflation, exchange rate and gold price. Exchange rate is found to be the most important variable to determine the demand for money, which is compatible with the considerable level of dollarization in the nation and high degree of openness. The gold price variable, which is introduced in the money demand equation for the first time, expresses its strong relevance. Income elasticities are around 1.8, much lower than in previous works on Vietnam. On the other hand, the estimation of the error-correction model indicates that the mean reversion speed is relatively low, especially for M1. Particularly, the stability test result concludes the stable demand for both M1 and M2 which is the first necessary condition within the monetary targeting framework.

#### **Chapter 4 Information content of money in inflation dynamics**

As Svensson (1999 and 2000) and Rudebuschan and Svensson (2002) point out, the predictive power of money on inflation does *not* depend on the existence of a stable money demand function. Therefore the satisfaction of the first condition of the monetary targeting framework found in Chapter 3 does not necessarily guarantee the relevance of such a monetary policy regime. That is why we consider in this chapter the information content on future movements in prices that money conveys. An important amount of information then indicates the validation of the second requirement and the pertinence of the SBV current strategy.

Money-inflation relationship in Vietnam has been an important topic due to past experiences of high inflation. However, to the best of my knowledge, no study has focused on the special role of money but rather treated it in the same manner to all other possible inflation determinants. Existing researches mostly rely on Vector autoregression (VAR) or Vector Error-correction model (VECM) framework to derive monetary influence on inflation. They cannot nevertheless find unanimous results: some find that M2 growth significantly affects inflation (IMF 2006, Bhattacharya 2013) whereas others conclude on only modest or non-significant impacts that money has on inflation dynamics (Camen 2006, Le and Pfau 2009, Nguyen and Nguyen 2011).

In this research I favor the use of a money-augmented Phillips-curve model suggested in Gerlach and Svensson (2003) to investigate the information content of money aggregates in inflation forecasting. As a partial equilibrium model, it is not complicated technically but still efficient in describing economic forces behind inflation dynamics.

The model involves the use of the real money balance gap and money growth gap along with output gap and currency depreciation as inflation predictors. The real money gap is the difference between real money supply and long-run equilibrium money balance that is estimated in Chapter 3; and the money growth gap is calculated based on year-on-year rates of change of these two variables.

The results clearly indicate that both monetary measures contain substantial predictive power on future inflation over one to two year horizon, though the real money gap accounts for a larger extent. The money growth gap is almost as informative as the output gap or exchange rate change, supporting the central bank current intermediate target. On the other hand, the SBV's credibility is found to be weak since the central bank can correct roughly 72% of present inflation deviation from the objective within two-year's time.

In sum, it is convenient to conclude that monetary targeting is still appropriate for Vietnam since there is no sign of instability of demand for money but a significant relationship between money and inflation. Nonetheless, it is imperative that the SBV improves its efficiency, which can be done by including the real money balance in its policy function among other measures.

## **Part Two Monetary policy indicators**

Monetary policy effectiveness can be improved in various ways. This second part of the thesis proposes two indicators that can help enhance the central bank's policy efficiency. Chapter 5 computes and evaluates several core inflation measures in order to suggest the most prominent one to the monetary authority. Chapter 6 introduces a short-run indicator based on information on domestic and global financial markets – the Financial Conditions Index.

### **Chapter 5 Which core inflation measure for Vietnam?**

Central banks all have to distinguish between permanent and transitory price changes in order to react in a timely manner to a price shock that has enduring impact on inflation, maintaining price stability without dampening economic growth. They have therefore relied on “core” inflation, a series which contain only permanent price changes. There are many techniques to rule out transient components from headline

inflation, from a purely statistical approach to a more theoretically based method, each one has its own advantages and drawbacks.

Although a core inflation indicator has been presented in Vietnam since January 2015 by the General Statistics Office, it is still worth considering other measures since it is common that the central bank compares various series to enhance its decision making process. The GSO series is computed by removing food, foodstuff, and energy inflation, and price changes of administered goods and services (health and education services) from the headline inflation. Insufficient data do not, unfortunately, allow us to include this measure in the evaluation exercise.

In this chapter, five measures of core inflation are investigated for Vietnam and then examined to see if there could be any qualifying candidates, useful for policy purposes. These measures are: the excluding food price (initiated by Gordon, 1975), the trimmed-mean and the weighted median (Bryan and Cecchetti 1994), the Cogley (2002)'s exponentially smoothed and the output neutral inflation of Quah and Vahey (1995).

The idea behind the first measure is that by removing the components that are historically volatile or strictly controlled, one can get rid of transitory price changes but retain only the underlying inflation trend. We can in deed exclude food (as done in this study), and/or energy, and/or administered goods (like GSO measure). Meanwhile, Bryan and Cecchetti (1994) propose limited influence core inflation. The method is pretty simple: order the headline inflation series based on cross-sectional price changes, trim the tails of the cross-sectional distribution, and average the weighted price changes of the remaining items. If the trimming percentage is lower than or equal to 49% (here it is 25%), it is the trimmed mean inflation, while the weighted median core inflation takes its value from the price change of the first component having the cumulative weight superior than or equal to 50%. The Cogley (2002)'s smoothed inflation is calculated by applying a one-sided low-pass filter to current and past movements (36 months in this study) of the CPI. Finally, on the basis of a vertical long run Phillips curve, Quah and Vahey (1995) define core inflation as the underlying movement in inflation being neutral to output in the (medium to) long run and use a bivariate Structural Vector Autoregressive model of output and inflation growth (here we use inflation) to construct it.

All five measures are then evaluated, firstly by their ability to capture the trend inflation, proxied by 36-month centered moving average CPI inflation. Here, the exponentially

smoothed measure outperforms the others. The second exercise consists in comparing their predictive power vis-à-vis the headline where the output-neutral inflation with highest R-squared statistic in all estimations expresses its dominance. The last evaluation examines the cointegration relationship between core and headline inflation. Furthermore, the test imposes a uni-directional error-correction mechanism which comes from core measure to headline inflation only. While all five candidates satisfy the first part of the test, only SVAR-based measure passes the second requirement.

In sum, the results singles out the output-neutral as a useful core inflation indicator for policy purposes. Meanwhile, the central bank can also count on exponentially smoothed inflation to communicate with the public for its relatively good performance and simple construction. Future studies should however return on this subject when gathering enough data of the GSO core inflation to compare its performance with the others.

## **Chapter 6 A financial conditions index for Vietnam**

The tight connection between monetary - financial and real economic sphere has been well-documented in the literature. It is common wisdom that being able to quantitatively measure the information about economic activity contained in financial variables is meaningful for policy makers. Due to forward-looking nature of the financial market, current financial conditions can play a valuable role in macroeconomic forecasting models. Besides, since several transmission channels are captured in the changes of financial conditions, quantifying these movements is helpful for the conduct of monetary policy. Recently, there have been a great deal of propositions of financial conditions indexes (FCI) which synthesize the information contained in numerous financial variables into a single indicator, facilitating the use.

The aim of this chapter is to build up a financial conditions index for Vietnam. Although the Vietnamese financial market is still underdeveloped, it has been growing actively these recent years. It is thus believed that once constructed, such an index can serve as a useful indicator for the central bank.

There are two main methodologies to compute FCIs: the weighted-sum and the factor model approaches. In the first approach, the FCI is a weighted sum of selected financial variables with weights may be attributed equally for all variables or resulted from regression-based methods (Rosenberg 2009, Hatzius et al. 2010). Meanwhile, the factor

model approach is inspired by the fact that financial variables tend to move together, so the authors use different techniques to extract an (unobserved) common factor from financial variables that accounts for this comovement (Stock and Watson 2010). Our FCI for Vietnam is constructed using the Generalized Dynamic Factor Model (GDFM) framework proposed by Forni et al. (2000, 2005), based on a dataset of thirteen domestic and external financial variables. With this method, the estimated factor is said to be able to capture all the dynamic structure of the cross-sectional panel while still preserve the consistency of the standard factor model.

The FCI is defined as the common factor that captures the greatest shared variation in financial variables. Indeed, any variable can be decomposed into two orthogonal parts: a common component and an idiosyncratic element. The common component is driven by a certain number of dynamic common factors, among which the first one accounts for the biggest share in total variance. This dynamic factor is then approximated by one or some static factors which are contemporaneous linear combinations of financial variables.

Furthermore, as financial variables often reflect cyclical economic developments along with their own evolution, whereas an FCI should summarize only information extracted from financial variables without any influence from business cycles, the common factor is regressed on current and lagged output gap after being estimated. The error term obtained from that regression is thus the (purged) FCI containing only the exogenous movements in financial conditions.

The FCI performs well as a leading indicator for economic activity by capturing, with leads of 9 to 12 months, all significant developments during the examined period. More importantly, the FCI forecasts the output gap better than the autoregressive model does, irrespective of the forecast horizon. The robustness checks also give credit to the FCI for its outstanding performance compared to variants of FCI, constituting variables and other financial indicators. It is therefore beneficial for the SBV to consider this measure of financial conditions when making short-run policy decisions.

For the period ahead, with financial conditions being improved, the FCI indicates that the Vietnamese economy is gradually expanding, if there is no impactful incidents turn up.



## CHAPTER 2

### ECONOMY OF VIETNAM – AN OVERVIEW

**Abstract** From a planned economy, Vietnam has progressively transformed to a market one. Experiencing spectacular economic growth over the last twenty years, the country has become one of the most attractive investment destinations of foreign investors, while in domestic market, the private sector presence has been strengthened, contributing to the whole economy dynamism. To support such economic development, there have been commendable efforts by the government and the central bank. This chapter describes the main features of the economy of Vietnam since the *Doi Moi* reform program in late 1980s. The macroeconomic aspects is first summarized, including a presentation of recent performance and the economy model. The second section focuses on various financing channels of the economy, ranging from foreign direct investment, external borrowing or public finance to domestic financial sector. Lastly, the central bank and its monetary policy is studied in the third section.

**Keywords** Macroeconomic performance, growth model, financing, central bank, monetary policy

## 2.1. MACROECONOMIC SITUATION OF THE ECONOMY

### 2.1.1. *Economic performance*

The most convenient way to assess how well a country is doing to realize the key macroeconomic policy goals is to look at its economic performance. This latter is always expressed in terms of indicators for the purpose of giving some quantitative content to the government's economic aims and achievements (Crockett and Goldstein 1987). Indicators of economic performance should then cover the most fundamental components of economic welfare which are economic growth, employment, price stability and balance of payments sustainability. Our analysis on Vietnamese economic performance is therefore implemented on the basis of these four aspects.

- Economic growth

Attaining a high economic growth rate is the aim of the authorities of every country. In this realm, Vietnam has recognized remarkable achievement especially since late 1980s, as can be seen in Figure 2.1, left panel. The Gross Domestic Product (GDP) growth rate reached the highest value of 9.54% in 1995, while the average is an impressive number of 6.9% (over 1990-2013). For a better assessment, the Vietnam growth rate is compared with that of the rest of the Association of Southeast Asia Nations (ASEAN) and other developing countries. The right panel of Figure 2.1 shows that the former has been during most of the time above the average<sup>3</sup> rate of the region and amongst the greatest if we consider emerging markets from all over the world. More importantly, the country weathered the Asian crisis of 1997-98 and the global financial turmoil of 2007-09 in a finer way than most of other economies of comparable size in the region.

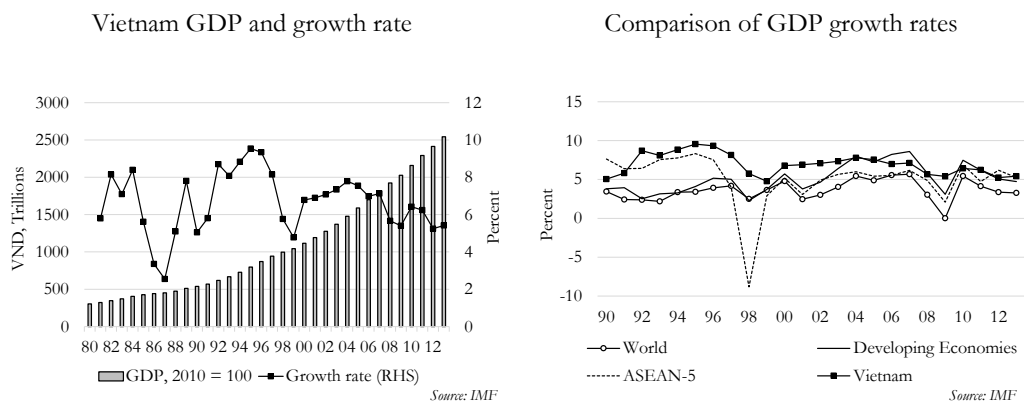
The profound reform program of *Doi Moi* initiated in 1986 has released the previously confined sources of economic dynamism, resulting in development for the economy. In the process of a regime change by dismantling the central planning system to move towards the market economy, the ownership structure has progressively diversified. Beside state-owned and collective enterprises, and a small household sector, the private sector, as both domestic and foreign-invested firms, was recognized and has rapidly

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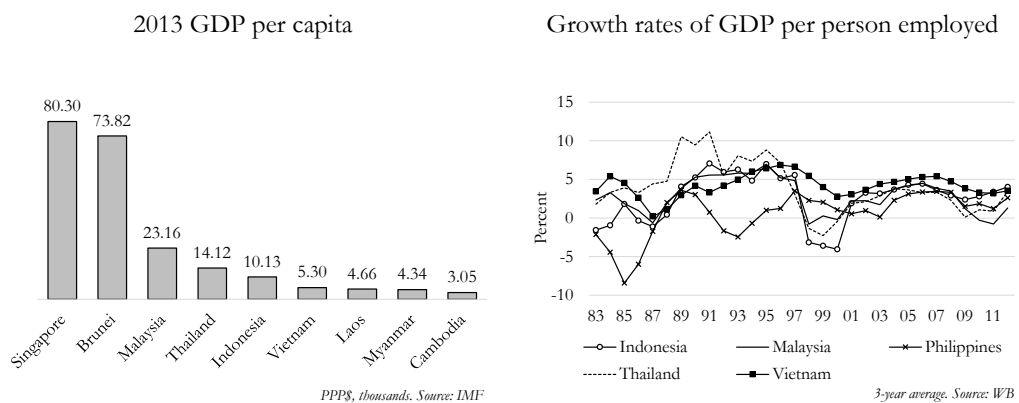
<sup>3</sup> All the average values of the ASEAN and group of developing countries are calculated by excluding Vietnam's number

expanded since then. These private enterprises have become the most important contributors to Vietnam's economic performance since 1998. There has also been the gradual integration of the nation into the regional and global economy along this transitional period, especially the accession to the ASEAN in 1995 and the World Trade Organization (WTO) in 2007. These memberships on the one hand have brought substantial benefits to the country through the promotion of external trade and capital inflows; on the other hand reflect the perception of international community of the efforts and attainment that Vietnam has had over the last two decades.

**Figure 2.1 Vietnam GDP and growth rate comparison**



**Figure 2.2 Comparison of GDP per capita and GDP per person employed**



It could be argued that real growth is more desirable when it is accompanied by an overall improvement of standard of living of local residents meaning that the economic development would be beneficial for every member of the economy. To this extent, it is interesting to look at the GDP per capita which is considered a measure of living standard. Following the policy shift, Vietnam has tried much to improve the quality of

life of the inhabitants: GDP per head has grown from less than USD100 in 1990 to USD400 in 2000 and up to USD1900 in 2013. As a reward, in 2009, the country was approved the middle income status by World Bank. The growth rate of GDP per capita (based on Purchasing Power Parity) has been prevailed over the ASEAN average with the only exception in 2010. However, it is demonstrated in Figure 2.2, left-hand panel that in spite of its effort, Vietnam remains among the countries of lowest income in the region (only above Cambodia, Lao and Myanmar) and the gap with its regional peers is still ample.

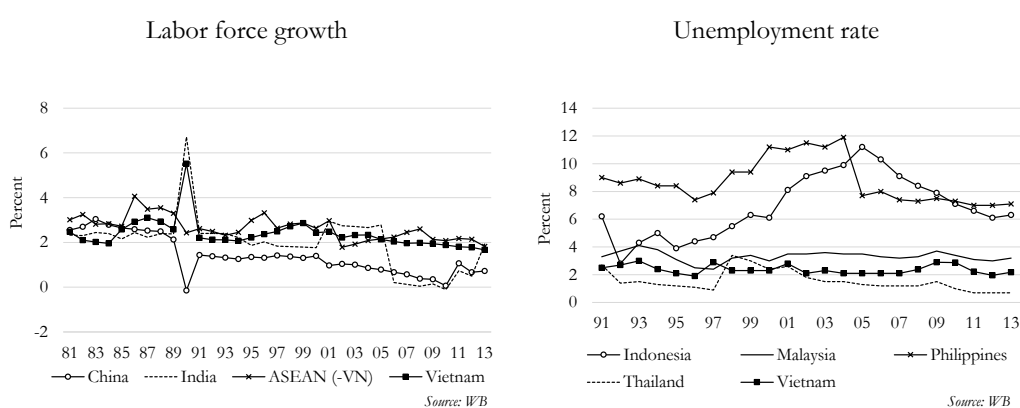
Another indicator directly related to the economic growth is the growth of GDP per person employed which represents labor productivity. The 1983-2012 period has seen a net increase of labor productivity of Vietnam. On average the indicator has augmented of 4.53%, outperforming the region average (2.93%) (Figure 2.2, right panel). On the other hand, when the average growth rate of output per worker is calculated separately over two sub-periods (1992-2000 and 2001-12), it can be observed that the rise in productivity in Vietnam is slowing down, from 4.82% in the first to 4.26% in the second sub-period, following the same tendency of the economic bloc (from 3.08% to 2.81%). Finally, we could notice that the growth rate of labor productivity is smaller than that of total GDP, suggesting that employment must have grown.

- Employment

Closely related to economic performance, creation of jobs or maintenance of a low unemployment rate is a crucial objective for government policy. One can refer to the rate of growth of the labor force per year as an indicator of employment development. Figure 2.3, left panel, gives us some ideas about the state of nature of labor market in ASEAN and China and India. The Vietnamese labor market has been somewhat followed the trend in the regional market with a period of noticeable expansion before 2000 (2.82% in 1980s and 2.36% in 1990s) succeeded by a more moderate progression of the labor force until the present time (neighboring 2%). On average, the growth of the work force in Vietnam is close to that of the region but lower than the latter of 25 percentage points (2.37% vs. 2.64%). Although this indicator provides some useful information about labor market conditions, it is not complete to judge the performance of different countries in the employment field. Indeed, a country with rapidly growing demographics could seem to be more successful in developing employment than the one where the population expands more slowly, even though the latter has a lower rate of involuntary unemployment.

A measure that can overcome this weakness is the rate of unemployment as percentage of total labor force. Obviously, the aim of government policy is to reduce the number of unemployed people, or alternatively say the smaller the unemployment rate, the better the performance of the economy. As can be observed in the right panel of Figure 2.3, Vietnam has performed well in this field. The proportion of jobless people in the national work force is modest and has been below the average rate of neighbor countries. The unemployment rate did sometimes augment, due to crises, but has remained less than 3%. High economic growth along with effective birth regulation program has resulted in more abundant work opportunities for the inhabitants. Consider the nature of the Vietnamese population, 70.7% is between 15 and 64 years old (in 2013) with an average growth rate of 0.9% per annum over the last ten years (Source: World Bank), the stability of unemployment rate at such a moderate level could be a considerable accomplishment. Nevertheless, the share of skilled workers in the labor force has been small – almost 18% in 2013, even after gradual increase from 2000 (GSO). High proportion of unskilled workers has been accompanied with low wages, high job insecurity and undeclared work. Such factors often contribute to social exclusion and growing inequality in the society. As a consequence, the problem that has to face the government in the coming years is how to develop the national labor market not only quantitatively but also qualitatively in order to bring the production up to a more sophisticated stage, and significantly improve living conditions for working people.

**Figure 2.3 Labor market comparison**

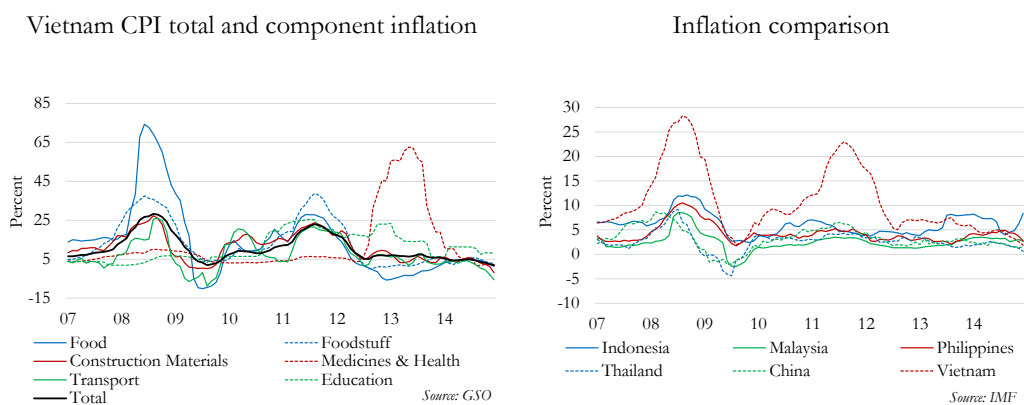


- Price stability

The well-known Phillips curve shows that there is a trade-off between inflation and unemployment. A low level of unemployment can be reached by high inflation and vice versa. This is why price stability is another important indicator of economic performance. From a domestic point of view, the government might try to stabilize the general level of consumer prices; therefore, it is worth looking at the movements in the consumer price index (CPI). Price stability appears to be the most substantial pre-occupation of Vietnamese as the country has been experienced severely high and persistent inflation, especially from the beginning of 2008 (see Figure 2.4, left panel). Inflation has had devastating influence on the Vietnamese economy, notably for the medium class. In point of fact, food and foodstuff both recorded extremely strong increase, beside other seriously inflated consumer goods and services such as education, transport and housing, which are all essential for people's life and country's development.

Notably, if the government can attribute the peak of inflation in mid-2008 to the damages of the global increase in food and energy prices, it cannot do so for the second summit realized three years later since this latter seems to be the national own story (Figure 2.4, right panel). From January 2010 to December 2011, while year-on-year monthly average inflation rate of neighbor countries was at most 5.35%, that of Vietnam climbed up to 23%. Over the same period, the regional average inflation is merely 4.7% whereas the country number is nearly three times bigger.

**Figure 2.4 Vietnam's and regional peers' inflation**



There are many factors pushing Vietnam inflation strongly upward as observed in 2011. The upsurge of the global price of several food commodity and energy (Figure 2.33 in the Appendix) did vigorously affect the domestic price level. Even though Vietnam is the world second biggest exporter of rice, it has to import a lot of other food stuffs such as wheat, dairy products and vegetable oil, which all experienced a boom in their price late 2010 and early 2011. Additionally, hikes of fuel price and electricity, and minimum wage, as the government's adaptive policy<sup>4</sup>, amplified existing inflation burden. Another component of cost-push inflation in the country is the devaluation of the dong by the State Bank of Vietnam (SBV), which was of 9.3% only in the first half of 2011. On the other hand, loose monetary policy in the past few years, expressed by extremely strong expansion in money supply and excessive credit growth<sup>5</sup>, has pushed inflation to take off. However, all of these above-mentioned factors could not have so much influence on Vietnam inflation if there was not sound domestic demand, especially in retail market, which has augmented by 27.8% per annum from 2007 (GSO). Important domestic demand growth has encouraged and allowed producers and importers to easily pass their higher cost of inputs on to retail prices rather than restructure their production or functioning. Finally, there must have been some degree of inflation inertia in local residents' formation of expectations because Vietnamese have been for long living with soaring consumer prices.<sup>6</sup>

- Balance of payments

Crockett & Goldstein (1987) argue that a sustainable balance of payments structure is an important policy goal. By maintaining the sustainability of the external payments configuration, countries would lessen the risks of protectionist pressures and minimize the costs and uncertainties involved when there is an unsustainable position arising and needing to be corrected.

A popular indicator related to the balance of payments is the current account surplus or deficit. While it seems to be more desirable to have a positive balance of the current account, the inverse situation cannot, however, always be criticized as a bad signal.

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<sup>4</sup> Domestic oil and electricity prices are strictly regulated by the government

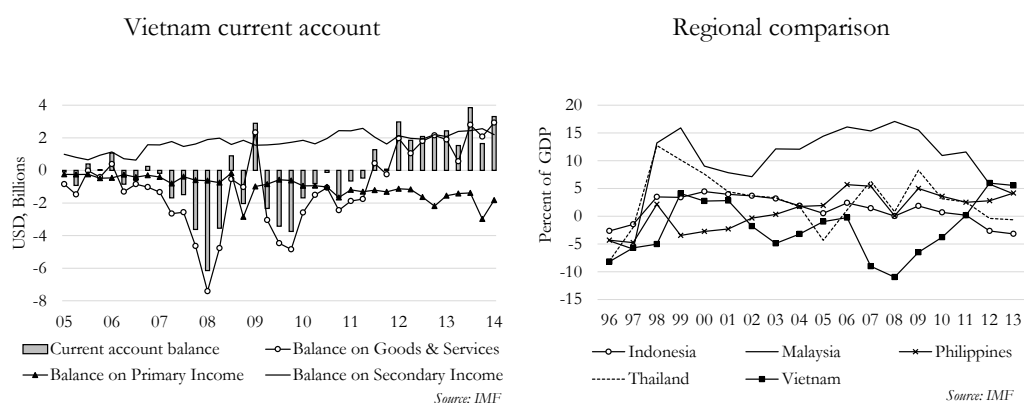
<sup>5</sup> During 2007-2011 period, M2 grew on average 28.9% per year while annual credit growth was of 33%

<sup>6</sup> For a more detailed study on determinants of inflation in Vietnam, see Nguyen and Nguyen (2011), Bhattacharya (2013) among others, for instance.

Ghosh and Ramakrishnan (2006) indicate that it all depends on the factors that engender such a deficit to properly say whether that external payments position is good or bad.

Since the current account balance can be measured in several ways, a deficit may reflect different national circumstances. First, if the current account is expressed as the difference between the value of goods and services exported and imported<sup>7</sup>, a deficit then means an excess of imports over exports. In this case, the deficit might be due to competitiveness problems, or high economic growth associated with insufficient domestic production, or decreasing demand in trading partners. For Vietnam, Figure 2.5 (left panel) shows that the country has registered negative balance of the current account during two thirds of the time since 2005, which has been mainly driven by deficit in trade balance. Stronger domestic demand because of fast economic growth has not been fully satisfied by the nation's yet weak production, notably in technology and innovation industry, inducing bigger increases in imports than exports. Besides, the country current account was also touched by the global crisis of 2007-2009 as importer countries' economy slowed down, their demand on imported goods decreased, the country exported less while still had to import high value merchandises. Therefore, Vietnam recorded its biggest current account deficit of 12% of GDP in 2008, the biggest in the region (Figure 2.5, right panel). However, the country has run a current account surplus since 2012Q1, reflecting a positive balance on goods and services and a secondary income surplus more than offsetting the deficit in primary income balance.

**Figure 2.5 Vietnam and ASEAN current account**

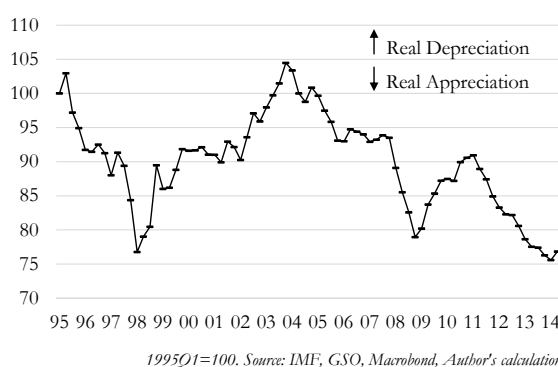


<sup>7</sup> The current account also includes net primary income (net income payments) and net secondary income (net current transfers), but these two elements only stand for a small fraction of the overall account and often offset each other.



With regards to competitiveness issues, one may look at the Real Effective Exchange Rate (REER). As an index that describes the relative strength of a currency relative to a basket of other currencies, REER can be viewed as an overall measure of the country's external competitiveness. Figure 2.6 depicts the evolution of such an indicator for Vietnam from 1995Q1 to 2014Q3. It is calculated based on CPI inflation and time-varying trade weights (export + import) of 27 most important trading partners.<sup>8</sup> Overall, the REER is appreciating which indicates decreasing competitiveness over the last two decades. Real appreciation happened in pre-crisis periods of both Asian and global crises, which may help cut back the downside effects of the crises that the country has to bear. Meanwhile, post-crisis time is associated with real effective depreciation of the dong. Since 2011, the Vietnam currency is appreciated against its major trading partners' one; the country is thus losing multilateral price competitiveness.

**Figure 2.6 Vietnam real effective exchange rate**



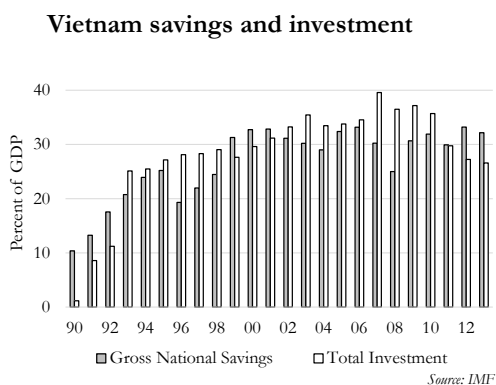
Additionally, the World Economic Forum's Global Competitiveness Report series still classify Vietnam as a country of weak competitiveness, staying in the first stage of development – the factor-driven stage. Meanwhile, many other ASEAN countries have already moved into upper stages for their economies are more competitive, and their advancing development is accompanied with higher productivity and product quality (Table 2.8). Vietnam has been competing by basing primarily on unskilled labor and natural resources while domestic companies vie on the basis of low price and sell raw staple products or commodities, typically operating at the bottom of the value chain. Moreover, several weaknesses prevent the country from being upgraded to a higher level. For instance, perceived corruption level though decreasing is still acute, the quality of higher education and training is low and far from the expectations of business

<sup>8</sup> See the Appendix for details on REER calculation

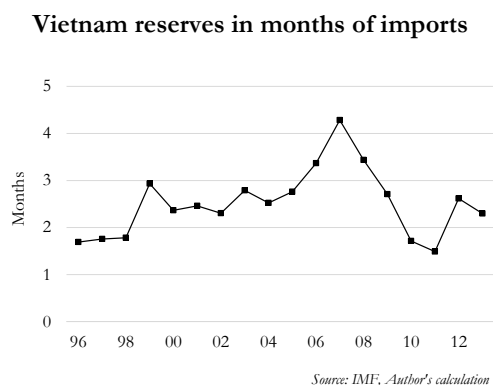
leaders, difficult access to financing, and substantial delays in adopting the latest technology.

A current account imbalance can also denote the difference between national savings and investment, a deficit in this case may reflect a lower level of saving than investment. If investments are efficient enough, this kind of deficit is welcomed as it would foster the national economic growth and development. For a developing country like Vietnam, a current account deficit may be natural since there are abundant investment opportunities that the economy cannot afford to take all in charge. As can be seen in Figure 2.7, total investment as percent of GDP was quite small at early 1990s but grew rapidly along the country's integration into regional and global economy. The gap between aggregate investment and gross national savings were extremely high during periods around the Asian and global financial crises. After the first half of 1990s with moderate level, investment in Vietnam has exceeded that of ASEAN-4<sup>9</sup> countries. The average difference amounts to 9.7% between 1998 and 2010, but has fallen significantly ever since. On the other side, saving has been high, hovering over 30% of GDP since 1999, due to underdevelopment of financial sector.

**Figure 2.7**



**Figure 2.8**



Although such current account deficits could be beneficial for Vietnam, running large and persistent deficits is dangerous because the country risks facing an abrupt and painful reversal of financing like Thailand in 1997. Among the factors susceptible to generate a reversal, many can be found in the Vietnamese situation, for instance: relatively low foreign exchange reserves (Figure 2.8), excessively fast domestic credit growth (Section 2.3.2), low growth in partner countries, high level of dollarization and weak financial sector (Section 2.2.2). Despite stable foreign direct investment (FDI)

<sup>9</sup> Indonesia, Malaysia, Philippines, and Thailand

inflows and remittances that are important sources of external financing, and existing capital controls<sup>10</sup>, caution is still required lest the country would be vulnerable to such a turnaround.

### 2.1.2. *Macroeconomic policy model*

- Socialist-oriented market economy

The 6<sup>th</sup> National Congress of the Communist Party of Vietnam in December 1986 marked an important step in the development of the national economy. Following its abandonment of the central planning model to adopt the so-called socialist-oriented market economy, the whole economic system and society have experienced dramatic transformations. Without entering into more details about these drastic changes, this section presents some principal characteristics of the socialist-oriented market economy model that has been installed in the country since then.

Officially, the socialist-oriented market economy is described as a multi-sectoral commodity economy functioning by market rules, consisting of a mixture of private, collective and state ownership of the means of production, and having the state sector as its backbone.

This model is inspired by the Chinese socialist market economy<sup>11</sup> where private sector is a major component of the economic system alongside the state-owned and collective enterprises. Principal differences between Vietnamese model and the Chinese one lie in their contrasting economy size, in the context where the reforms emerged and particularly in the role distribution of sectors in the economy. While China's reforms started after 30 years of bureaucratic in peace with large surpluses already accumulated; Vietnam began its transition 10 years later following decades of war and international embargo, thus in a total disastrous situation. On the other side, while private enterprises are allowed to exist but of only marginal importance in Vietnam<sup>12</sup>, those of China

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<sup>10</sup> Controls apply to all transactions in capital and money market instruments and in collective investment securities.

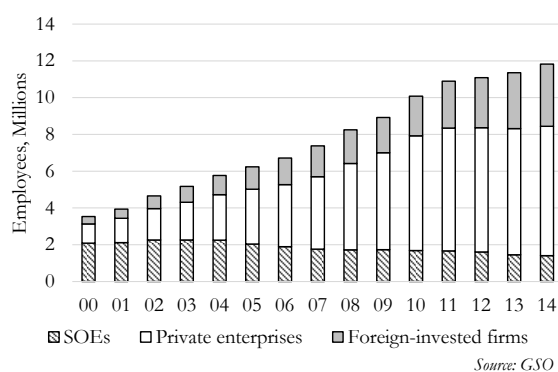
<sup>11</sup> Often referred to as “state capitalism” by analysts

<sup>12</sup> It is not until 2005 that private enterprises and state companies are legally equally treated as a result of the fusion of the old 1999 Enterprise Law (concerning only private sector) and the 2003 State Enterprise Law into a law unique – the 2005 Enterprise Law.

are much more accredited. For more complete comparisons between the two models see Karadjis (2005) and Cling et al. (2013), for example.<sup>13</sup>

Although China is an evident model for a combination of market economy with a one-party state led by the Communist party, Vietnam has also looked elsewhere. For instance, a glance at the neighbor Singapore, a single-party state as well, where the government *de facto* controls the “commanding heights of the economy” could bring about the establishment of the state investment agency called SCIC<sup>14</sup> in Vietnam, aiming to retain its stakes in partly privatized firms (The Economist 2008). Another example is the attempt to build up Korean *chaebol*-type conglomerates started in 2005 by merging multiple small state-owned enterprises (SOEs) into bigger entities known firstly as General Corporations and later as Groups. Nevertheless, by considering the actual links between state and private firms in Vietnam, Beresford (2008) suggests that the Taiwanese model – in which SOEs directly support<sup>15</sup> thousands of small export-oriented private firms – may be a more appropriate model for the country if it still wants to conserve the decisive role of state sector. In fact, the Vietnamese state and private sectors have not been rivals but rather of mutual dependence since many small to medium sized private firms are in sub-contracting arrangements with state-owned ones.

**Figure 2.9 Employment structure by ownership**



After years of transformation, the Vietnamese private sector has been growing considerably. Employment in this sector has expanded by nearly 7 times over the 2000-2013

<sup>13</sup> Nevertheless, since 2005, the market-oriented reforms in China have been partially reversed with the creation of grand state-owned enterprises concentrated in heavy industries. The two economic models have been since then much alike.

<sup>14</sup> State Capital Investment Corporation

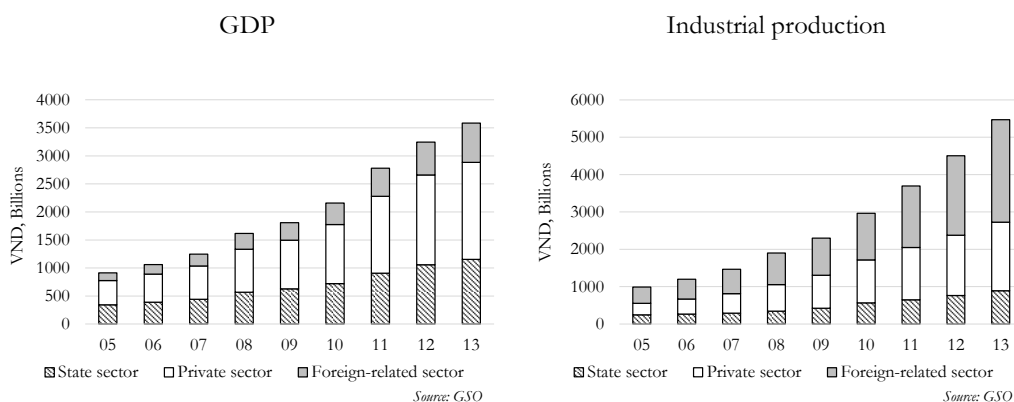
<sup>15</sup> by providing inputs or buying outputs of these small firms

period, from 1 to 6.9 million, representing now more than 60% of the national (declared) workforce. Figure 2.9 also shows that foreign-invested firms<sup>16</sup> have increasingly recruited to attain over 3 million employees in 2013, while state sector has lost more and more of its personnel both absolutely and relatively regarding other sectors.

Not only efficient in creating jobs, domestic private and foreign-invested sectors are good performers in production as well. GDP generated by private sector has grown by 6.07% on average over 2005-2013, while the GDP growth of state sector is only 5.27%. The best actor is foreign-related sector whose production growth has averaged 8.85% per annum, greater than the overall mean of 6.23%. The GDP structure by ownership has been relatively stable since 2005, with the dominance of private sector which accounts for roughly 48% of the national production (Figure 2.10, left panel). The second place is occupied by public sector but its importance has been diminishing, from 38% in 2005 down to 32% in 2013. Meanwhile, foreign-invested firms has increased their contribution to Vietnam's GDP, which is now 20%.

As regards the industrial production (IP), although the growth rate of private sector is lower than its public peer's (8.1% per annum on average over 2010-2013 versus 9.2%), the former's contribution is double that of public sector (33.6% of total IP versus 16.3% in 2013). In this area, domestic sector has been predominated by foreign-related one. The latter's weight has always been the most important, reaching 50.1% of total IP in 2013 (Figure 2.10, right panel).

**Figure 2.10 Production by ownership**



<sup>16</sup> including FDI and joint-venture firms

Next, we compare the three sectors by their labor and capital productivity. Imposing state enterprises' 2005 GDP per person employed (or unit of capital) ratio as unity, we have Figure 2.11 depicting the relative evolution of both productivity measures of each sector over time. While private and foreign sectors has manifested only weak improvement in labor productivity since 2005, public sector has seen its ratio growing by almost five times, from VND170 million/employee in 2005 to VND790 million/employee in 2013. In spite of the reduction of its share in GDP, the state sector's part in the total number of employees has decreased more strongly, resulting in the hike in its labor productivity. With regard to capital productivity, there is not much difference between sectors at the end of the sample. Although private enterprises' ratio was 2.5-time bigger than that of the other two sectors in 2005, it has steadily fallen to stay around one in 2012 (from 0.62 in 2005 to 0.21 in 2012). In other words, the capital output ratio has surged in private sector while remained stable in state and foreign-related ones. This can be due to the decline of capital cost that have to bear private enterprises. In the middle of 2000s capital was much more expensive for these companies than the others that they had to rely on other production factors. Later on, with the normalization of treatment between economic sectors after the new Enterprise Law coming into effect in 2005, they have had more access to and cheaper capital; thus, their stock of capital have expanded.

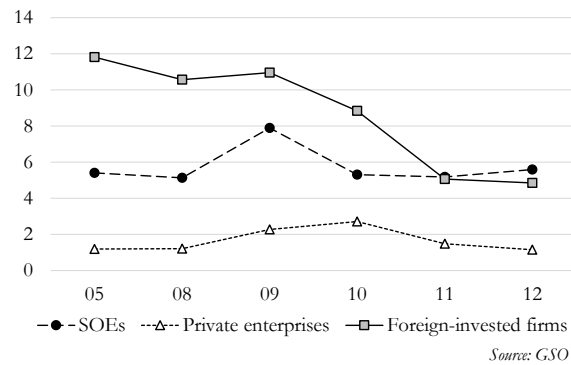
**Figure 2.11 Productivity by ownership**



Finally, profitability of the three categories is considered (Figure 2.12). Private enterprises have the lowest profit/gross revenue ratio while state-owned companies have registered quasi-stable profit margin of about 5.5%, except in 2009. Foreign-invested firms recorded very high profit rate in the middle of 2000s which has however shrunk dramatically since then. SOEs thus substituted them to be the most lucrative sector even though the gap is still small. This result is reassuring because SOEs are treated as

the backbone of the economy and have received many privileges but have delivered unsatisfactory performance. The scandals at Vinashin<sup>17</sup> and Vinalines<sup>18</sup> have pointed out the urgent need to restructure these state companies.

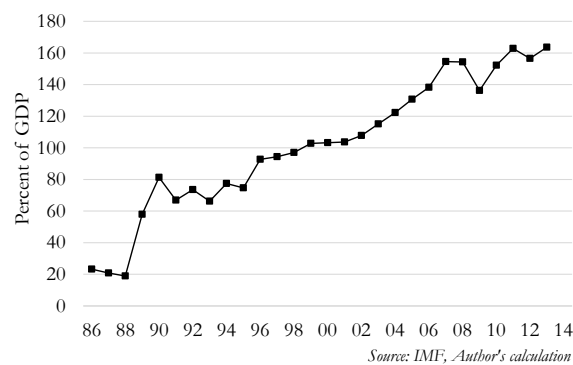
**Figure 2.12 Profit margin by ownership**



- Export-led growth strategy

Like other emerging and developing South-East Asian countries and because of its size, Vietnam is highly opened to the international economy. But this has not been imaginable as far as mid-2000s since it had been an isolated country before the American embargo removal in 1993. The degree of openness (sum of exports and imports over GDP), around 70% at that time, has not ceased to increase ever since, reaching almost 164% in 2013 (Figure 2.13).

**Figure 2.13 Vietnam degree of openness**



<sup>17</sup> Vinashin – Vietnam Shipbuilding Industry Group – received the state bailout in 2013 after heavily indebted. Its executives have even been arrested for mismanagement. After the conglomerate’s bankruptcy, the core company specialized in shipbuilding is restructured to become a 100% state-owned limited company.

<sup>18</sup> Vinalines – Vietnam National Shipping Lines conglomerate – registered huge losses and nonperforming loans. Some of its executives have also been imprisoned for embezzlement.

The country has also implemented an export-led growth model to profit more of its openness. The original export-led growth model consists in developing the national productive capacity by focusing on foreign markets. However, with the global increased mobility of technology, capital and managerial expertise, this development strategy has now been taken a new form. As such, the Vietnamese export-led growth strategy can be characterized by a combination of two major elements. Apart from the managed undervaluation of the exchange rate that will be discussed in Section 2.3.2, the second element is double-fold. While still building its indigenous industrial capacity, the country has also turned itself into an export production platform for foreign multinational corporations (MNCs). Beneficiary of prioritized access to credit, inputs importation facilities, as well as infrastructure improvement, the national traditional export industries have contributed a non-negligible part to economic growth. Exports of natural resources<sup>19</sup>, agricultural products<sup>20</sup>, and textile and foot wares<sup>21</sup> account for around 40% of GDP. This number is relatively stable throughout the 2005-2014 period, with the last two categories rotate to occupy the most important place. Natural resource exportation has on the contrary continuously decreased, from almost 14% GDP in 2005 to roughly 6.4% in 2014 (Figure 2.14, left panel). Over total export value, these exports have recorded diminishing shares too (Figure 2.14, right panel). The arrival of MNCs in Vietnam through Foreign Direct Investment (FDI) firms and joint-venture companies has promoted the production and exportation of more sophisticated, higher value-added goods such as computers, telephones, electronic, machinery and means of transport products, etc. From a tiny share of 3% of GDP and almost 8% of total export in 2005, these merchandises now represent 25.6% of GDP and 38% of total export.

These good numbers need however to be used with caution. By looking at the importation pattern, we realize the assembling nature of Vietnam's growth model. For instance, to export apparel, foot wares and accessories, the country has to import a lot of machines, equipment, and even cloth for textile industry. Another example is the importation of fertilizers to serve agricultural production and exportation. In a likely

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<sup>19</sup> Natural resources include coal, crude oil, gasoline, steel, and valuable stones and metals.

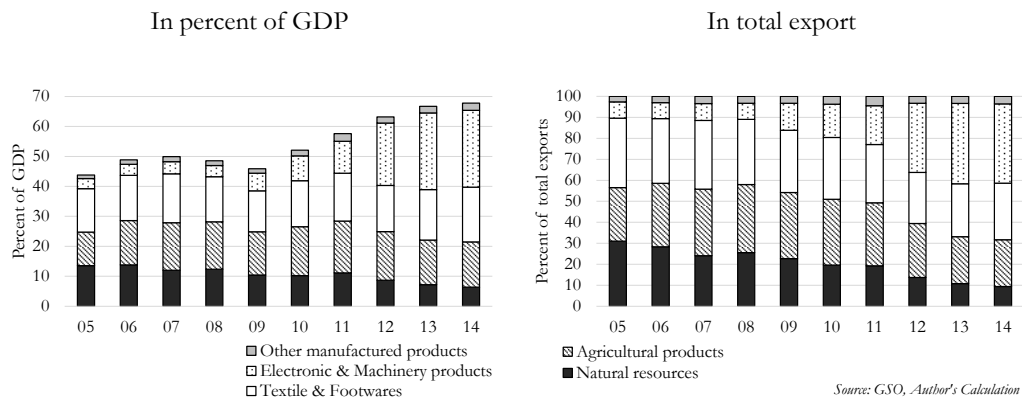
<sup>20</sup> Agricultural products include both raw and preliminarily treated products: cashew nuts, cassava and products, pepper, rice, rubber, sea food, tea, vegetables, wood and wood products.

<sup>21</sup> Textile and foot wares category consists of textile, shoes and sandals, hand bags, wallets, suitcases and umbrellas.



manner, a great amount of money has to be paid out for imported electronic spare parts and computer final products, or whole units of means of transport because of the country's assembler role. Assemblage is necessary for every country without solid industrial base to enter the global production chain. Recent substantial technological and capital mobility has moreover spread this model to many countries especially where wages are still low. Nonetheless, one cannot rely on this comparative advantage forever since wages will increase along the economic development process.

**Figure 2.14 Exported product value shares**



**Figure 2.15 Vietnam foreign trade structure by ownership**

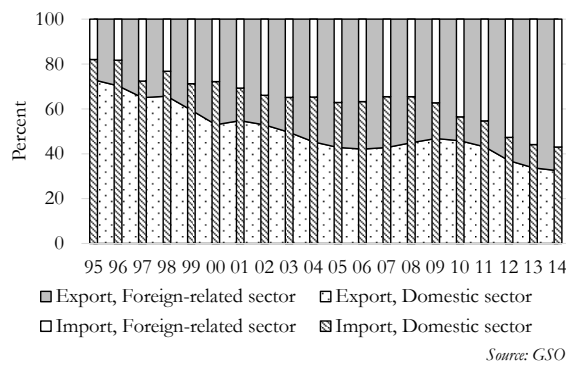


Figure 2.15 shows us the contribution of domestic sector to foreign trade in comparison with that of foreign-related enterprises. The share of domestic sector in both export and import has been decreasing over the last twenty years. From the position of an absolute dominator, domestic enterprises are now outperformed by FDI or joint venture firms in exporting goods to foreign markets. The former only accounted for 32.6% of total export in 2014. Foreign-related companies' share in import has also

increased but the difference between two sectors is smaller than in export. This evolution in foreign trade structure points out an important fact. Indeed, relying on an export-powered growth model has promoted the development of Vietnam's national industry body, but not as much as it has reinforced the country's dependence on MNCs.

## 2.2. FINANCING FOR THE ECONOMY

Financial resources are important to every business; so do they to every economy. This is particularly true for developing countries who often face critical resource constraints plaguing their efforts in fighting poverty and achieving other development goals. Those difficulties come from insufficient financing capability of internal sources such as government funding or domestic financial intermediation. External finance are thus much needed. Without any exception, a developing economy like Vietnam is relying heavily on external financing, both from official and private sources, besides its small but growing domestic funding bodies. This section will discuss the most important financing sources for Vietnam as well as related subjects being debt sustainability, financial liberalization, domestic financial system stability and the like.

### 2.2.1. *External finance*

According to the United Nation Conference on Trade and Development (UNCTAD) and World Bank classification, the aggregate capital inflows into a country can be decomposed into four categories: equity investment; external debt, including Official Development Assistance (ODA); and workers' remittances.

- Equity investment

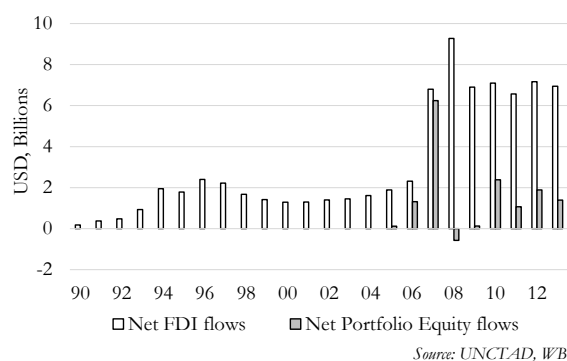
Vietnam has received equity investment by means of Foreign Direct Investment (FDI) since 1980s, and more recently started to have portfolio equity investment. FDI refers to investment made by a resident entity in one economy with the objective of establishing a lasting interest in an enterprise based in another country. It is distinguished from portfolio equity investment by the ownership of 10% or more of the ordinary shares or voting stocks.

The second type of equity investment has been very volatile, as can be seen in Figure 2.16. On the eve of the global financial crisis, portfolio equity flows amounted to USD6.2 billion, synonymous to a leap of 375.5% from 2006's number. However, it turned negative one year later and has hardly exceeded USD2 billion ever since. This

evolution suggests that portfolio equity is not a reliable source of financing for development.

Inversely, FDI continues to be an important funding source for Vietnam. The development of FDI flows since 1990 can be divided into three periods: before 1994, 1994-2006, and 2007-present (Figure 2.16). After the US embargo removal in 1993, direct investment from abroad entered in a new phase with net inflows surrounding USD2 billion per annum. Despite some decline in the aftermath of the Asian crisis, the flows gradually recovered until reaching the pre-crisis level in 2006. Beside the above mentioned surge in portfolio equity flows, 2007 also saw an almost 200% upswing in FDI. Nevertheless, unlike the former, FDI inflows have stayed relatively stable ever since. Except 2008, average net FDI inflows to Vietnam over 2007-2013 period is nearly USD7 billion.

**Figure 2.16 Vietnam net equity investment inflows**



Asian countries are the most active direct investors in Vietnam, with 8 out of 10 biggest investor countries coming from this continent. Among them, Japan occupies the top of the leaderboard with cumulative registered investment of USD35.2 billion in 2013, representing more than 15% of the total outstanding FDI stock. Regarding FDI structure by sector, more than a half of accumulated registered capital are invested in manufacture and processing (USD126 billion in 2013). These investments have brought in meaningful contribution to the development of the country’s productive body over the last two decades. The second biggest receiving sector is real estate, accounting for 21% of the FDI stock, which would be conducive to a property boom in Vietnam a couple of years ago.<sup>22</sup>

<sup>22</sup> The complete list of top FDI investors and top receiving sectors can be found in the Appendix.

Such a good direct investment attracting performance is the fruit of the government's numerous supporting measures, ranging from the provision of a more equitable legal framework to practical and economic reforms to improve domestic investment environment. The promulgation of the Foreign Investment Law in 1987 and several amendments thereafter, together with reforms on trading rights and gradual relaxation of non-tariff barriers are among the most notable institutional efforts towards the creation of a level playing field between domestic and foreign enterprises. Vietnam also promotes supporting and accessory industries, enhances infrastructure, and delegates FDI management to local governments to increase flexibility and effectiveness. Furthermore, frequent and close consultation with existing and potential investors shows the government's willingness to attract sustainable FDI flows.<sup>23</sup>

There have been however some concerns about the benefit of FDI to the economy so far. Indeed, scholars and policymakers refer to limited technological transferring, weak participation of domestic enterprises in the production chain of FDI firms, and unsound investment structure. For instance, Honda Vietnam has 40% of its spare parts produced locally but most of them are from other FDI companies in Vietnam; or only 10 over 70 input providers for Canon Vietnam are domestic.<sup>24</sup> Consequently, there are urgent needs for a change in strategy. Not only is it important to attract FDI quantitatively, but boosting technology and managerial know-how transmission is also vital for the qualitative development of the economy. This can be done by endorsing domestic support industries, favoring projects that accommodate technological relocation, etc.

- External debt

The second essential source of external finance for Vietnam is debt owed to nonresident creditors. According to WB, external debt must be the debt repayable in foreign currencies or in goods or services by public and private entities in the country. The total debt include short-term (original maturity of one year or less) and long-term (maturity of more than one year) debt and IMF credit. As shown in Figure 2.17, long-term debts have dominated over short-term ones, representing over 90% of the total debt. External debt stocks were relatively stable around USD20 billion before 2008 but have increased rapidly since then. This is due to large accumulation of long-term debts (private long-term debt data are not available until 2010, but due to capital controls the

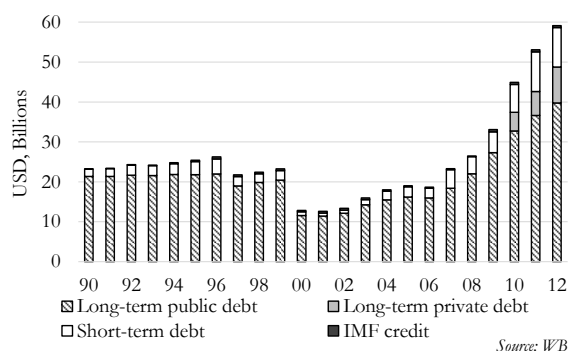
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<sup>23</sup> See Vo and Nguyen (2012) for more details on the government's pro-FDI measures

<sup>24</sup> Government website (baodientu.chinhphu.vn) April 9, 2015

past amount could not be so big that could change the overall pattern). Since 2010, public long-term debt keeps expanding but with a slower rhythm (growth rate passes from 11.8% per annum in 2011 to 7.4% in 2013), while private debt is growing very fast, more than 30% per year.

**Figure 2.17 Vietnam external outstanding debt stock**



Within (long-term) public and publicly guaranteed (PPG) debt category, the share of debts coming from official creditors are stable from one year to another, equaling more than 80%, while private creditors only account for 20% of the total PPG debt stock. On private creditor side, over 1997-2013 on average more than a half of debts are bank loans; this number in 2013 is 67.5%. Vietnam's borrowing by bonds started in 1997 and has steadily gained ground, now accounting for 32% of private creditors' lending to the country. Meanwhile, trade credits and the like to public debtors are less and less relied on.<sup>25</sup> Among official creditors, if bilateral loan agreements accounted for virtually all of official credits to the country in the 1990s, their share has been steadily declining. At the same time, multilateral organizations like WB group or IMF have accorded more and more credit to Vietnam; their share have increased from 22% of official PPG debts in 2000 to 52% in 2013.

Concessional loans<sup>26</sup> from both types of official creditors predominate non-concessional ones. Over all PPG debts from official creditors, the former often represents more than 90% and still 88.5% in 2013. The share of concessional debts in total multilateral credits is contracting, though slowly, following Vietnam's classification as a

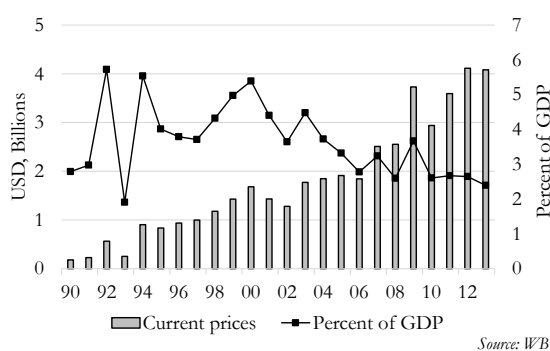
<sup>25</sup> All external debt data are from WB International Debt Statistics.

<sup>26</sup> "These are loans that are extended on terms substantially more generous than market loans. The concessionality is achieved either through interest rates below those available on the market or by grace periods, or a combination of these. Concessional loans typically have long grace periods." (IMF)

middle-income country in 2010. Meanwhile, the share of these debts in bilateral loans is staying most of the time at 95% or more, without any signs of weakening.

A special kind of concessional loans, also an important external funding source for Vietnam is Official Development Assistance. This flow of official financing constitutes concessional loans with a grant element of at least 25%, having as its main objective the promotion of economic development and welfare in developing countries. Indeed, ODA has effectively supported the socio-economic development and poverty reduction efforts in Vietnam. Physical (transportation, water supply and drainage) and social infrastructure (education and training, and health care) development are receiving the most funds (each sector accounting for more than 30% of total ODA financing), following by rural development and poverty reduction programs. Until 2013, more than 50 donors (nearly 30 bilateral and more than 20 multilateral) have been implementing regular ODA programs in Vietnam. Among them, Japan is the biggest bilateral donor and WB International Development Association (IDA) the top multilateral grantor. From 2008 to 2012, more than 54% of bilateral and 40.5% of multilateral ODA disbursements are from Japan and IDA respectively.

**Figure 2.18 Vietnam net ODA received**



The net received ODA value has been following an upward trend, from USD265 million in 1990 to USD4.36 billion in 2013 (Figure 2.18). The 1990 decade recorded an impressive average ODA disbursement growth rate of 41% per annum, succeeded by 9% average growth in 2000s and 4% over 2010-2013.<sup>27</sup> Inversely, net ODA as percent of GDP is rather falling, in accordance with somewhat opposite evolution of the two variables. It was almost 4% on average over the 1990s, down to 3.7% in 2000s, then

<sup>27</sup> Calculated on net ODA received in constant prices

to 2.6% from 2010 to 2013. The ratio is forecasted to continue its waning due to Vietnam's access to ODA, notable grant aids, is more and more reduced.

**Table 2.1 Vietnam external debt sustainability ratios**

	External Debt Stocks (% of Ex- ports)	Interest Payments on External Debt (% of Exports)	External Debt Stocks (% of GNI)	Interest Payments on External Debt (% of GNI)	External Debt Stocks (% of GDP)
1990	-	-	384.01	1.16	359.55
1991	-	-	257.06	0.53	306.14
1992	-	-	255.32	0.59	246.60
1993	-	-	190.62	0.85	183.35
1994	-	-	156.22	0.60	152.03
1995	-	-	123.98	0.68	122.26
1996	272.41	2.01	108.19	0.80	106.33
1997	183.53	2.74	82.54	1.23	80.88
1998	185.33	3.54	83.99	1.60	82.37
1999	164.01	2.56	82.15	1.28	81.00
2000	73.56	2.02	38.74	1.06	41.25
2001	69.49	2.11	36.20	1.10	38.79
2002	67.34	1.52	35.70	0.81	38.03
2003	67.78	1.28	37.92	0.72	40.34
2004	58.92	1.17	37.04	0.74	36.33
2005	51.47	1.18	33.65	0.77	33.03
2006	40.90	1.00	28.71	0.70	28.09
2007	41.76	1.10	30.95	0.82	30.04
2008	37.28	0.84	27.54	0.62	26.95
2009	52.01	0.85	32.61	0.53	32.55
2010	56.05	0.98	40.28	0.71	39.84
2011	49.98	0.95	40.92	0.78	39.43
2012	47.50	0.97	39.69	0.81	38.00
2013	45.80	0.85	40.20	0.75	38.38

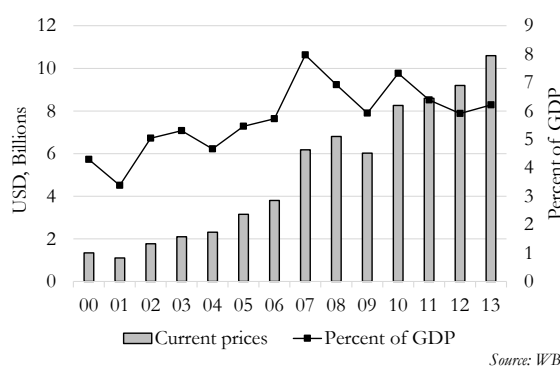
‘-’ not available data. Source: World Bank

We conclude this section on Vietnam's external debt with an analysis of debt sustainability. Various ratios as presented in Table 2.1 can be indeed useful. The year 2000 marks a crucial break in external debt management of the country. In 1990s, total outstanding debt was always at dangerous level, no matter whether it is measured in per-

centage of Exports<sup>28</sup>, Gross National Income (GNI) or GDP. Over this period, external debt stocks amounted to 201% of exports, and more than 186% of GNI or GDP on average. In spite of important annual drops, at end-1999 debt-to-export and debt-to-revenue ratios were still 164% and 82% respectively. Since 2000, debt-over-GNI and debt-over-GDP ratios have stabilized around 40%, while total external debt stocks equal less than 50% of total exports; all are staying at acceptable levels. Interest payments on external debt ratios, on the other hand, remain quite stable over the studied period. With that favorable debt dynamics, Vietnam is actually classified as having low risk of external debt distress, with PPG external debt below vulnerability thresholds according to IMF and WB (2014).

- Workers' remittances

**Figure 2.19 Vietnam workers' remittances**



Beside debts and equity investment, Vietnam has been receiving substantial amount of workers' remittances from abroad, which constitute a principal element of private capital inflows. As shown in Figure 2.19 personal remittances have witnessed an eight-fold increase in value over the last 14 years. Vietnam has been among the top ten countries who receive the biggest amount of remittances these recent years according to data compiled by WB. Worker's remittances as percentage of GDP are going up as well. In 2013, remittances account for 6.2% of GDP, similar to total short-term debt's importance but outperform total equity investment (4.9%) and ODA (2.4%). However, while remittances have become significant financial resources for Vietnamese households, they cannot be substitute for other sources of development finance. Nguyen and Mont (2011) point out that development effect of international remittances is very

<sup>28</sup> Exports stem from Exports of goods and services, and receipts of income from abroad.



weak in Vietnam since most of workers' remittances from abroad are spent on property, debt repayment, and saving, while none of this money is spent in production or current consumption.

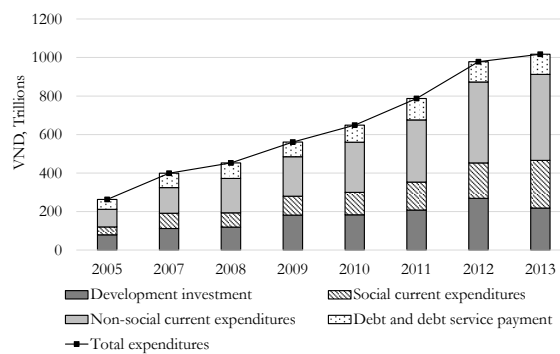
### 2.2.2. Internal financing

Despite its small scale and incompleteness, internal financing sources such as government finance or financial intermediaries are expanding speedily to contribute more and more to the socio-economic development.

- State funding of the economy

In a developing country like Vietnam, the government plays a key role to economic development. Among the most important instruments at the disposal of the government to achieve its goal, public finance is indispensable to foster economic activity. Development investment item of public expenditure, most of which is spent on capital construction, is augmenting at the speed of 17.4% per annum on average over 2007-2013 (Figure 2.20). This item now reaches VND218 trillions (2013), representing 21.4% of the budget and historically being in line with comparable countries. Within the current expenditures, spending for education and health care are two of the most essential elements, with the former pleasantly higher than in comparator low-income or emerging market countries. They both have grown by 19% per year on average over 2007-2013.

**Figure 2.20 Public expenditures and structure**



However, the contribution of public finance to economic development is actually being reduced amid more and more expensive functioning of the government. Although development investment occupies the second biggest position of the budget, it is far

behind the top item which is non-social current expenditure<sup>29</sup>. This latter accounts for more than one third of the state budget, even twice as big as the investment value. Particularly, public employee compensation is much higher than that of other developing countries. On the other hand, while the share of investment is cut down over time (30.2% of the total expenditures in 2005, 21.4% in 2013), that of operating expenses is climbing up, even more strongly (from 34.8% in 2005 to 43.9% in 2013). IMF and WB (2014) thus suggests that Vietnam should carry out a fiscal consolidation to support robust inclusive growth by providing higher investment, maintain critical social spending, and making spaces for potential restructuring costs.

The government special task in economic development process must rely on a solid revenue base. For Vietnam, principal sources of general government revenues emanate from various taxes and fees, and oil revenues. Among tax earnings, value added tax (VAT) and corporate income tax (CIT) are the two most important contributing items with around 25% of tax revenues from VAT and 30% from CIT. From 2003 to 2013, CIT revenues have subsided from 8.25% of GDP to only 3.6% (Table 2.2) due to a tax rate cut from 28% to 25% in 2009. This revenue element is expected to fall further in the coming years because the tax rate will be revised down to 22% in 2014 then to 20% in 2016 as parts of the government's expansionary fiscal policy. At the same time, personal income tax is enriching the budget but its impact is still moderate due to difficulties in tracking personal earning in private sector. Apart from tax income, oil is a main source of the state revenues. From 2000 to 2008, its contribution equals 20%-30% of the total revenues, or more than 6.5% of GDP (Table 2.2). Since 2009 (except 2012), as the world price has firmly dwindled, oil revenue is diving too.

**Table 2.2 Principal budget revenue sources in percent of GDP**

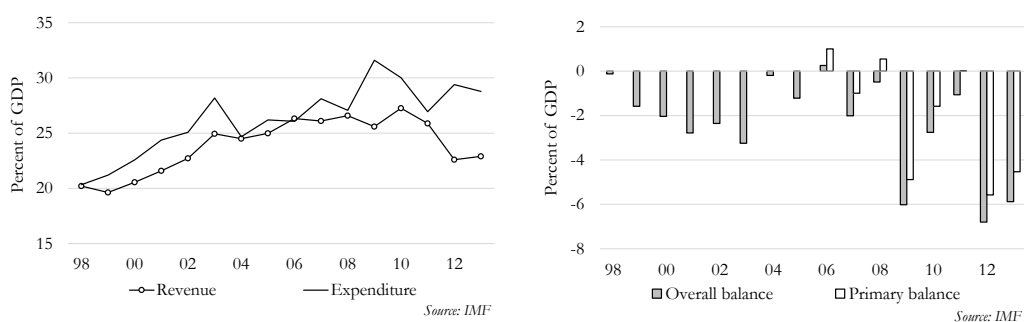
	2003-2005	2006-2008	2009-2011	2012-2013
Value added tax	5.50	6.21	7.25	5.80
Corporate income tax	8.25	9.72	7.00	3.60
Personal income tax	0.47	0.63	1.13	1.34
Trade-related tax and fee	3.25	3.51	3.75	2.20
Oil revenues	6.51	6.58	3.54	3.60
Other	1.74	1.26	2.80	2.60

Source: Pham et al (2012), IMF, GSO, Author's calculation

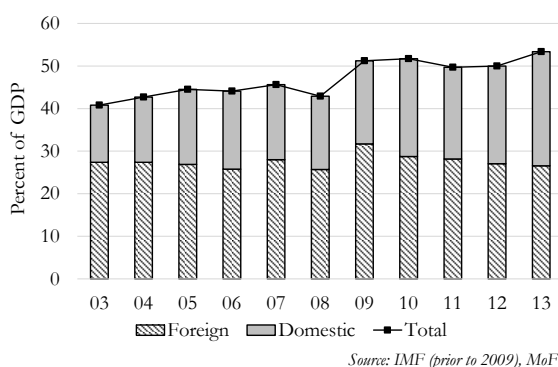
<sup>29</sup> Current expenditure excluding spending on education, health care and culture

Overall, total revenues has been in decline since mid-2000s after regular accumulation in earlier years (Figure 2.21) while expenditures is expanding. Due to a slowing of economic growth in recent years, an expansionary countercyclical fiscal policy has been adopted. Indeed, tax and tariff reductions and exemptions are scaling revenue down, but more than the degree of expenditure restraints (including the above-mentioned capital cutback and some civil service and wage freezing), resulting in fiscal deficit enlargement. Three over five years since 2009 witness an overall balance of more than 5% of GDP, with the primary balance broadly nearby. Despite the government various efforts to limit the deterioration in fiscal position, a significant budget deficit is anticipated to sustain because more fiscal stimulus on revenue side are programmed for years ahead.

**Figure 2.21 General government budget balance**



**Figure 2.22 Public sector debt**

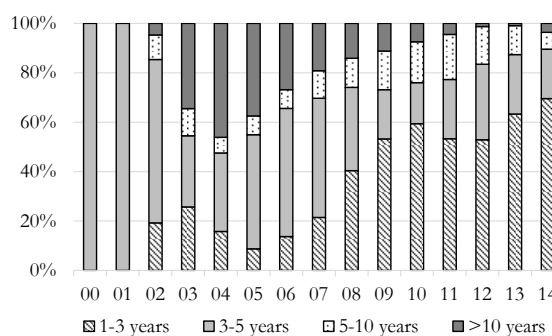


To finance its budget deficit, the government is incurring debts, both domestically and internationally<sup>30</sup>. Figure 2.22 exhibits general public sector liabilities in percent of GDP, including public and publicly guaranteed debts of the central and local government,

<sup>30</sup> Domestic and foreign debt is defined as VND and foreign-currency denominated debt respectively.

and state-owned enterprises. Total public debt is always bigger than 40% of GDP since 2003, but stayed rather stable prior to 2009. After a brief decrease in 2011, public debt has risen considerably ever since, in contrast to other low-income countries (IMF and World Bank 2014), due to sizeable build-up of domestic debt. Only the latter is presented in this paragraph since most of PPG external debts, which are long-term ones, have been discussed in the above section on External finance (section 2.2.1, page 29).

**Figure 2.23 Government bond maturity profile**



Source: AsianBondsOnline

Public domestic debt has doubled since 2003, 13.4% of GDP to 26.8% in 2013. If at the beginning of 2000s, only one third of public debt is VND denominated debt, in 2013 the latter's share is already more than 50%. This sharp increase, especially during recent years, results from fiscal easing measures, thus the need to finance primary deficits. General government debt is mounting more rapidly than that of SOEs, which is actually waning in terms of percent of GDP. Additionally, public debt expansion also reflects development in domestic bond market<sup>31</sup> since it is the government's principal internal financing place. In 2013, about a half of public debts are materialized by bonds, doubling the value of loans and advances from financial institutions. Government bonds are issued mainly by the State Treasury with an average term of 3.8 years in 2013 and a coupon ranging from 7.5 to 9 percent, mostly held by financial intermediates and about 7% of the outstanding stock by nonresidents. However, vulnerabilities are developing since the maturity structure has been shortened dramatically (Figure 2.23). Before 2007, number of bonds of 1-3 year to maturity represented only 17.4% of total outstanding securities; this number went up to 40.4% and 69.6% in 2008 and 2014 respectively. According to IMF and WB (2014), although total public debt is still below

<sup>31</sup> An analysis of Vietnam bond market will be given in the following section on Bank and market funding.

distress thresholds, fast growing domestic debt and scheduled fiscal easing would make overall debt a real concern in the medium run.

- Bank and Market funding – Analysis of the financial system

Financial intermediation has been for long believed to play an active role in the growth process by effectively funnel household saving to business investment. The Vietnam financial system, despite its nascent characteristics, deserves a center position in the economic development of the country during the last three decades.

Vietnam's financial industry essentially started in 1990 with the transformation of the banking system from one-tier to two-tier, in which the SBV operates as a central bank while credit institutions conduct commercial banking services. Since then, the financial sector has grown significantly, now becoming a crowded marketplace of banks and non-banks establishments, with total assets of 200 percent of GDP in 2011. The number of banks along with their capital scale has augmented considerably. There are in 2013, 150 banks and bank branches and over 1000 non-bank credit institutions. The establishment of equity and bond markets also foster the financial sector's expansion and develop more funding channels for the economy. Along with developing standard commercial financial services, efforts have been made to facilitate access to finance for small and medium enterprises, low-income clients and rural areas through the nationwide network of three supporting banks<sup>32</sup>.

*Banking sector* is dominating the financial system; its assets equal 160.6% of GDP in 2013, representing about 90 % of the whole system's assets. Deposit-to-GDP and credit-to-GDP ratios both point to a quick expansion of the sector, especially from 1999. As shown in Figure 2.24, bank deposit has increased significantly since end-1990s, driven by a large savings ratio, rapid economic growth, and slower development of alternative savings instruments. The ratio of banking sector credit to GDP follows the similar pattern, owing to very high investment level. These ratios have exceeded the regional standard as measured by ASEAN-4 average during recent years (WB and IMF 2014). Almost all of domestic credit is offered to private sector, but the share of net claims on general government in total credit has been rising speedily since 2007 (3% in 2007 to 10.6% in 2013), equaling 11.4% of GDP in 2013. About 38% of total

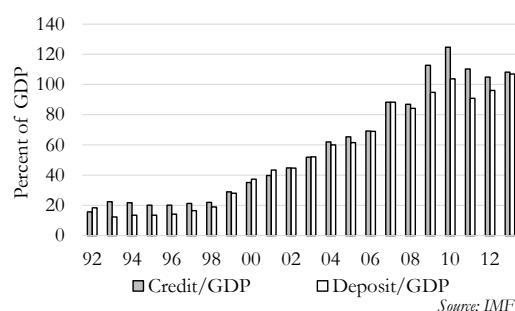
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<sup>32</sup> Including Vietnam development bank, Bank for social policies, and Bank for agriculture and rural development.

credit is provided to productive sectors (agriculture and industry), 10% for construction, and 23% for service (2013).

However, the banking sector development has been volatile recently, reflecting unstable external environment and erratic macroeconomic policies. Since 2006, deposit and credit have seen peaks and troughs succeeding one another several times. After experiencing a 50% leap compared to the previous year in 2007, mainly reflecting large capital inflows following Vietnam's accession to the WTO, both indicators decreased in 2008 as a result of the global crisis. Since then, circles of policy relaxation followed by tightening every one to two years have triggered aggressive fluctuation of credit and deposit (Figure 2.24). Likewise, the number of banks, private joint-stock banks in particular, after having risen dramatically until 2009 due to (excessive) regulation easing, has been in sharp decline succeeding the government's decision to restructure the banking system and to reduce the total number of banks to around 15.

**Figure 2.24 Banking sector development indicators**



Although there has been more and more participation of private sector in this business, State presence is still large and involves both direct and indirect ownership links. At end-2013, even though private credit institutions' shares of charter capital and gross capital have exceeded those of State-owned commercial banks (Table 2.3), the latter accounts for 43.5 % of assets, 43.1% of deposits, and 46.8% of credits (SBV website, 2014). The participation of the State in the banking system is even more important if equity investment of the State, SOEs and SOCBs in many of the 33 joint-stock banks (JSBs) is taken into consideration. Among private banks, JSBs are growing the most strongly while Finance and leasing companies and People credit fund are marginal participators. The share of foreign banks in commercial banking activities remains small, representing 11-12% of total assets.

Another important characteristic of the banking system is high degree of cross ownership. Indeed, JSBs have much participation of other banks (SOCBs and other JSBs) and enterprises (both SOEs and private corporations). This complex structure arouses many concerns about conflicts of interest, statistical errors, and prudential regulation circumvention inside the sector.

**Table 2.3 Vietnam banking system as of end-2013**

Group	Number	Charter capital (%)	Total assets (%)	Gross Capital (%)	Credit balance*
State-owned commercial banks	5	30.21	43.52	35.68	51.28
Joint-stock banks	33	45.65	42.80	41.79	35.32
Joint-venture & Foreign banks	10	19.23	12.25	21.47	8.94
Finance & Leasing companies	28	4.44	1.14	0.57	3.21
Central people credit funds	1	0.47	0.30	0.50	0.22

\* Data as of 31/12/2011. Source: SBV

Banks' revenue comes mostly from net interest income, which accounts for more than 86% of total revenue, much higher than in regional peers. Banks' profitability has decreased significantly during recent years, with all banks' ROA of 1.8% in 2007 falling to 1% in 2009-2011, then to 0.5% in 2013.

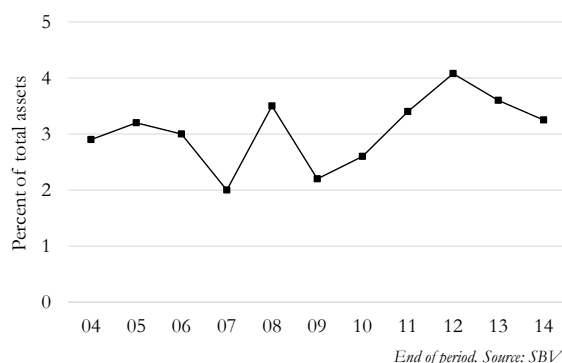
Bad debts and liquidity risk has been matters of great concern recently. Weak corporate governance, complex cross-ownership structure, lax internal controls and management, and a fragmented regulatory and supervisory architecture have promoted poor lending practices at many banks, gradually undermining the robustness of the sector. As a consequence, the amount of non-performing loans (NPLs) has surged since 2011, arousing anxiety about a bank crisis (Figure 2.25). Nevertheless, due to inconsistent methods of loan classification across domestic banks and in Vietnam compared to international standards, and lack of data transparency, the true level of NPLs remains obscure. At end-2013, the SBV reported the level of bad debts over total loans to be 3.6%, receding from the mid-2012 peak of almost 5%. The central bank, however, admitted that under thorough calculation, the ratio should be 9%. Meanwhile, Moody's estimated that problem assets should amount to at least 15% of banks' total assets.<sup>33</sup> Accurately measuring the size of NPLs through special audits, and proper accounting

<sup>33</sup> SBV website; Reuters February 22, 2014.

and classification, and using this to estimate the recapitalization needs are the first important step of a successful restructuring process, which has been yet to be done by the central bank.

The establishment of Vietnam Asset Management Company (VAMC) to deal with this issue has had only limited effects. Indeed, the debt-solving firm has sold merely 4% of bad debts that it purchased previously from banks at end-October 2014, almost one and a half year since its formation.<sup>34</sup> Few investors are willing to buy bad debts and collateral as VAMC offers them at much higher prices than market value. Furthermore, the charter capital of the company is considered too small given the amount of bad debts in the economy. Another part of the banking sector restructuring includes mergers of weak banks, acquisition of weak banks by other banks or non-bank enterprises, increasing foreign participation. Nonetheless, merging several weak banks does not necessarily mean the creation of a healthy bank; and rising acquisition among banks and between banks and non-banks could complicate even more the cross-ownership structure which is already convoluted.

**Figure 2.25 Banks' non-performing loan ratio**



While the banking sector is large, the *capital market* is quite small and narrow despite the liberalization process in financial sector. For instance, the insurance market has grown fast since the beginning of 2000s, with double-digit annual growth rates, but gross premium amounts to only VND48 trillion in 2013, less than 1.4% of GDP. Starting from an extremely low base, Vietnam's insurance market is still far below its regional peers (Figure 2.26). Non-life insurance is prevailing with more than a half of gross premiums coming from this segment. Life insurance is at a very early stage of

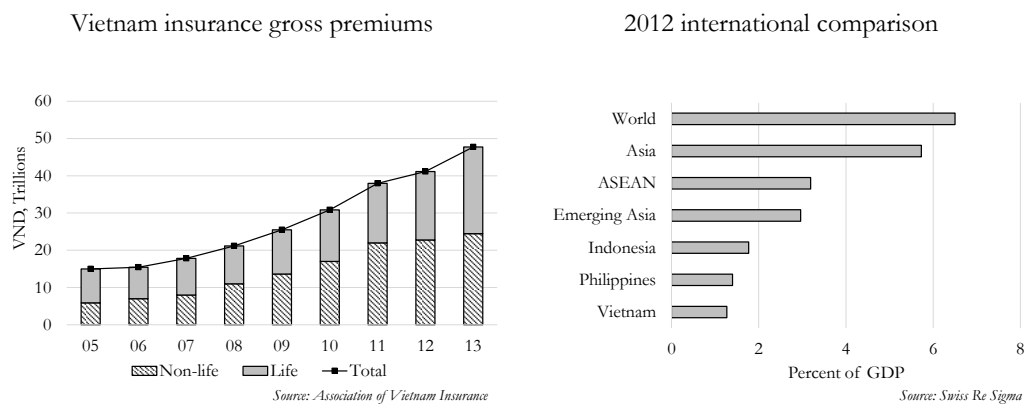
<sup>34</sup> Thanh Nien News, October 31, 2014



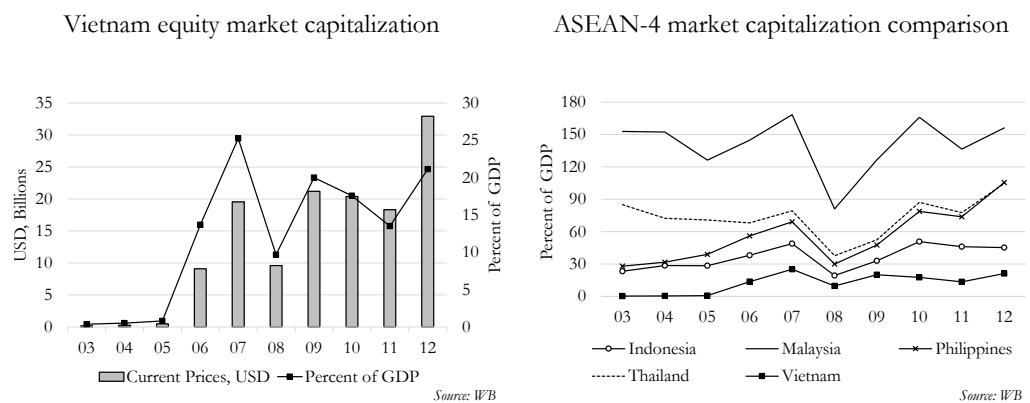
development but seeing more and more entries over time. Reassurance remains strongly dependent on foreign players.

Other institutional investors such as investment funds, private pension funds are all of negligible size. Mutual funds accounts for only 0.5% of GDP in 2013 but can see significant progress in the future along with improved legal framework and market confidence. Meanwhile, the Social Security Fund, a state-owned pension fund, is managing a substantial asset of 6.5% GDP (WB and IMF 2014) but needs a more well-defined investment strategy and a decentralized asset management scheme.

**Figure 2.26 Vietnam insurance market and comparison**



**Figure 2.27 Vietnam equity market and comparison**

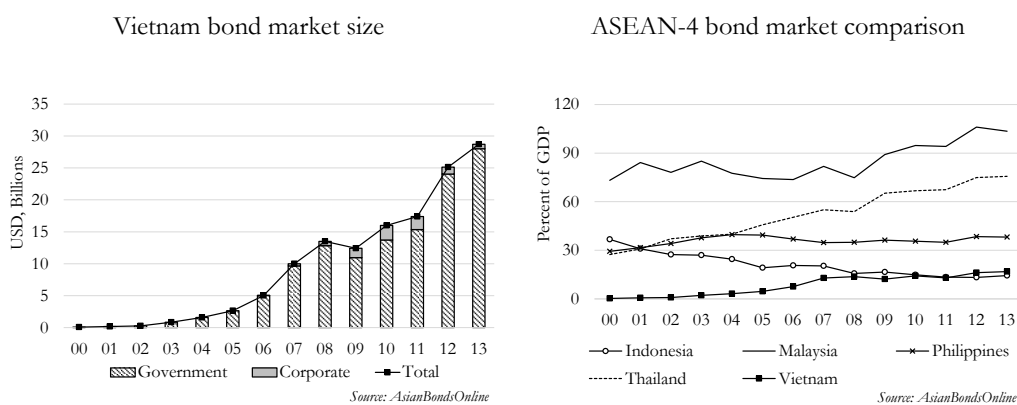


A segment of the capital market that has expanded rapidly and drew much attention is the securities market. Since the opening of the Ho Chi Minh City securities trading center in 2000, the market has witnessed a spectacular development, now comprises two stock exchanges, one center for unlisted stocks, along with a trading platform for bonds. From an almost negligible funding channel ten years ago, Vietnam's securities

market size now equals 37.3% of GDP (2012), of which 57% is accounted for by the stock market.

The latter has grown significantly since 2006 driven by global liquidity abundance, prospects of economic development and legislation easing. The market has attracted nearly 700 companies to list on its two stock exchanges, ranging from financial service providers to consumer staple manufacturers. However, given the small market capitalization in percent of GDP, the large number of listed companies means that they are mostly of small size, while the listing of bigger enterprises, including state-owned ones, has been postponed due to poor performance of the market recently. The stock market is also highly concentrated, with top ten corporates representing 66% of total market capitalization. Compared with other countries in the region, Vietnam's equity market size is quite modest (Figure 2.27).

**Figure 2.28 Vietnam bond market and comparison**



On the fixed-income side, in spite of recent significant development, the market is small and dominated by government bonds. At end-2013, the total outstanding amount is USD29 billion (VND605 trillion), of which 98% is made up by government bonds (Figure 2.28). Corporate bond grew strongly during 2009-2011 when it accounted up to 2.3% of market share. Similar to the stock market, Vietnam's fixed-income market remains incipient relative to that of neighbor countries (Figure 2.28, right panel). Limited number of investment products, lack of firm accounting and disclosure standard, and automated matching system, among other financial infrastructural elements contribute to poor liquidity of the corporate bond market. At the same time, government bonds are still not attractive to non-institutional investors and mostly comprise of short-maturity securities. Recently, the government has approved a detailed roadmap for bond market development, with a special focus on government bond segment

which is an important foundation for the sound development of corporate bond market subsequently. Promoting securities markets is crucial for the economy since it expands access to long-term finance for corporates, governments and financial institutions while contributing to the financial stability.

### 2.3. CENTRAL BANK AND MONETARY POLICY

Any macroeconomic study cannot be complete without the analysis of the central bank and its monetary policy, especially when such institution, rather than anything else, is at the heart of this thesis. A monetary policy framework comprises the ‘institutional arrangements under which monetary policy is made and executed’ (McNees 1987). Thus, we begin this section with a crucial element of any country’s monetary policy framework which is how it is determined and a directly linked issue – the central bank independence. Next, the actual monetary regime as well as proposal of alternative strategies is presented. The last subsection is dedicated to the central bank’s operational aspects.

#### 2.3.1. *Institutional framework*

- Legal status

The State bank of Vietnam (SBV), the country’s central bank, is at present functioning according to the law on the State bank of 2010 (National Assembly of Vietnam 2010). According to Article 2(1)<sup>35</sup> of this legislative document, the SBV bears a status of a ministerial agency. As the central bank, its task is to perform the state management of monetary and banking activities, including pursuing the monetary policy and supervising the credit institutions system under the instruction of the Prime Minister.

This new law also provides a clearer definition of the national monetary policy. Article 3(1) indicates ‘The monetary policy constitutes monetary decisions at national level pursued by the relevant authorities, including decisions on the objective of stabilizing the currency value shown by the price inflation indicator, and decisions on the use of instruments and measures to meet the set targets’. Conformably, the National Assembly (NA) approves the annual CPI inflation objective proposed by the SBV; while the

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<sup>35</sup> Article 2 Paragraph 1

SBV Governor, with the Prime Minister's approbation, makes decisions on the instruments and measures to meet the objectives of the national monetary policy.

Consequently, the 2010 Law contains a very important adjustment compared to its previous versions that is the precision made on the currency value concept. Before, the currency value was not clearly defined (without the term 'shown by the price inflation indicator'), leading to confusing interpretation of the monetary policy conduct. It was not straightforward whether the central bank's ultimate goal was the stability of internal or external currency value, price inflation or exchange rate. Another perplexity arose regarding the distinction between the final and intermediate target within the exchange rate targeting framework, if this was really the case, whether the bank's end objective is a stable exchange rate or its aim is to target the exchange rate in an export favorable way to promote growth. With the precision recorded in the new law, it is now clear that the SBV's primary privilege is price stability which is supported by a widespread acceptance among central banks of the view that price stability fosters economic performance. This change also shows one of the government's efforts to regain macroeconomic stability after almost 30% inflation in 2008.

Nonetheless, apart from its primary objective of price stability, the SBV still has to fulfil a long list of targets. We can see in the Law's Article 4(1): 'Activities of the State Bank aim to achieve price stability, maintain the integrity of banking activities and the credit institutions system, secure the safety and effectiveness of the national payment system, and contribute to the socialist-oriented socio-economic development'. Such a multi-pillar mandate, criticized a lot by economists, has complicated the central bank's functioning and limits the efficiency of monetary policy. Academics and experts have pointed out the need to identify an overt order for monetary policy objectives. This would however take time to be realized.

- Central bank independence

Moving towards a modern central bank model consists of increasing the bank's independence since the latter can matter to the monetary authority operative effectiveness. There have been plentiful of researches on the relation between central bank independence (CBI) and inflation outcomes. Academic literature has demonstrated why independent central banks could reduce inflation in the long run by removing inflation

bias from macroeconomic policy (see for example Rogoff 1985, Walsh 1995). Empirical evidence supports the view that central bank autonomy has resulted in lower inflation (Alesina and Summers 1993, Lybek 1999).

There are four categories of CBI: functional, institutional, personal and financial (Bini Smaghi 2007). About functional independence, an independent central bank should be free to set its policy instrument with the aim of achieving its objective. This type of independence thus requires that the primary objective of the central bank be set in a clear and legally certain way. This implies that the central bank should have full autonomous power in setting its goal(s) and the use of its instruments. In the literature, two key dimensions of functional independence are distinguished, as in Walsh (2005). The first dimension contains institutional characteristics that keep the central bank away from any political influence in defining its policy objectives and implementing the monetary policy; and the second refers to the situation where the central bank can freely implement policy in pursuit of monetary policy goals. These two dimensions are commonly known under the terminology came from Debelle & Fischer (1994) which are “goal independence” and “instrument independence”.

The second category – institutional independence – means that when carrying out the tasks and duties conferred upon it by law and when performing its other activities, the central bank may not seek or take instructions from the government or any other body. By definition in the above-mentioned law, being a ministerial organism the SBV’s definition of targets and decisions on instrument usage need to be validated by the government or the Prime Minister. So the SBV has almost no functional and institutional independence.

Turning to personal independence, the appointment and dismissal of the Governor and members of the central bank’s decision-making bodies should be curbed from any political pressures. Again, as imposed by its legal status, it is the Prime Minister who decides the organization of the SBV, and to nominate or dismiss the central bank Governor and major members of the governing board.

A central bank cannot credibly operate in an independent way without proper financial means, i.e. it should not depend on the government, the parliament or any other third party, for financing of its operative expenses. Four aspects of financial independence – the right to determine its own budget; the application of central bank-specific ac-

counting rules; clear provisions on the distribution of profits; and clearly defined financial liability for supervisory authorities – are particularly relevant in this respect. Regarding this CBI dimension, above statements are confirmed. The central bank must rely on governmental funding for most of its operative expenses. The amount of its charter capital is decided by the Prime Minister, and granted by the State Budget.

Altogether, the SBV's independence still remains at a very limited level. The lack of autonomy of the central bank from the government has been among the biggest obstacles to an efficient monetary policy implementation. It is not however simple to improve the situation. As To et al. (2012) suggest, turning the SBV into an organism only belongs to the NA and totally independent from the government seems unrealistic at least in the medium run since this requires huge changes in several legal documents including the Constitution, National Assembly organization law, State Bank law, etc. Instead, policymakers can consider the transition of the SBV towards a modern central bank independent from the government functionally and institutionally (To et al. 2012). Remaining a ministerial body, the bank still depends on the government for its organization and funding, but the former is autonomous for its monetary policy implementation since it only has to report to the to-be-created NA's National monetary policy council.

### *2.3.2. Monetary policy strategy*

The Vietnamese monetary authority has been following a monetary targeting regime. The SBV sets targets for money (represented by M2) and credit growth annually to attain its objective of CPI inflation. The intermediate targets can be a range or a ceiling target, and are publicly communicated. These numbers can be adjusted during the year in case of volatile economic conditions. Table 2.4 exhibits the SBV's yearly definitive objectives and the realized growth rates of M2 and total credit. From 2000 to 2003, the deviation between targets and actual rates are small, usually below 5%. However, from 2004, the gaps become extremely large and erratic. Since 2011 fortunately, the situation has been improved and the gaps has been narrowed.

From the IMF (2010)'s point of view, the SBV is actually incorporating an exchange rate targeting in its monetary framework, even though the central bank does not classify itself as an exchange rate targeter. It is capital controls applying to all transactions in capital and money market instruments and in collective investment securities that

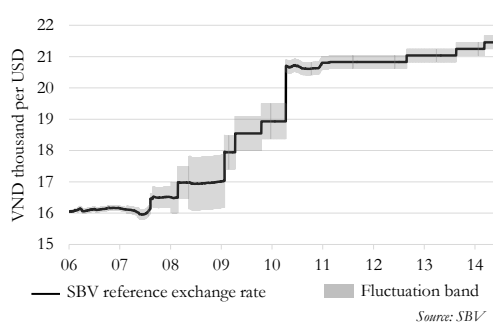
allows the central bank to target both domestic (i.e. money) and exchange rate objective.

**Table 2.4 SBV intermediate targets and realization (annual percentage)**

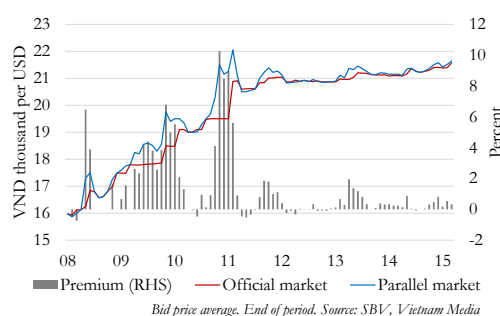
Year	M2 growth		Credit growth	
	Target	Actual	Target	Actual
2000	38	38.96	28 – 30	38.14
2001	23	25.53	20 – 25	21.44
2002	22 – 23	17.70	20 – 21	22.20
2003	25	24.94	25	28.41
2004	22	30.39	25	41.65
2005	22	29.65	25	31.10
2006	23 – 25	33.59	18 – 20	25.44
2007	20 – 23	46.12	17 – 21	53.89
2008	32	20.31	30	25.43
2009	18 – 20	28.99	21 – 23	37.53
2010	25	33.30	25	32.43
2011	15 – 16	12.07	20	14.70
2012	14 – 16	18.46	15 – 17	8.85
2013	14 – 16	18.85	12	12.52

Source: SBV, GSO

**Figure 2.29**  
SBV exchange rate targeting



**Figure 2.30**  
USD price on official retail market and parallel market



The central bank releases a reference bilateral exchange rate vis-à-vis the US dollar on a daily basis, which is considered the central parity or the target, and allows banks to trade the dong within a certain symmetric band (Figure 2.29). The fluctuation band is very narrow from late-2006 until early 2007, only +/- 0.25% of the reference rate.

Since then it has been revised several times. In particular, between two years from early 2009 to early 2011, the SBV fixed a ten-year record large band of +/- 5% under pressures of economic downturn, big current account deficit, and non-negligible tension from the gold market and forex parallel market. These factors also lead to an 8.5% devaluation of the dong at mid-February 2011. Likewise, remarkable devaluations of the yuan by the People's Bank of China in August 2015 did force the SBV to adjust its reference rate accordingly to conserve the country's competitiveness.

The forex parallel market has for long existed in Vietnam, despite being considered as illegal. It emerges due to foreign exchange restrictions within the fixed exchange rate in the past and the present regime of peg with relatively narrow band. Moreover, with dong's value being eroded by high inflation during many years, foreign currencies come out among the inhabitants' most appropriate choices of store of value. Figure 2.30 demonstrates the evolution of USD/VND on the official and parallel market and their gap (the exchange rate premium) from 2008 to March 2015.<sup>36</sup> The 2009-2011 period is characterized by substantial disparity between exchange rates on the two markets. Note that in this period the official market rates already attain the upper limit of the allowed trading band most of the time, so big positive premiums mean far-beyond-reference parallel exchange rates. If in 2008, the gap once reached 6.5% the official rate but prompt reaction of the SBV<sup>37</sup> succeeded in joining the two rates together after only 2 months, yet this is not the case from April 2009 to February 2010 and from November 2010 to February 2011. Persistent premiums had generated sustained upward pressure on the USD price. In spite of several measures (widening the trading band, devaluation, administrative measures), the central bank could not efficiently attenuate the spiral. In November 2010, the markets recorded the all-time high premium of 10.3%. Since mid-2011, exchange rate movements on two markets are close to each other and the gap has never exceeded 2%, owing to the SBV's more flexible and timely intervention, and a moderate inflation level.

Difficulties in meeting intermediate targets prevent the SBV from securing its final objective. Years when big gap between the SBV's objective and realized inflation rate

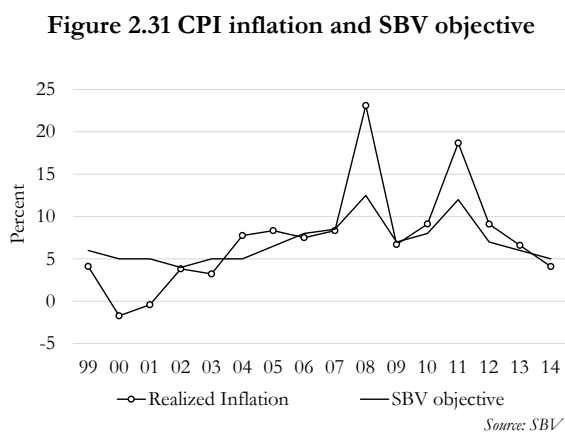
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<sup>36</sup> Data on parallel market are not released by the SBV or GSO. Those presented here are collected from various sources and thus subjected to errors.

<sup>37</sup> SBV's measures include stricter control over exchange bureaus, gold import interdiction, while enhancing forex supply for importing basic goods.



exists seem to match those with important M2 and credit gap<sup>38</sup>, and big exchange rate premium (Figure 2.31). In particular, the inflation gap was higher than 10.6% in 2008, and almost 6.7% in 2011. Moreover, inflation objective determination process should also be called into question.



In recent years, the fact that a growing number of countries, including developing ones, have adopted inflation targeting (IT) strategy, and the persistence of high inflation in the economy have induced the Vietnam monetary authority to consider pursuing the strategy itself. Furthermore, successful experience from IT countries in inflation control and economic performance makes this framework more appealing.

A pure IT regime is defined as a public declaration of a quantitative target for inflation in the medium run, coupled with a commitment of the central bank to pursue and reach that target. Conditions necessary to apply an IT regime are numerous, which can be divided into four broad categories:

- Institutional independence: The central bank must have full legal autonomy and be free from fiscal and political pressures that create conflicts with the inflation objective.
- A well-developed technical infrastructure: The central bank must have inflation forecasting and modeling capabilities and the data needed to implement them.
- Economic structure: Prices must be fully deregulated, the economy should not be overly sensitive to commodity prices and exchange rates, and dollarization should be minimal.

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<sup>38</sup> The difference between the targeted and realized growth rate of M2 and credit supply

- A healthy financial system: In order to minimize potential conflicts with financial stabilization objectives and guarantee effective monetary policy transmission, the banking system should be sound and capital markets well developed.

Regarding these preconditions, it is evident that Vietnam is not ready for IT at least in the medium run. Apart from above-mentioned limited independence of the central bank which would take much time to change, the SBV does not collect any of the other three prerequisites either. In an economy where almost all transactions are done in cash, it is difficult for the central bank to assemble sufficient and exact data for inflation forecasting; if not mention its relatively reduced capability of modeling. De facto dollarization is another major obstacle for dollars make up about 20% of money used in transactions<sup>39</sup>. Moreover, the Vietnamese banking system is still underdeveloped, so are capital markets.

Sharing this point of view, Le (2007) writes that the lack of adequate tools of the central bank would hinder the latter to carry out an effective IT monetary policy. Additionally, other policymakers in the ministries of finance, planning and investment, industry and trade may not see the need to adopt strict IT rules and implication, nor be willing to cede to the SBV that degree of power.

Meanwhile, Batini and Laxton (2006) showed that it is unnecessary for countries, even emerging markets, to meet those stringent preconditions for a successful adoption of IT. Their survey indicated that no inflation targeter has these conditions in place before adopting the regime; and if using the preconditions as additional control variables, no precondition have significant impact on the improvement in macroeconomic performance following the adoption of IT. The authors, however, concluded that even if satisfying institutional and technical standards may not be decisive before adopting IT, improvements made by central bank and other bodies of government after IT introduction will be crucial to success. With the same reasoning, To et al. (2012) conclude that Vietnam cannot shift to the full-fledged IT in the medium run but an implicit IT regime is totally applicable in the coming years.

Beside IT, the SBV can also consider other monetary regimes. Le (2007) suggests a real exchange rate (RER) targeting framework especially for Vietnam by arguing that it helps promote Vietnam's national priorities, which are rapid and sustainable growth,

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<sup>39</sup> *Bloomberg News* – Apr 6, 2011

modernization, industrialization and poverty reduction. According to the author, a stable and competitive RER has a powerful influence on the allocation of labor and capital and on the composition of domestic output; and has a more effective stabilizing force than an inflation target. Moreover, targeting a RER is a realistic and doable task for the SBV, therefore improving the monetary policy transparency and strengthening the central bank accountability. The mechanism of this regime is derived from the Singaporean managed trade-weighted exchange rate regime, where the Singapore dollar (SGD) is managed against a basket of currencies of its major trading partners and competitors. The SGD is also allowed to fluctuate within a concealed policy band to adapt to short-term evolutions in foreign exchange markets.

Another proposal for Vietnam as a small exporter specializing in manufacture of mineral and agricultural products is the Export price pegging (PEP) as in Frankel et al. (2002). It is suggested that the monetary policy fixes the local-currency price of the export commodity (but not the dollar-price because the country in question is too small to influence the commodity price on the world market). In an operational point of view, the central bank may communicate a daily exchange rate against the dollar that goes perfectly in line with the dollar price of the investigated commodity on the world markets, and the former may try to intervene to maintain that level of exchange rate. This technique is hence equivalent to fix the commodity price in terms of domestic currency. Considering a sample of oil exporters, the paper's simulation results demonstrate that if those countries had been pegged to their principal export goods in the past, rather than to the dollar, they would have gained export competitiveness strictly at the time when their balance of payments was under maximal distress.

All in all, the SBV's money targeting regime is facing numerous challenges. In an environment of financial innovation, market computerization and globalization, the relationship between monetary aggregates and the price level is becoming weaker. The central bank may fail to manage the selected monetary aggregate with sufficient precision. However, since it does not appear to be the moment to switch to another regime in the medium run, it is important to re-examine the conditions of the current one. If those conditions are always satisfied, enhancing the money targeting framework rather than making a radical change seems a wiser choice.

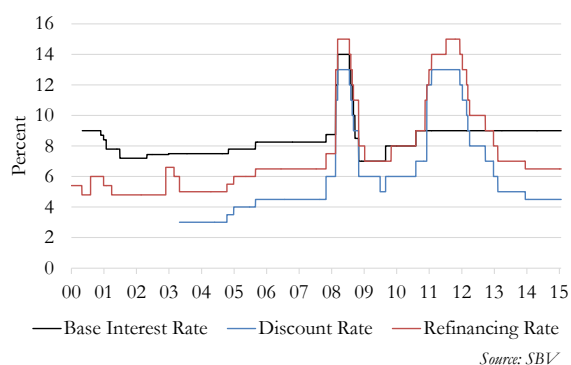
### 2.3.3. Operational framework

According to the 2010 State Bank law, the instruments at the disposal of the central bank are: interest rates, exchange rates, open market operations, compulsory reserve requirement, and other tools prescribed by the Government.

- Interest rates

The SBV basically determines three interest rates: base rate, discount rate, and refinancing rate. The base rate, or the prime rate, fundamentally serves as the reference rate for all mobilization and lending activities in banks. The Vietnam Civil Code (Article 476) indicates that banks' deposit and lending rates are limited to 1.5-time the base rate. It is calculated based on interbank interest rates, Open Market Operations (OMOs) rates, financial institutions' deposit rate, and capital demand-supply analysis. However, the SBV has relied less and less on this instrument for the latter has not been able to reflect market tendency. Indeed, as shown in Figure 2.32, since 2011 the base rate is kept constant at 9% in contrast to the other two policy rates. There are also debates on whether the central bank should abandon this rate tool.

Figure 2.32 SBV policy interest rates



Discount rate along with refinancing rate are the actual most-used interest rate tools of the SBV. Discount rate is the interest rate applied for the central bank's principal refinancing operation – short-term acquisition of bonds. On the other hand, refinancing rate applies for marginal refinancing facilities (short-term mortgage loans, overdraft permission, and overnight loans). With this characteristic, discount rate is referred to as the SBV's floor rate while refinancing rate as ceiling rate. Nevertheless, their influence on market rates are quite limited. Since bills or bonds used as collateral, and access conditions in discount and refinancing facilities are similar, the two rates are not capable to form an effective rate band on the interbank market. Besides, only state-owned

banks can approach refinancing activities of the SBV in general. During certain periods, in 2010 for example, some of them are willing to hold a lot of bonds in spite of their modest revenue (even inferior to inflation rate) since they could borrow from the central bank at about 11% then lend to other banks on the interbank market at 12-13%, leading to huge profits at state-owned banks that year<sup>40</sup>. Similarly, in late 2011, difficulties in mobilization from residents and reduced access to the SBV refinancing facilities forced small banks to rely on the interbank market as their only urgent source of funds. Some of them had to suffer an extreme rate of 30% – 40% for one-week collateralized loans which is unprecedented in Vietnam.

- Exchange rates

Exchange rates between Vietnam Dong and foreign currencies are, according to the Law, established on the forex market under the central bank management. The SBV makes decisions on exchange rate regime and exchange rate management mechanism.

Since the abolition of planning economy, Vietnam's exchange rate policy, despite lots of changes, has been basically relying on a peg regime to the US dollar.<sup>41</sup> The current regime is pegging with crawling bands. As presented above, the SBV is somewhat targeting the USD/VND parity by the announcement of a daily reference rate and a symmetric band for permitted fluctuations.

With the existence of a parallel market, the SBV's usage of USD/VND exchange rate as a monetary policy instrument faces many difficulties. However, the central bank's non-recognition of the forex parallel market during periods of insufficient supply of foreign exchange on official market and continued macroeconomic instability is apparently not a solution to improve the situation. Instead, it may gradually incorporate this coexisting market into the official one so that the inhabitants' demand for foreign exchange can be more easily satisfied and the SBV's control over forex market becomes more efficient.

- Open Market Operations

Open market operations were introduced for the first time in July 2000, and have now become the major policy tool of the SBV. OMOs are bond auctions realized between

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<sup>40</sup> Reuters.com – *March 3, 2011*

<sup>41</sup> See Appendix for a list of all exchange rate regimes in Vietnam since 1989

the monetary authority and credit institutions on the open market. Initially, only short-term bonds are accepted but from 2003, medium- and long-term bonds are also eligible for trades since the number of short-term assets are quite small. However, types of securities traded on the market remain scant, mainly Treasury bills (364 day maturity) and State bank bills.

The SBV uses two traditional types of operations which are outright buying/selling of bonds and repo transactions (bonds are subject to be repurchased by their initial holder after a period of time). Repos dominate the bid side while outright sales by the SBV are principal operations on the ask side. Two kinds of auction are possible: volume auction (more popular) and rate auction.

**Table 2.5 Open market operations statistics**

	Number of sessions	Total vol- ume (VND bil.)	Repos & Out- right purchase (VND bil.)	Reverse repos & Outright sale (VND bil.)	Interest rates (%/annum)
2000	17	1904	1354 <sup>a</sup>	550	4,5 - 4,9
2001	48	3934	3314 <sup>a</sup>	620 <sup>b</sup>	3,4 - 5,15
2002	85	9146	7246	1900	4,5 - 5,1
2003	107	21184	9844	11340	1,58 - 5
2004	123	61936	60986	950 <sup>b</sup>	3,25 - 5,45
2005	158	102479	100679	1800 <sup>b</sup>	3,7 - 7,4
2006	162	124235	36833	87402 <sup>b</sup>	0,8 - 7,1
2007	355	415861	59011	356850	3,75 - 8
2008	393	1036066	947206	88860 <sup>b</sup>	4,5 - 30,1
2009	329	961875	961773	102	6,5 - 9
2010	491	2108716	2101421	7295	7 - 10
2011	431	2801253	2801253	0	10 - 15
2012	378	623922	449922	174000	7 - 14
2013	418	434249	179386	254863	1,17 - 7,2

Note:

<sup>a</sup> Including outright purchase of 480 and 60 (VND billions) in 2000 and 2001 respectively

<sup>b</sup> Reverse repo volumes included are 50, 950, 700, 200 and 12023 (VND billions) in 2001, 2004, 2005, 2006 and 2008 respectively

Source: SBV

Since 2000, the size of OMOs have increased rapidly. The number of participating credit institutions is now over 60 versus 21 at the beginning, with 75% of participants are joint stock banks. The number of sessions has grown up significantly as well, from

less than 20 sessions in 2000 (one session every ten days) to almost 500 sessions recently (8 – 12 sessions a week). Success volume has also augmented strongly, with particularly active trading in 2010-11 (Table 2.5).

Although OMOs is at present the most important SBV's tool for market accommodation, there still exist many weaknesses. Firstly, its size is sometimes constrained by money supply target, thus its influence is limited in case of substantial shortage of funds in banks. Secondly, despite the fact that state-owned banks only represent about 10% of the total number of participants, they are the most involved. These banks usually possess a large number of bonds/bills eligible for bidding, so could effortlessly win the auctions even when they are not really in need of refinancing. Meanwhile, smaller and mostly private banks, who do not have that advantage, cannot easily approach the facility. They have to offer very high interest rate in auctions or pay high price to winner banks to repurchase the funds that the latter obtain from bidding. Thirdly, interest rates concluded in auctions do not sometimes come from supply-demand equilibrium. In 2011 for example, when interest rates went up to 20% during auctions, exceeding the SBV's objective, the central bank intervened by applying a unique level of interest of 15% (To et al. 2012).

- Compulsory reserve requirement

Compulsory reserve requirement is the SBV's traditional instrument. The central bank fixes the reserve requirements depending on the currency in which deposits are denominated, term of deposits, and the type of credit institution. Compulsory reserves are calculated based on average deposit amount over the running period, and must be deposited at the central bank. Before February 2008, deposits of more than 24 month maturity were not subjected to compulsory reserves. Since September 2011, the requirements also apply on overseas deposits of all credit institutions (required reserves ratio – RRR – equals 1%). Furthermore, since December 2012, following the government's guidance on supporting agriculture and rural development, if financial institutions provide more than 70% of its total credit to agricultural and rural development projects, the applied RRR will be 1/20 of the regular ones; RRR equals 1/5 the regular level if credits for that privileged sector account for 40% – 70% of the total credit. The latest regulation on compulsory reserves is exhibited in Table 2.6.

- Other instruments

Applied since 2001 in Vietnam, currency swap is an efficient tool in response to banks' demand for VND denominated funds, especially foreign banks with excess foreign currency funds but not enough bonds to rely on other refinancing tools. However, this is not a privileged instrument of the SBV as the swap rates are much higher than interbank interest rates.

Besides, the SBV also employs some administrative measures and moral suasion. For instance, the central bank imposed ceiling interest rates for both VND- (14%) and USD-denominated (2%) deposits to restrict the explosion of bank lending rates in 2011. The SBV also issues circulars to regulate the trading of gold and USD, or uses its influence over state-owned banks. Nevertheless, those are only marginal tools, and the central bank is steadily moving towards exclusive usage of indirect instruments.

**Table 2.6 Compulsory reserve requirements**

Credit institution	Deposits in VND (in effect from Mar 2009)		Deposits in foreign currencies (in effect from Sep. 2011)	
	Demand and Short-term deposits	Other deposits	Demand and Short-term deposits	Other deposits
	Group 1	3%	1%	8%
Group 2	1%	1%	7%	5%
Group 3	1%	1%	7%	5%
Group 4	0%	0%	0%	0%

Note:

Group 1 includes: State-owned commercial banks (except Group 2), Urban Joint stock commercial banks, Branches of foreign banks, Joint venture banks, Finance companies, Leasing companies

Group 2: Bank for Agriculture & Rural development

Group 3: Rural Joint stock commercial banks, Cooperative banks, National People's Credit funds

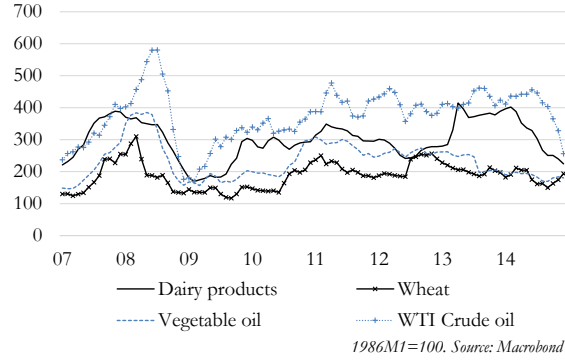
Group 4: Local People's Credit funds, Bank for Social policies, Other credit institutions

Source: SBV



## APPENDIX

**Figure 2.33 World commodities prices**



### REER calculation

REER index at time  $t$  is calculated using the formula:

$$REER_t = \sum_{j=1}^n (e_{jt} \frac{P_{jt}}{P_t})^{w_{jt}} \quad (2.1)$$

where  $e_{jt}$  is the bilateral exchange rate between VND and partner  $j$ 's currency at time  $t$ ,  $P_{jt}$  and  $P_t$  denote the price level of country  $j$  and Vietnam at time  $t$  respectively, and  $w_{jt}$  is the normalized trade weight of country  $j$  in Vietnam's total foreign trade value at time  $t$ .

Bilateral exchange rates between VND and trading partners' currency are cross exchange rate between USD/VND and partners' exchange rate against the USD. All come from Macrobond database.

Consumer price index is used to adjust differences in inflation between countries. Data are from IMF, except for Vietnam, China, Taiwan and Hong Kong (national sources). All CPI have 2010 as base year.

Trade weights are the sum of each country's weights in export and import. Countries are selected to cover around 90% of Vietnam's total foreign trade. Some countries are removed from the calculation due to the existence of hyperinflation during the studied period. The list of selected partners is given in Table 2.7.

**Table 2.7 Vietnam's trading partners selected for REER calculation**

	Country	Trade weight*
1	Japan	12.92
2	China	11.65
3	Singapore	9.64
4	South Korea	8.00
5	United States of America	7.82
6	Taiwan	7.72
7	Thailand	4.01
8	Australia	3.38
9	Germany	3.08
10	Hong Kong SAR	2.97
11	Malaysia	2.85
12	France	2.10
13	Indonesia	1.98
14	United Kingdom	1.70
15	Netherlands	1.45
16	Philippines	1.34
17	Switzerland	1.33
18	Italy	1.19
19	India	1.15
20	Belgium	1.01
21	Cambodia	0.94
22	Spain	0.67
23	Canada	0.60
24	Sweden	0.41
25	Denmark	0.26
26	New Zealand	0.26
27	Mexico	0.24
	Total	90.66

\* 1995-2013 average trade weight (sum of export and import values over total foreign trade value). Unit: percentage.

Source: GSO, Author's calculation

**Table 2.8 Competitiveness comparison of selected Asian countries**

Country	Over- all	Basic requirements				Efficiency enhancers						Innovation factors	
		Institu- tions	Infra- structure	Macro- economic environ- ment	Health and primary edu- cation	Higher educa- tion and training	Goods market effi- ciency	Labor market effi- ciency	Financial market develop- ment	Techno- logical readiness	Market size	Business sophisti- cation	Inno- vation
<b>Factor-driven (Stage 1)</b>													
Myanmar	134	136	137	116	117	135	130	72	139	144	70	140	138
Cambodia	95	119	107	80	91	123	90	29	84	102	87	111	116
Laos	93	63	94	124	90	110	59	34	101	115	121	79	84
India	71	70	87	101	98	93	95	112	51	121	3	57	49
Vietnam	68	92	81	75	61	96	78	49	90	99	34	106	87
<b>Transition from Stage 1 to Stage 2</b>													
Philippines	52	67	91	26	92	64	70	91	49	69	35	46	52
<b>Efficiency-driven (Stage 2)</b>													
Indonesia	34	53	56	34	74	61	48	110	42	77	15	34	31
Thailand	31	84	48	19	66	59	30	66	34	65	22	41	67
China	28	47	46	10	46	65	56	37	54	83	2	43	32
<b>Transition from Stage 2 to Stage 3</b>													
Malaysia	20	20	25	44	33	46	7	19	4	60	26	15	21
<b>Innovation-driven (Stage 3)</b>													
Singapore	2	3	2	15	3	2	1	2	2	7	31	19	9

Extracted from the World Economic Forum's 2014-2015 Global Competitiveness Report (Schwab 2014). Numbers are rankings within the 144 country sample.

**Table 2.9 Vietnam exchange rate regimes**

Period	Regime
1989-1990	Pegged exchange rate with crawling bands
1991-1993	Pegged exchange rate within horizontal bands
1994-1996	Conventional fixed peg arrangement
1997-1998	Pegged exchange rate with crawling bands
1999-2000	Conventional fixed peg arrangement
2001-2007	Crawling peg
2008-	Pegged exchange rate with crawling bands

Source: Vu et al. (2013)

# PART ONE

## Monetary Targeting in Vietnam

### An Evaluation

The State Bank of Vietnam (SBV) has been following a monetary targeting regime. For the efficiency of monetary policy under this framework, two conditions must be fulfilled: the existence of a stable money demand function and a significant relationship between money and inflation. Given all intrinsic and global innovations that the economy has been experiencing, there is a need to challenge this monetary strategy in the actual context. This is the objective of the next two chapters where each condition will be examined. The final answer to whether the SBV should continue its current path will be provided at the end of Chapter 4.

## CHAPTER 3

### IS MONEY DEMAND IN VIETNAM STABLE?

**Abstract** By adopting the bounds testing for cointegration framework in Pesaran et al. (2001), this chapter investigates the dynamics of money demand in Vietnam from 1999 to 2014. The empirical result delivers strong evidence for a long-run relationship between M2 money demand and income, expected inflation, exchange rates and gold price. More crucially, the stability test conclusion points out the presence of stable money demand in Vietnam. This result validates the first requirement of the monetary targeting regime.

**JEL classification** E41, C22

**Keywords** Money demand, bounds testing, ARDL, Stability, Vietnam

### 3.1. INTRODUCTION

Money demand study is essential for the conduct of monetary policy, especially in a monetary targeting framework. Once the money demand function remains stable, the relationship between monetary aggregates and their determinants could deliver accurate signals for setting an appropriate policy stance; macroeconomic outcomes would then be predictable.

Likewise, understanding the demand for money is apparently crucial for an efficient implementation of monetary policy of the State Bank of Vietnam (SBV). Since the central bank has been following a monetary targeting strategy, the effectiveness of its monetary policy rests for a large part on the capability of defining a pertinent money demand function and the stability of the latter. This task has never, however, been easy, particularly during such a dynamic period as the 2000s with growing trend of financial liberalization and innovations in the world, and also intrinsic developments of the economy.

The policy shift from central planning to market regulation in late 1980s has brought in rapid economic growth and also an important foundation for substantial financial progressions during the last two decades, resulting in increasing monetization and financial deepening in the country. This could have had impacts on money demand through income effect of higher revenue or substitution effect of newly available assets. However, the presence of persistent and high inflation has been able to reduce the residents' preference for domestic currency. Meanwhile, Vietnam has for long experienced dollarization phenomenon and as the current account has been gradually liberalized, it would be appropriate to be aware of some intervention of international variables in the money demand function.

Although there have been a great number of works on the demand for money for both developed and developing countries, there are only a few published studies on Vietnam, and merely one of them considers the stability of the money demand (H. D. Nguyen and Pfau 2010). Given this scarcity, this chapter aims to analyze the stability of the demand for money in Vietnam by firstly specifying the most relevant money demand function. Taking into account several evolutions in the national as well as global macroeconomic environment during the last two years, the re-visitation of the subject is worth pursuing. Besides, it is interesting to include a new variable in the money demand function in the case of Vietnam. Indeed, the gold price is a highly potential candidate since Vietnamese

residents have a habit of holding gold, apart from USD, as a store of value, and often react forcefully against the rise and fall of the price of gold. To the best of our knowledge, this is the first time the gold price is incorporated in the money demand function. Additionally, this study also benefits from the new econometric technique developed by Pesaran et al. (2001) named the bounds testing approach or Autoregressive Distributed Lag (ARDL) approach for cointegration, suitable for small sample estimation, which has not been done before for the case of Vietnam.

The paper is organized as follows. The next section reviews some recent empirical researches on the money demand for developing countries, including those on Vietnam's. Section 3 demonstrates in detail the methodology, the variable and data selection, and the results of our practical analysis. Section 4 concludes.

### 3.2. LITERATURE REVIEW

Wishing to understand an issue of such importance as the demand for money, there has been a vast stream of researches carried out worldwide over the last decades. While money demand empirical studies on developed countries at first dominated, the number of works on developing economies has been augmented steadily. One can refer to Knell & Stix (2004) for a useful summary of the main findings in the literature since the 1970s. By analyzing almost a thousand of money demand estimations, they found that despite large dispersions concerning time periods, countries or estimation methods among others, it is possible to extract some common features from these studies. The estimates of income elasticity are close to one, but tend to be larger when a broad rather than a narrow monetary aggregate is used. It could also be varied if proxies for wealth or financial innovations are included. As regards the opportunity cost of holding money, it is found to play an important role in determining money demand and be negatively related to the latter.

In empirical researches, the error-correction models (ECMs) or cointegration framework has proved to be the most successful tool in money demand estimation (Sriram 1999). Beside two principal approaches of Engle & Granger (1987) and Johansen & Juselius



(1990), the bounds testing procedure, or the Autoregressive Distributed Lag (ARDL) approach, proposed by Pesaran et al. (2001) has progressively been employed<sup>42</sup> when analyzing the demand for money. The main advantage of this approach is that it does not require all variables to be I(1) as the Johansen framework but still being applicable if the dataset contains a mixture of I(0) and I(1) variables, thus does not add some uncertainty into the analysis caused by the stationary pre-testing. Achسانی (2010) found that the ARDL approach is more appropriate in predicting money demand function in compare to Johansen procedures for the case of Indonesia. In addition, S. Narayan & P. K. Narayan (2005) and P. K. Narayan & Smyth (2006) state that this bounds testing procedure is not disturbed even if the sample is small.

With reference to the money demand stability, the empirical literature does not always show unanimity on this topic. In most cases, the stability tests proposed by Brown et al. (1975), namely CUSUM and CUSUMSQ test, are applied but some studies demonstrate signs of temporary instability of the money demand. As in Bahmani-Oskooee & Rehman (2005), for a set of Asian developing countries, they find that for some countries M1 is not stable all over the sample period even though the money demand is cointegrated with its predictors. Samreth (2009), Azim et al. (2010), Padhan (2011) and Dritsakis (2011) share similar conclusions for the case of Cambodia (M1), Pakistan (M1,2), India (M3) and Hungary (M2). Meanwhile, Kumar (2011) detects that M1 demand in twenty developing Asian and African are not affected by financial reforms, remain stable over 1975-2005 period as a consequence. Having comparable results there are Akinlo (2006) on M2 of Nigeria, Bahmani-Oskooee & Wang (2007) on M1 and Baharumshah et al. (2009) on M2 of China, Tang (2007) on M2 of Japan and Dagher & Kovanen (2011) on M2 of Ghana among others.

Only a few empirical studies are focused on the money demand in Vietnam, differing by time period, monetary aggregate, data frequency and model specification. Adam et al. (2004) estimates demand for narrow money, M1, by using monthly data from January 1991 to June 1999, trying to extract the precise currency substitution effect from the money demand in Vietnam. They argue that in the presence of currency substitution, the competition between monies in financing transactions can be illustrated by the income

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<sup>42</sup> See Bahmani-Oskooee (2001), Akinlo (2006), Bahmani-Oskooee & Wang (2007), Tang (2007), Samreth (2009), Baharumshah et al. (2009), Azim et al. (2010), Dagher & Kovanen (2011) and Dahmardeh & Izadi (2011) for instance

elasticity of money demand being a function of the expected rate of domestic currency depreciation that implies a non-constant elasticity. Using a Vector Error Correction Model (VECM), they find that in long run, people switch from one currency to another for transaction motive but in short run, portfolio effects dominate. Watanabe & Pham (2005), also taking into consideration the dollarization phenomenon but analyze the demand for M2 domestic money and foreign currency deposits separately. Covering the period from 1993Q1 through 2004Q4, the estimated long-run equation exhibits very high income elasticity (2.76) of the demand for domestic M2. Short-term deposit rate, inflation and foreign interest rate also enter the function significantly. Meanwhile, demand for foreign currency deposits is determined by income and difference of rates of return on USD and VND deposits. Up to now, the only study which examines the stability of money demand in Vietnam is Nguyen & Pfau (2010). Employing quarterly data for 1999-2009 periods under the Johansen cointegration framework, they find evidence for a long-run relationship between real M2 demand, income, foreign interest rate and the real stock price; inflation merely intervenes in the short-run. Their CUSUM and CUSUMSQ tests exhibit the stability of money demand during the sample period.

### 3.3. EMPIRICAL ANALYSIS

#### 3.3.1. *Function specification*

Although money demand theories diverse greatly (see Sriram 1999) they share an important aspect that is the relationship between the quantity of money demanded and a set of economic variables connecting money to the real sector. The conventional and general formulation of money demand takes the form:

$$m = f(y, s) \tag{3.1}$$

where real money balances  $m$  depends on a measure of transactions or scale variable  $y$  and the opportunity cost of holding money  $s$ . Hence, the function specification involves the choice of parameters representing these three variables.

In this study, M2 money stock is chosen naturally because the central bank of Vietnam sets the annual growth rate of M2 as an intermediate target to reach its monetary policy goal. Moreover, to widening the scope of the study, M1 ( $m1$ ) demand is also investigated. In developing countries, narrow money aggregates often show more stability and also high degree of monetary policy relevance.

For Vietnam, the most prominent candidate for the scale variable is GDP ( $y$ ), because this is the only available parameter of quarterly frequency, and it could present both the income and wealth criteria that a scale variable should contain<sup>43</sup>. The consumer price index (CPI) representing the national price level ( $P$ ) is used to derive real variables of the money stocks and GDP.

Concerning the opportunity cost of holding money, it is often said that both the own rate of money and the rate of return on alternative assets should be included in the money demand estimation (Klein 1974, Tobin 1956). The VND nominal short-term deposit interest rate ( $i$ ) as well as its real version ( $r$ ) is chosen to serve as the own rate of money for M2 which also comprises time and savings deposits; however,  $i$  or  $r$  enter M1 demand function as an opportunity cost.

With reference to the rate of return on alternative assets, several variables can be appointed. Firstly, the use of expected rate of inflation ( $\pi^e$ ) in the estimation is necessary (Friedman 1956 & 1969) since it can be considered as penalty for holding cash rather than switching to real assets in an inflationist economy like Vietnam. Moreover, as the financial sector is not well developed, alternative financial assets are not abundant, which induces people to look for real assets instead when high inflation occurs.

Secondly, even though the financial development in Vietnam is only at the very beginning stage, it has been growing fast these recent years. It is thus important that a proxy for financial innovations<sup>44</sup> enters the function, such as the stock market index ( $vnse$ ).

Thirdly, in the presence of dollarization in Vietnam, which implies the portfolio shifts between VND and USD, the bilateral exchange rate ( $e$ ) is worth taken into account with the increase of  $e$  meaning the depreciation of domestic currency<sup>45</sup>. The USD/VND exchange rate that the Central bank has paid much attention on is preferred to the multilateral one. Besides, as domestic residents mostly stay and spend at home, ignoring any changes in the foreign price level; nominal exchange rate is favored. Another proxy for

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<sup>43</sup> Consequently, the effect of real income on money demand in this framework can be referred to as wealth effect.

<sup>44</sup> Financial innovation refers both to technological advances which facilitate access to information, trading and means of payment, and to the emergence of new financial instruments and services, new forms of organization and more developed and complete financial markets.

<sup>45</sup> Mundell (1963) suggested the potential importance of exchange rate on money demand.

international, economic openness impact on money demand is foreign interest rate which is nevertheless less relevant here due to existing capital controls in the country. It is thus excluded in this research.

Last but not least, the incorporation of domestic gold price (*gold*) in the estimation is meaningful. Gold is highly appreciated by Vietnamese and has for long been kept as a store of value. The fact that people always keep track of gold price closely along with easy exchange of gold results in a dynamic market of this asset in Vietnam. The domestic gold price is utilized instead of the world one because it is the former that people focus on and there have been recurrent deviations between the two prices. As far as we know, it is the first time this variable is introduced in the equation of money demand. One can of course think of many other commodities which can be considered as substitutes for money like housing or land price but for Vietnam, there is no or very limited liable data covering these asset prices. This can however be some promising ingredients for future studies.

The money demand function can as a result be represented as follows:

$$m = f(y, i \text{ or } r, \pi^e, vmse, e, gold) \quad (3.2)$$

Based on conventional economic theory, the income elasticity is expected to be positive and close to one, but for developing countries it can be bigger as often found in the literature. Because short-term deposits are included in M2 the interest rate semi-elasticity is supposed to be positive too. Expected inflation is predicted to have a negative coefficient in the money demand function.

Three remaining variables, for their part, could have mixed impact on money demand. Beside their obvious substitution effect on the demand for money, they can on the other hand raise the portfolio value of the asset holders, subsequently increasing the money demand through wealth effect<sup>46</sup>. Their elasticity thus bears undetermined sign. If the wealth effect prevails, the coefficients would be positive; otherwise they are predicted to be negative.

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<sup>46</sup> An appreciation of foreign currency vis-à-vis the domestic one would augment the portfolio value of the foreign money holder, leading to higher demand for VND via wealth effect. (Arango and Nadiri 1981).

### 3.3.2. Estimation methodology

As mentioned in section 3.2, the cointegration framework proposed by Pesaran et al. (2001) has gained growing confidence of empirical researchers. The advantage of this approach is its applicability not only on regressors irrespective of whether they are stationary or integrated of order 1 but also on small-sized sample. Given these features, the bounds testing procedure is selected to identify the determinants of money demand in Vietnam. To examine if the demand for money remains stable over time thereafter, two stability tests will be run.

The underlying ARDL model of this approach embodies the dependent variable in its first-difference form as a function of its own lags, current and lagged changes of explanatory variables, and a linear combination of dependent and explanatory lagged level variables as in Equation (3.3).

$$\Delta m_t = c_0 + c_1 t + \alpha m_{t-1} + \theta X_{t-1} + \sum_{i=1}^p \gamma_i \Delta m_{t-i} + \sum_{j=0}^q \varphi_j \Delta X_{t-j} + u_t \quad (3.3)$$

where  $m_t$  is real money balances,  $X_t$  is a vector of explanatory variables susceptible to explain the demand for money as listed above,  $t$  is a time trend and  $u_t$  denotes the disturbances assumed to be serially uncorrelated and normally distributed.

The bounds testing proceeds in several steps but does not require a pre-test for the presence of unit roots in variables. The aim of the first step is testing for the existence of a long-run relation between dependent variable and its predictors. In this stage, by estimating Equation (3.3) with the same lag length on all variables, i.e.  $p = q$ , the model with optimal number of lags is pointed out based on information criteria such as Akaike's (AIC) and Schwarz's Bayesian (BIC) ones, which in parallel must satisfy the non-serial correlation condition. Once we have the selection result, the Wald test for joint significance is employed on all lagged level variables of the accepted model. This test is for the null hypothesis of no cointegration or no long-run relationship defined by  $H_0: \alpha = \theta = 0$  against its alternative  $H_1: \alpha \neq 0, \theta \neq 0$ .

The  $F$ -statistic computed from this test is then compared to the critical values presented in Pesaran et al. (2001). If it is higher than the corresponding upper bound of the critical value, the null hypothesis is rejected, meaning the long-run relationship between  $m_t$  and  $X_t$  exists; if it falls below the lower bound,  $H_0$  cannot be rejected, and if it lies within these two bounds, the result is inconclusive. In case  $H_0$  is rejected, Pesaran et al. (2001) suggest

a supplementary test to ascertain the presence of the long-run relation – test the  $H_0: \alpha = 0$  based on the  $t$ -statistic  $t_\alpha$ . By comparing  $t_\alpha$  to critical values introduced in the paper, if this null hypothesis is rejected, a large value of  $t_\alpha$  would help confirm the long-term relationship.

When the results of the first step, especially the  $F$ -stat, support the evidence of the cointegration between variables, the second step is carried out to estimate the coefficients of the long-run relationship. As indicated in Pesaran et al. (2001), the lag length for each variable need not be identical except for the identification purpose above. To this end, by letting  $p$  and  $q$  diverse, the order of the  $ARDL(p, q)$  is determined based on information criteria. The estimated Equation (3.3) provides the estimates of  $\alpha$  and vector  $\theta$  which constitute the long-run equation and allow us to get  $\hat{\varepsilon}_t$  which is the equilibrium correction term.

$$m_t = (-1) \frac{\hat{c}_0}{\hat{\alpha}} + (-1) \frac{\hat{c}_1}{\hat{\alpha}} t + (-1) \frac{\hat{\theta}}{\hat{\alpha}} X_t + \hat{\varepsilon}_t \quad (3.4)$$

Finally, to obtain the estimated short-run coefficients, the conditional error-correction model regression associated with Equation (3.4) is performed.

$$\Delta m_t = \eta \hat{\varepsilon}_{t-1} + \sum_{i=1}^p \gamma_i \Delta m_{t-i} + \sum_{j=0}^q \varphi_j \Delta X_{t-j} + u_t \quad (3.5)$$

where  $\hat{\eta}$  is the equilibrium adjustment coefficient.

The existence of cointegration relation of money demand and its determinants is not sufficient to conclude that the demand for money is stable, as Bahmani-Oskooee & Rehman (2005) pointed out. Consequently, a specific test for stability should be used. So as to examine the stability of the money demand, the tests proposed by Brown et al. (1975) named CUSUM and CUSUM squared (CUSUMSQ) tests are applied recursively to the residuals  $\hat{u}_t$  of Equation (3.5).

### 3.3.3. Estimation sample and data

The estimation sample is from 1999Q2 to 2014Q3, for a total of 63 quarterly observations. The sample cannot be extended due to data availability. The monetary and interest rate data are from International Financial Statistics (IFS) published by the IMF. Data on GDP, CPI, and Vietnam stock market index (VN-Index) and VND/USD exchange rate are extracted from Macrobond database. Real GDP is deseasonalized for it exhibits important seasonal movements. The stock market had not been inaugurated until July 2000,

so the VN-Index of end-July 2000 is appended to 2000Q2 observation while each of the first four points is given a value of 100. We are allowed to do so because the market scale and variation was quite small at that time. The Vietnam gold price is taken from the SBV source. The expected rate of inflation is calculated based on Gerlach and Svensson (2003)'s formulation of rational expectations (see Appendix 2 for more details). The definition of variables as well as data statistical description is demonstrated in Table 3.6 and Table 3.7 in Appendix 1. All variables are in logarithm form, except interest rate and inflation.

### 3.3.4. Results

Although it is not required by the bounds testing procedure that stationary tests are driven, it is important to ensure that none of the variables are integrated of order higher than one. We thus begin by testing for the presence of unit roots in the variables. The Augmented Dickey-Fuller (ADF) unit root test is run on both level and first-difference variables, with the lag length determined by Schwarz's Bayesian information criterion. A constant is included in all models and the regressions are done with or without a time trend.

**Table 3.1 ADF unit root test**

Variable	Level		First difference	
	(1)	(2)	(1)	(2)
<i>m1</i>	0.262	0.296	0.019	0.034
<i>m2</i>	0.235	0.811	0.000	0.000
<i>y</i>	0.870	0.001	0.000	0.000
$\pi^e$	0.049	0.011	0.000	0.001
<i>i</i>	0.197	0.031	0.000	0.000
<i>r</i>	0.054	0.008	0.000	0.000
<i>vnse</i>	0.442	0.179	0.000	0.001
<i>e</i>	0.462	0.405	0.009	0.079
<i>gold</i>	0.912	0.603	0.000	0.000

Models contain an intercept and (1) no deterministic trend or (2) a deterministic trend. Statistics presented are p-value of the ADF tests.

Source: Author's estimates

The results presented in Table 3.1 show that we cannot reject the null hypothesis of existence of a unit root in a half of level variables at 5% significance level. Output, expected

inflation and interest rates (both nominal and real one) are trend stationary while all the rest are I(1), irrespective of whether a linear time trend exists in the series. Our dataset thus comprehends a mixture of I(0) and I(1) processes, which guaranties the suitability of the ARDL approach and confirms our methodology choice.

Entering the first step, the existence of a long-run relation between money demand and its predictors is investigated. Since the interest rates, both nominal and real one, and the stock market index failed to supply statistically significant parameters in the demand function of both money balances, the model reported for M1 and M2 henceforth are composed of four determinants that are real income, expected inflation, nominal exchange rate and gold price.

**Table 3.2 Statistics for selecting the lag order**

M1								
Lag	Without deterministic trend				With deterministic trend			
	AIC	BIC	$\chi_{SC}^2(1)$	$\chi_{SC}^2(4)$	AIC	BIC	$\chi_{SC}^2(1)$	$\chi_{SC}^2(4)$
1	-318.44	-286.77	3.21*	15.28	-320.01	-286.23	3.47*	12.00
2	-324.08	-282.20	1.82*	4.88*	-328.81	-284.83	2.03*	9.28*
3	-320.76	-268.82	7.14	15.33	-322.55	-268.53	6.15	18.18
4	-323.87	-262.05	3.51*	4.94*	-323.38	-259.51	3.62*	9.65

M2								
Lag	Without deterministic trend				With deterministic trend			
	AIC	BIC	$\chi_{SC}^2(1)$	$\chi_{SC}^2(4)$	AIC	BIC	$\chi_{SC}^2(1)$	$\chi_{SC}^2(4)$
1	-213.75	-182.34	0.39*	9.06*	-218.00	-184.50	1.21*	11.90
2	-241.60	-200.05	0.84*	3.95*	-240.31	-196.68	0.34*	3.07*
3	-252.48	-200.97	3.12*	6.52*	-253.83	-200.26	4.22	8.56*
4	-245.57	-184.28	7.56	10.84	-246.09	-182.75	6.69	8.47*

Notes: AIC and BIC are Akaike's and Schwarz's Bayesian Information Criteria.  $\chi_{SC}^2(1)$  and  $\chi_{SC}^2(4)$  are chi-squared statistics to test for no residual serial correlation of order 1 and 4 respectively. \* refers to the acceptance of  $H_0$  at 5% significance level. Source: Author's estimates.

Based on preconditions of the bounds testing procedure, only models without serial correlation problem should be considered. As can be seen in Table 3.2<sup>47</sup>, the model which satisfies this requisite and has minimal AIC and BIC value for M1 is the one with two lags

<sup>47</sup> The lag order of variables is restricted to 4 lags to avoid multicollinearity problem in the estimations.



of the regressors, and two lags for M2, regardless of whether a trend is included or not. Besides, the M1 four-lag model and three-lag model of M2, both without trend, can be chosen for further investigation because they are supported by no serial correlation test result.

The  $F$ -test and  $t$ -test are then carried out on these models with or without a trend. The  $F$ -statistics clearly favor the exclusion of the time trend since no model with trend gives a significant statistic. Among no-trend models, both models of M1 and M2's two-lag one satisfy the test (Table 3.3). The  $t$ -statistics do help us to choose the final model of M1 because the result lies above the upper bound of 5% critical values in the model with two lags. Therefore, at the end of this stage, we can conclude that the null hypothesis of no long-run equation for money demand, irrespective of monetary aggregates, is rejected. The function estimation can now be processed.

**Table 3.3  $F$ - and  $t$ -statistics for testing the existence of the long-run relationship**

M1				
Lags	Without deterministic trend		With deterministic trend	
	$F$ -stat	$t$ -stat	$F$ -stat	$t$ -stat
2	5.07 (u)	-3.63 (u)	4.96 (l)	-0.27 (l)
4	6.28 (u)	-2.57 (b)	4.62 (l)	-2.04 (l)

M2				
Lags	Without deterministic trend		With deterministic trend	
	$F$ -stat	$t$ -stat	$F$ -stat	$t$ -stat
2	5.77 (u)	-3.32 (b)	4.35 (l)	-3.19 (l)
3	4.74 (b)	-2.22 (l)	3.76 (l)	-2.81 (l)

Notes: All models contain an unrestricted intercept. (u): the statistic lies above the 0.05 upper bound; (b): the statistic falls between the 0.05 bounds; (l): the statistic lies below the 0.05 lower bound. Source: Author's estimates

By searching among  $4 \times 5^4 = 2500$  equations for each money aggregate using AIC and BIC as guides, the following ARDL models are selected: ARDL(2,1,0,2,4) for M1 and ARDL(3,2,2,3,2) for M2 where the corresponding lags for money, income, inflation, exchange rate and gold price are shown in the parenthesis respectively.

These specifications result in the estimated long-run money demand in Equation (3.6) and (3.7).<sup>48</sup> All parameter estimates have the expected sign and are statistically significant at 5%, except  $\pi_t^e$  at 10% in both equations.

$$m1_t = 1.754 y_t - 0.013 \pi_t^e - 3.515 e_t + 0.395 gold_t - 0.998 + \hat{\varepsilon}_{1t} \quad (3.6)$$

$$m2_t = 1.884 y_t - 0.011 \pi_t^e - 2.900 e_t + 0.498 gold_t - 3.926 + \hat{\varepsilon}_{2t} \quad (3.7)$$

In both money demand functions the income elasticity is all greater than one, but close to each other. From M1 to M2, we can observe that the broader the considered money stock, the higher the estimated elasticity. Referring to existing literature on money demand, the same statement can be found in general (Knell & Stix (2004)). This result itself is reasonable, because narrow money is basically held for transaction purposes while there is also a role for portfolio motives in broad money.

The highest value of 1.88 is registered for M2, smaller than previous results for Vietnam as in Watanabe & Pham (2005) and Nguyen & Pfau (2010) which are 2.76 and 2.52 respectively. The origin of these differences may emerge from the omission of wealth measures in money demand estimation in these studies. Knell & Stix (2004) argue that given high correlation between income and wealth, the lack of such variables will lead to overestimation of the income elasticity. On the other hand, our estimated coefficient is in accordance with findings of money demand studies for other developing countries like Bahmani-Oskooee & Wang (2007) on China, Dritsakis (2011) on Hungary, Dagher & Kovanen (2011) on Ghana, etc.

Expected inflation produces surprisingly small effect on money demand. This could be due to the fact that there are not many real assets that can substitute money in case of high inflation. Meanwhile, the estimate of the gold price elasticity shows that the money demand, irrespective of measures, and the domestic price of gold move in the same direction. One percent increase in the gold price will cause a 0.4 percent augmentation in the M1 and 0.5 percent in M2 demand in the long run. The positive sign means that holders of gold benefit from its incremental price (wealth effect) rather than reform their portfolio after such changes. The magnitude is relatively important, which is imaginable for a country like Vietnam with an impressively dynamic market for gold. This considerable influence of gold price confirms the argument presented above of Knell & Stix

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<sup>48</sup> See Table 3.8 in the Appendix for more details

(2004). Indeed, the inclusion of wealth aspect of gold in the money demand function helps obtain better estimations of the income elasticity.

The estimated exchange rate substitution impact on both measures of money demand is of critical importance, going from 2.9 to 3.1 percent reduction of the demand on VND following a depreciation of one percent of the domestic currency. The valuation impact in the long-run is expressed by the substitution effect as Vietnamese people shift from domestic currency (in cash and deposits) to USD. One should keep in mind that Vietnamese people tend to hold foreign currency in cash rather than as bank deposits, so the real M2 balances would decrease.

**Table 3.4 Equilibrium error-correction form of the ARDL(2,1,0,2,4) for M1**

Lag order	0	1	2	3	4
ECT		-0.100*** (0.017)			
$\Delta m1$		0.633*** (0.115)	-0.410*** (0.096)		
$\Delta y$	0.156** (0.059)	-0.046 (0.038)			
$\Delta \pi^e$	-0.002*** (0.001)				
$\Delta e$	-0.471** (0.232)	0.309 (0.253)	0.323 (0.241)		
$\Delta gold$	0.012 (0.031)	-0.055* (0.031)	-0.010 (0.031)	-0.038 (0.032)	-0.064** (0.031)

$\bar{R}^2 = 0.87$ ; RSS = 0.01; Log-likelihood = 184.49 ; AIC = -338.98 ; BIC = -307.32 ;  
 $\chi^2_H(1) = 1.62$  [0.20] ;  $\chi^2_N(2) = 1.57$  [0.46] ;  $\chi^2_{SC}(4) = 7.05$  [0.13] ;  $F_{3,43} = 0.01$  [0.99]

Standard errors are given in parenthesis. \*, \*\* and \*\*\* denote statistical significance at 10%, 5% and 1% respectively.  $\bar{R}^2$  is the adjusted squared multiple correlation coefficient, RSS is the residual sum of squares, AIC and BIC are Akaike's and Schwarz's Bayesian Information Criteria,  $\chi^2_H(1)$ ,  $\chi^2_N(2)$  and  $\chi^2_{SC}(4)$  refer to chi-squared statistics to test for homoskedasticity, normality of the errors and no residual serial correlation respectively, and  $F_{3,43}$  is Ramsey RESET test statistic for no functional form misspecification, p-values are given in [.]. Source: Author's estimates

The results of the conditional ECM regressions are given in Table 3.4 and Table 3.5. These estimates provide some complementary information on the complex dynamics existing between money demand and its determinants. The general observation is that the behavior of regressors is mostly the same in all three money demand function. The statistics are highly significant. The regressions fit very well as they pass all the diagnostic

tests against non-normal errors, heteroscedasticity, serial correlation of the residuals and functional form misspecification. A more detailed investigation is provided below.

Firstly, the error-correction term is  $-0.1$  for M1, only a half of that of M2. It would take two years and a half to absorb all the eventual misalignment in real M1 demand, which is quite long, while the adjustment speed in M2 demand is merely 5 quarters. These results suggest that deviations from the equilibrium persist but the situation is better for broad money aggregate being targeted by the central bank. Comparable findings can be found in Baharumshah et al. (2009) and Bahmani-Oskooee & Wang (2007) on China and Kumar (2011) on some other Asian and African developing countries.

**Table 3.5 Equilibrium error-correction form of the ARDL(3,2,2,3,2) for M2**

Lag order	0	1	2	3	4
ECT		-0.209*** (0.037)			
$\Delta m1$		0.098 (0.117)	0.104 (0.105)	-0.211** (0.097)	
$\Delta y$	0.460*** (0.143)	-0.238* (0.141)	-0.056 (0.086)		
$\Delta \pi^e$	-0.001 (0.002)	0.001 (0.002)	-0.005*** (0.001)		
$\Delta e$	-0.912* (0.487)	1.393*** (0.474)	0.343 (0.468)	-0.702 (0.520)	
$\Delta gold$	0.159** (0.074)	-0.214*** (0.066)	-0.171** (0.065)		

$\bar{R}^2 = 0.62$ ; RSS = 0.03; Log-likelihood = 144.31 ; AIC = -252.63 ; BIC = -215.23 ;  
 $\chi_H^2(1) = 0.22 [0.64]$  ;  $\chi_N^2(2) = 0.62 [0.74]$  ;  $\chi_{SC}^2(4) = 7.02 [0.14]$  ;  $F_{3,38} = 0.63 [0.60]$

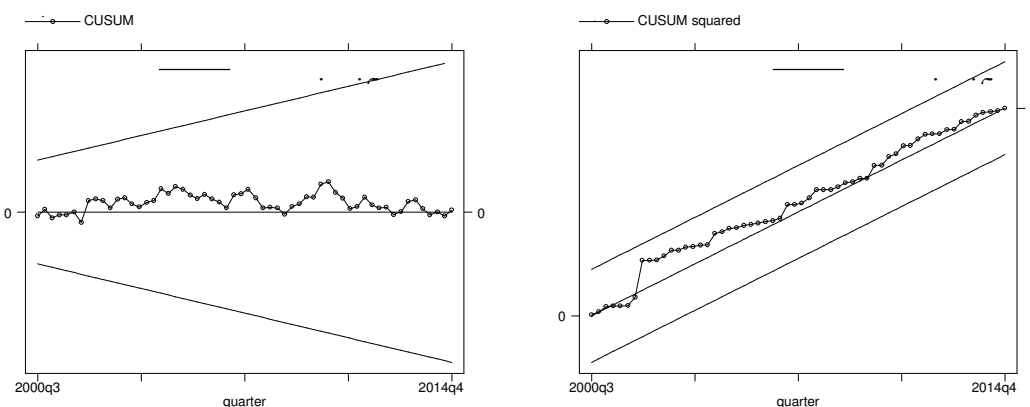
Standard errors are given in parenthesis. \*, \*\* and \*\*\* denote statistical significance at 10%, 5% and 1% respectively.  $\bar{R}^2$  is the adjusted squared multiple correlation coefficient, RSS is the residual sum of squares, AIC and BIC are Akaike's and Schwarz's Bayesian Information Criteria,  $\chi_H^2(1)$ ,  $\chi_N^2(2)$  and  $\chi_{SC}^2(4)$  refer to chi-squared statistics to test for homoskedasticity, normality of the errors and no residual serial correlation respectively, and  $F_{3,38}$  is Ramsey RESET test statistic for no functional form misspecification, p-values are given in [.]. Source: Author's estimates

Money own short-run impact is both corrective and stimulating. Income elasticity is overall positive, approving short-run income effect on money demand. However, this effect is rather short-lived, disappearing after just one quarter in both money demand equation.

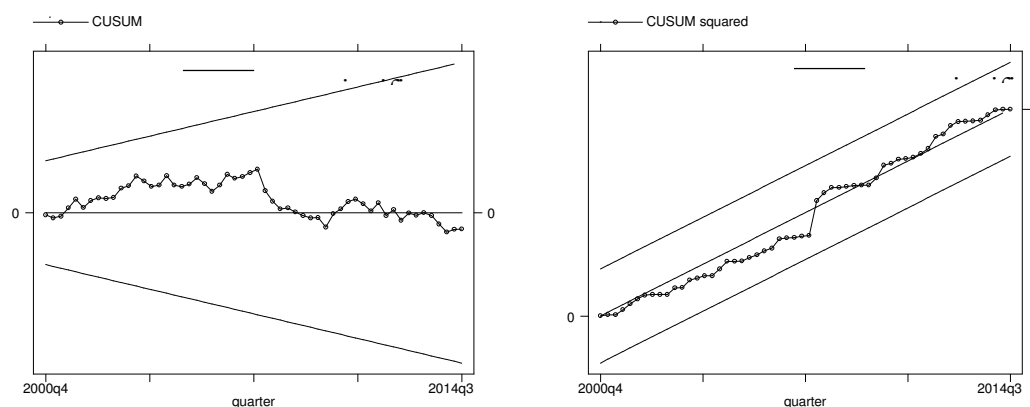
Expected inflation effect in the short run is similar to that in the long-run but of smaller magnitude: one percent increase in inflation anticipated by the residents will lead to a one-twentieth percent decrease in the money demand. The short-run impact is modest can be explained by the lack of comparable and accessible real assets as alternatives to money.

Both exchange rate and gold price have mixed effect on money demand in the short run. However, substitution effect is said to prevail over wealth effect. While the compounded effect from exchange rate is much smaller than in the long run, that of gold price is maintained. The meaningful contribution of gold price to the explication of the money demand in Vietnam is confirmed, which has however been omitted in all existing empirical researches.

**Figure 3.1 CUSUM and CUSUMSQ tests for M1**



**Figure 3.2 CUSUM and CUSUMSQ tests for M2**



Source: Author's estimates

The last step consists of examining the stability of the estimated long-run relationship between money demand and its determinants. This is done by carrying out the CUSUM and CUSUM squared tests. The results are plotted in Figure 3.1 and Figure 3.2. The figures show that both M1 and M2 are stable from 1999 to 2014 since the test statistics remain within their critical value at 5% significant level over the whole sample period. This important finding supports the monetary targeting's first condition on the stability of money demand in Vietnam.

#### 3.4. CONCLUSION

Understanding the demand for money is crucial for an effective implementation of monetary policy. However, there have merely been a handful of empirical researches on this topic for Vietnam. Wishing to enrich the money demand literature for the country, this study is performed to investigate the stability of money demand in Vietnam, not only on M2 as usually seen but also on M1. Additionally, since the latest work published its results, there have been many global and country-specific significant events likely to influence the money demand. They need to be taken into consideration when conducting such a study.

Using the recent cointegration framework developed by Pesaran et al. (2001), we find evidences for a long-run relationship between money demand, regardless of which monetary aggregate is considered, and income, expected inflation, exchange rate and gold price. Exchange rate is found to be the most important variable to determine the demand for money, which is compatible with the considerable level of dollarization in the nation. The gold price variable, which is introduced in the money demand equation for the first time, expresses its strong relevance. This result can inspire future practical works for countries where this precious metal has a substantial place in the economy. The failure of deposit interest rate to present significant impact on real money balances can be accounted for by the fact that under high inflation, deposit interest rates offered by banks are not sufficient to prevail over the inflation rate, provoking people's indifference on this financial parameter. Moreover, Le & Pfau (2009) on monetary transmission channels in Vietnam find that the interest rate channel plays only a little role in transmitting the monetary policy. Moreover, the stock market does not appear to be as attractive as before (see my previous study Lai 2013). The previously found significant effect of stock price on money demand should consequently be associated with financial market overheating rather than a structural change in that developing market.

The estimation of the error-correction model associated with the long-run equation indicates that the mean reversion speed is relatively low, especially for M1. The results of the ECM also point out the complexity of the relation between money demand and its explanatory variables but confirm their important contribution even in the short-run.

These findings on the one hand are consistent with the present conduct of monetary policy of the State Bank of Vietnam in some aspects as it has taken into account inflation rate, exchange rate and gold price. For instance, the central bank has recently adopted the new mandate of stabilizing the value of dong expressed by the inflation rate defined by the Law on the State Bank of 2010, which took effect January 1<sup>st</sup> 2011. It also intervened onto the domestic gold market in order to calm this market down in 2011. Macroeconomic conditions have been improved since then. On the other hand, our results could be useful for the future monetary policy. The SBV had better rely less on interest rate instruments to make its policy more responsive. Moreover, as foreign currency and gold holdings would provoke a powerful substitution effect against Vietnam dong, it is essential that the actual favorable macroeconomic environment is maintained to sustain residents' confidence on the domestic money. Additionally, the Bank should also reinforce its credibility in order to better anchor residents' inflation expectations to its objective, ameliorating the monetary policy efficiency.

Finally, the stability test result concludes the stable demand for both M1 and M2 which is the first necessary condition within the monetary targeting framework.

## APPENDIX 1

**Table 3.6 Variable definition**

Variable	Definition
<i>m1</i>	Logarithm of Real narrow money – M1, derived by dividing M1 by <i>P</i> (M1 in billions of VND)
<i>m2</i>	Logarithm of Real broad money, including foreign currency deposits – M2, derived by dividing M2 by <i>P</i> (M2 in billions of VND)
<i>P</i>	Consumer price index (2009=100)
<i>y</i>	Logarithm of Real income, derived by dividing Gross Domestic Product (GDP) by <i>P</i> (GDP in billions of VND)
$\pi^e$	Expected rate of inflation (percent)
<i>i</i>	Average deposit interest rate offered by banks, quarterly average (percent)
<i>r</i>	Real interest rate, derived from <i>i</i> by suppressing price movements (percent)
<i>vnse</i>	Logarithm of VN-index of the Ho Chi Minh City stock exchange, quarterly average (VN-index: 2000=100)
<i>e</i>	Logarithm of Nominal VND/USD exchange rate, quarterly average (exchange rate in thousands of VND per USD)
<i>gold</i>	Logarithm of Vietnam gold price, quarterly average (gold price in thousands of VND per tael, 1 tael ~ 1.2057oz)
Sources	IMF International Financial Statistics (provided by Macrobond) Macrobond database State Bank of Vietnam

**Table 3.7 Summary statistics, 1999Q2 - 2014Q3**

Variable	Mean	Standard deviation	Min.	Max.	Skewness	Kurtosis	Obs.
<i>m1</i>	7.837	0.675	6.518	8.779	-0.706	2.242	71
<i>m2</i>	8.994	0.958	7.092	10.305	-0.502	2.054	71
<i>y</i>	8.889	0.325	8.147	9.522	-0.037	2.379	63
$\pi^e$	7.885	6.266	-2.707	27.242	0.976	4.359	64
<i>i</i>	8.088	2.784	3.540	16.990	0.989	3.879	71
<i>r</i>	1.101	3.321	-8.376	6.700	-0.750	3.313	67
<i>vnse</i>	5.655	0.699	4.605	6.943	-0.197	1.938	72
<i>e</i>	2.797	0.168	2.423	3.059	0.033	2.314	72
<i>gold</i>	9.398	0.845	8.381	10.744	0.296	1.539	72

Sources: IMF IFS, Macrobond, SBV and Author's calculations



**Table 3.8 Long-run estimation results**

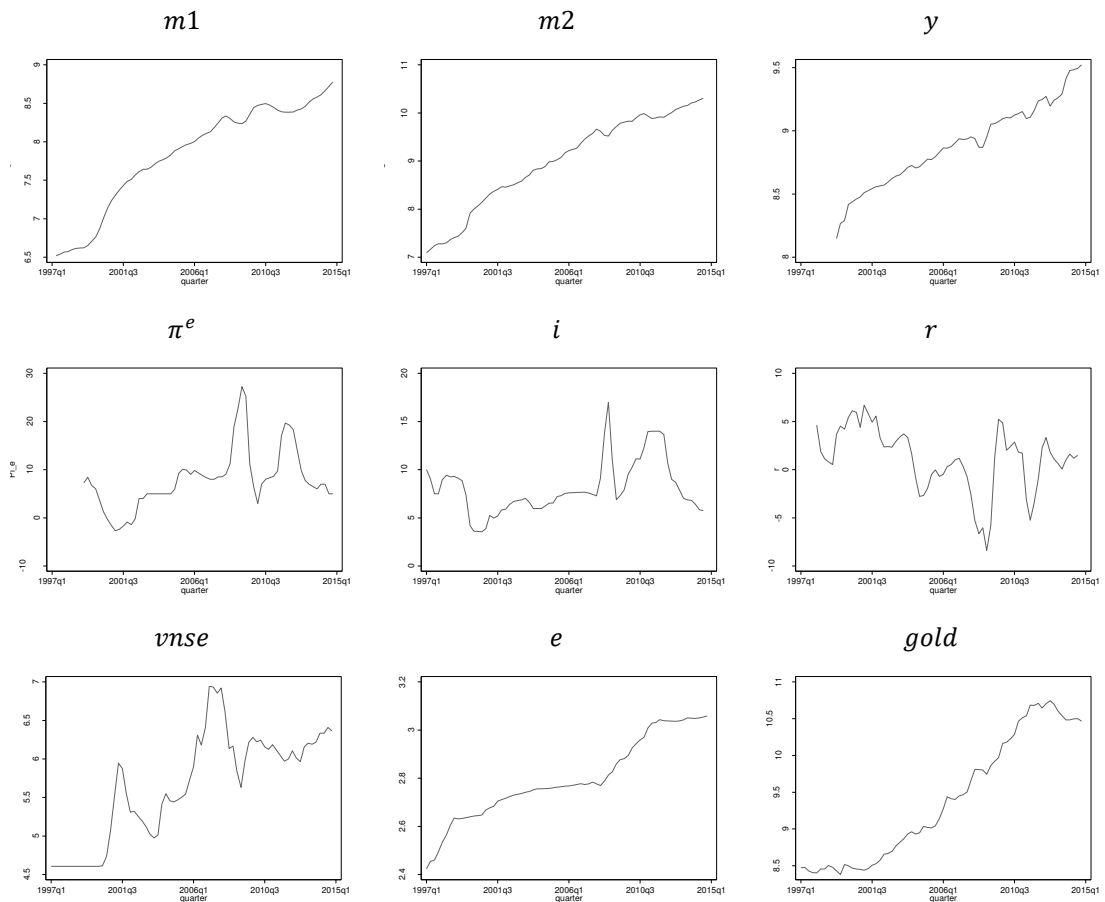
Equation	$m1_{t-1}$	$m2_{t-1}$	$y_{t-1}$	$\pi_{t-1}^e$	$e_{t-1}$	$gold_{t-1}$
$m1$	-0.100*** (0.024)		0.176*** (0.045)	-0.001* (0.001)	-0.352*** (0.095)	0.040** (0.017)
$m2$		-0.209*** (0.062)	0.395*** (0.125)	-0.002* (0.001)	-0.603** (0.230)	0.104** (0.048)

- Numbers displayed are estimated coefficients (without parentheses), standard errors of estimated coefficients (in parentheses). \*\*\*, \*\*, and \* denote statistically significant estimates at 1%, 5% and 10% respectively.

- Long-run coefficients as in Equation (3.6) and (3.7) are computed by dividing each regressor's coefficient by that of  $m1_{t-1}$  or  $m2_{t-1}$  accordingly, then multiplying by  $(-1)$ . See Equation (3.4).

Source: Author's estimates

**Figure 3.3 Data graphs 1999Q2-2014Q3**



Sources: IMF IFS, Macrobond, SBV and Author's calculations

## APPENDIX 2

### Rational inflation expectations formulation

We are inspired by Gerlach and Svensson (2003) specification in which public's inflation expectations depend simultaneously on the central bank's inflation objective,  $\pi^{obj}$ , and the credibility of this objective, as shown in Equation (3.8).

$$\pi_{t,t-1}^e = \pi_t^{obj} + \alpha_\pi(\pi_{t-1} - \pi_{t-1}^{obj}) \quad (3.8)$$

where  $\pi_{t,t-1}^e$  is the year-on-year expected inflation rate at  $t$  based on information at  $t - 1$ ,  $\pi_{t-1}$  is the year-on-year change in the consumer price index at  $t - 1$ .

This modeling allows us not only capture the persistence of past inflation rates in the expectation formulation but also incorporate information for the assessment of monetary policy credibility. As such, while it seems pretty arbitrary, it would be helpful in estimating inflation expectations for the case of Vietnam. However, some modifications are made to adapt to our framework.

First, by specifying as in Equation (3.8) with  $0 \leq \alpha_\pi \leq 1$ , the weight put on inflation objective is effectively always higher than that on the past deviation. This is problematic if the central bank does not have high credibility, which is very likely in a developing country. That's why  $\alpha_\pi$  is suppressed from the specification above. Second, since it is too restrictive if every single deviation is taken into account in the expectation formulation, a dummy  $D_t$  is added. In effect, the dummy takes the value of 1 if (i) effective inflation is higher than the objective, or (ii) deflation happens, or (iii) effective inflation exceeds 10%. Finally, in order to be more realistic, the judgment of the first condition and the past deviation (the second right-hand sided part of Equation (3.8)) are set on a yearly average basis. Consequently, we have inflation expectation formulation as presented in Equation (3.9).

$$\pi_{t,t-1}^e = \pi_t^{obj} + D_t \left[ \sum_{k=1}^4 (\pi_{t-k} - \pi_{t-k}^{obj}) / 4 \right] \quad (3.9)$$

$$\text{where dummy } D_t = 1 \text{ if } \begin{cases} \sum_{k=1}^4 (\pi_{t-k} - \pi_{t-k}^{obj}) / 4 > 0 \\ \pi_{t-k} < 0, \forall k = 1, \dots, 4 \\ \pi_{t-k} > 0.1, \forall k = 1, \dots, 4 \end{cases}$$

The SBV announced objective is chosen for  $\pi^{obj}$ . Those objectives are disclosed in advance for the next year but exposed to changes.

## CHAPTER 4

### INFORMATION CONTENT OF MONEY IN INFLATION DYNAMICS

**Abstract** This chapter examines whether money is always relevant in Vietnam's inflation forecast. The results highlight the meaningful contribution of money, no matter whether it is expressed in stock or growth. The real money balance is even shown to be more informative than the output gap in forecasting future inflation. Besides, money growth is as predictive as the output gap and currency depreciation. Together with the findings in Chapter 3, we can conveniently affirm the appropriateness of the monetary targeting in Vietnam.

**JEL classification** E37, E52, C26

**Keywords** Money, Inflation, Monetary targeting, Factor-GMM, Vietnam

#### 4.1. INTRODUCTION

As we have seen in Chapter 3, the existence of a stable money demand function for Vietnam is strongly approved. This points to the satisfaction of the first condition of the monetary targeting framework which has been undertaken in the country. This chapter represents a straight continuation of the previous one by considering the second requirement and thus the relevance of such a monetary policy regime. In effect, as Svensson (1999, 2000)'s theoretical discussion and empirical support in Rudebuschan and Svensson (2002), the predictive power of money on inflation does *not* depend on the existence of a stable money demand function. Being an intermediate target money has to convey some important information on future movements in prices; otherwise the signals it delivers would be misleading.

Inflation dynamic and determinants has been an important topic in the literature on Vietnam's economy due to past experiences of high inflation. However, to the best of my knowledge, no study has focused on the special role of money but treated it in the same manner to all other variables. Existing researches mostly rely on Vector autoregression (VAR) or Vector Error-correction (VEC) models where they include several competing inflation determinants, including money in the form of stock or growth of M2 or total credit. While some find that money significantly affects inflation (IMF 2006, Bhattacharya 2013), others indicate non-significant or modest impacts that money has on inflation compared to other regressors. For instance, Camen (2006) discovers that M2 growth accounts for less than 5% of inflation variation, only one-fifth of that of credit growth. Le and Pfau (2009) find that M2 does not Granger cause inflation over 1996-2005; meanwhile, Nguyen and Nguyen (2011) point out a significant but small, delayed impact of money on CPI inflation.

Not only in a monetary targeting country like Vietnam does the money-inflation relationship interest researchers. In the euro area for example, since the European central bank (ECB) has adopted a framework under which broad money growth continues to play a crucial role for policy setting, many studies have been carried out to examine this practice empirically. Gerlach and Svensson (2003) conclude on the predictive power of money on euro area inflation but specify that only real money stock is significant as opposed to the money growth. Using different methods, from Dynamic stochastic general equilibrium (DSGE) to simple Times series models, Stavrev and Berger (2012) uncover the meaning-

ful but rather marginal contribution of money to inflation forecast. Kovanen (2011) inspects the literature and also finds mixed results regarding the role of money in other countries.

In this research I favor the use of a money-augmented Phillips-curve model suggested in Gerlach and Svensson (2003) to investigate the information content of money aggregates in inflation forecasting. As a partial equilibrium model, it is not complicated technically but still efficient in describing economic forces behind inflation dynamics. On the other hand, there is evidence that adding money to models can help enhancing inflation forecast.<sup>49</sup>

Particularly, this study aims at answering three questions: (i) does money matter for inflation in Vietnam?; if so, (ii) does it perform better than other predictors such as past inflation or the output gap?; and (iii) which form of monetary indicators is useful to forecast inflation, should we continue to rely on the M2 growth or switch to a stock-based indicator instead?

The rest of the chapter is composed of three sections. Section 2 describes the model as well as the implemented arrangements. Section 3 supplies information about the data and the estimation method. The results will also be presented and discussed in this section. Additionally, the central bank's credibility will be considered. The last section concludes on the information value of money and shed some light on the pertinence of the central bank's actual monetary strategy.

## 4.2. THE MODEL

A simple Phillips curve model below is taken as our departure point. All variables (except inflation rate) are in natural logarithms.

$$\pi_t = \gamma\pi_{t-1} + \beta_y(y_{t-1} - y_{t-1}^*) + \varepsilon_{1,t} \quad (4.1)$$

The level of inflation at any quarter  $t$ ,  $\pi_t$  – measured by the year-on-year (yoy) change in the consumer price index (CPI), in addition to showing some inertia, is assumed to be a

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<sup>49</sup> Gerlach (2004), Bundesbank (2005), Assenmacher-Wesche and Gerlach (2006), Berger and Osterholm (2008), Fischer et al. (2008), among others

positive function of lagged output gap, which is the difference between  $y_{t-1}$  – the level of output during the previous period – and  $y_{t-1}^*$  – the potential output.

Alternatively, as presented in Svensson (2000), the Phillips curve equation can be derived from a  $P^*$  model.<sup>50</sup> Equation (4.2), suggesting that current CPI inflation depends on its lagged value, lagged real money gap,  $m_{t-1} - m_{t-1}^*$ , and also on the change of the latter,  $\Delta m_{t-1} - \Delta m_{t-1}^*$ .

$$\pi_t = \gamma\pi_{t-1} + \beta_m(m_{t-1} - m_{t-1}^*) + \beta_{\Delta m}(\Delta m_{t-1} - \Delta m_{t-1}^*) + \varepsilon_{2,t} \quad (4.2)$$

In Equation (4.2),  $m_{t-1}$  is the real money stock,  $m_{t-1} = \log(M_{t-1}/P_{t-1})$  with  $M_{t-1}$  the nominal money balance and  $P_{t-1}$  the price level.  $m_{t-1}^*$  is the long run equilibrium (LRE) real money stock, which can be defined *à la* Svensson (2000)<sup>51</sup> or the long run demand for real money balance as the one computed in Chapter 3. In a Phillips curve of this form, the real money gap represents demand pressure that generates inflation, it replaces the output gap in the conventional framework of Equation (4.1).

Nevertheless, one may wonder if the degree of money overhang, both in stock and growth, can completely substitute the output gap. Including one but not the other could be too restrictive. That's why I follow Gerlach and Svensson (2003) by enhancing the traditional Phillips curve in (4.1) with the two money gaps in (4.2). Furthermore, a supply-side factor,  $z_t$ , can be added to the inflation equation. Our new model of price determination is demonstrated in Equation (4.3):

$$\pi_t = \gamma\pi_{t-1} + \beta_y(y_{t-1} - y_{t-1}^*) + \beta_m(m_{t-1} - m_{t-1}^*) + \beta_{\Delta m}(\Delta m_{t-1} - \Delta m_{t-1}^*) + \beta_z z_{t-1} + \varepsilon_{3,t} \quad (4.3)$$

It is interesting to harmonize the measure of inflation on the left hand side and its lag with the other explanatory variables. This can be done by presenting inflation as a gap,  $\pi_t - \pi_t^*$ , with  $\pi_t^*$  being a long-run trend or an objective level of inflation. Therefore, by examining the role of the real money growth gap  $\Delta m_{t-1} - \Delta m_{t-1}^*$ , one can deduce that of the *nominal* money growth gap. Since  $\Delta m_t = \Delta \log M_t - \pi_t$  then  $\Delta m_t^* = \Delta \log M_t^* - \pi_t^*$ , so we

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<sup>50</sup> See also the Appendix for the development

<sup>51</sup> Therein, the LRE real money stock is defined as the difference between potential output and velocity at its LRE level ( $m_t^* = y_t^* - v_t^*$ ). This comes from the quantity equation:  $\widetilde{m}_t + v_t = p_t + y_t$ , the assumption on its LRE:  $p_t^* = v_t^* - y_t^* + \widetilde{m}_t^*$ , and by defining  $m_t^* = \widetilde{m}_t^* - p_t^*$  ( $\widetilde{m}_t^* = \log M_t^*$  the (log) nominal money balance).

have  $\Delta m_t - \Delta m_t^* = (\Delta \log M_t - \Delta \log M_t^*) - (\pi_t - \pi_t^*)$ . The real money growth gap is actually the difference between the nominal money growth gap and the inflation gap.

By incorporating the inflation gap and its lag, replacing  $z_t$  by the nominal exchange rate depreciation  $\Delta \log E_t$  to account for imported inflation, and setting the model in a forecasting context, we have a compelling model to analyze the information content of money on inflation:

$$\begin{aligned} \pi_{t+h} - \pi_{t+h}^* = & \beta_\pi(\pi_t - \pi_t^*) + \beta_y(y_t - y_t^*) \\ & + \beta_m(m_t - m_t^*) + \beta_{\Delta m}(\Delta m_t - \Delta m_t^*) + \beta_e \Delta \log E_t + \varepsilon_{4,t} \end{aligned} \quad (4.4)$$

for  $h = 4$  or  $8$ . All betas are supposed to be positive and  $0 \leq \beta_\pi \leq 1$ .<sup>52</sup>

In order to estimate Equation (4.4),  $\pi_t^*$ ,  $y_t^*$ ,  $m_t^*$ , and  $\Delta m_t^*$  must be specified. Gerlach and Svensson (2003) define  $\pi_t^*$  as an implicit objective of the central bank which can be computed by filtering the effective inflation series. Kovanen (2011), meanwhile, uses a fixed objective of 10% when estimating the Ghanaian case. In line with Chapter 3,  $\pi_t^*$  in this research stands for the announced inflation objective of the SBV. Every year, the SBV calculates its objective for the next year and presents this to the National Assembly (NA) for approbation. Once being approved by the NA, the objective will be disclosed to the public. This objective is not fixed for the whole year but subjected to changes conditional on SBV's judgment about economic evolution.

For potential output, I simply apply the Hodrick-Prescott (1997) filter to  $y_t$  series. The LRE real money stock is calculated from Equation (3.7) page 77. This is the estimated long-run demand for real money balances.  $\Delta m_t$  and  $\Delta m_t^*$  denote the four-quarter changes of the real money stock and its LRE level respectively. Similarly,  $\Delta \log E_t$  is the four-quarter changes of the nominal USD/VND exchange rates.

### 4.3. EMPIRICAL STUDY

#### 4.3.1. *Sample and data*

The analysis is carried out on quarterly data from 1999Q2 to 2014Q3, the same to the sample in Chapter 3. All data are extracted from Macrobond database, except for the SBV

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<sup>52</sup> An increase in the nominal exchange rate means a depreciation of domestic currency

inflation objective data are gathered from various sources, notably the central bank website and Vietnamese media. Real output is measured by GDP net of consumer price level. The list of variables and their statistical characteristics are presented in the Appendix.

To have the very first impression about the relationship between money and inflation, we have on Figure 4.1 four-quarter average CPI inflation plotted together with M2 growth. The figure show that Vietnam’s inflation has been quite volatile over the last two decades. As a consequence of 1997-98 Asian crisis, the country had to experience economic slow-down with deflation from end-1999 to early-2002. Moderate inflation rates were maintained during the next five years before it rocketed to more than 25% in 2008. Price level was then brought down to below five percent prior to soar up again in mid-2011. Inflation has been thereafter kept at a reasonable level. Simultaneously, the rate of money growth has fluctuated a lot since end-1990s. The year-on-year change of M2 balance reached its all-time record of about 75% in 2000, declined to 10% in end-2002, then stayed around 30% until 2007. Since then there have been many succeeding peaks and troughs. Overall, the relationship between these two variables appears to be very close with money leading 3-4 quarters. This is comprehensible since the SBV adjust its supply of M2 to attain its inflation objective. However, the huge and erratic difference between variation magnitude of inflation and money growth raises the question about monetary policy efficiency.

**Figure 4.1 Year-on-year inflation and money growth**

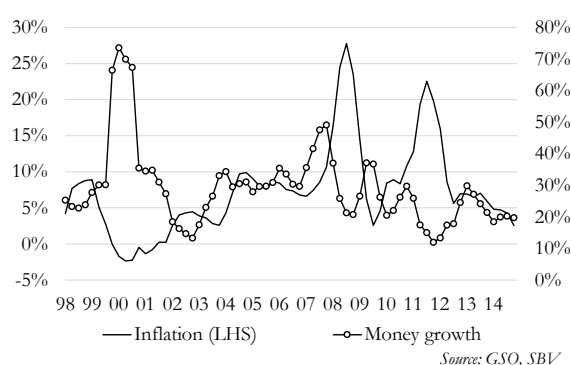
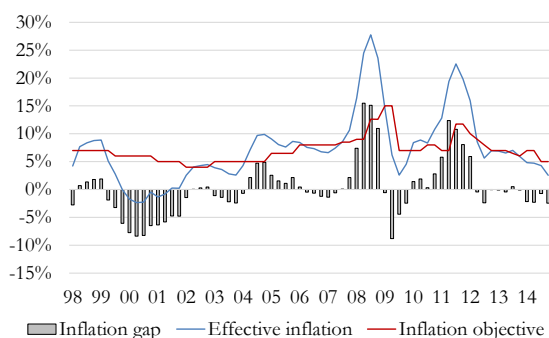


Figure 4.2 compares effective inflation rates and the SBV’s objective over time. It is manifested that inflation objective has not been so credible. The variance of the objective is too small compared to that of four-quarter average year-over-year effective inflation (0.05% vs. 0.31%), making the objective impossible to match the effective rate. Disposing a volatile inflation goal to the public is not good for the central bank’s credibility; but



much delay in or shortage of adjustment to take into account recent price evolution cannot make the bank more credible either. For instance, the central bank could not foresee low- and even deflation in 2000 and also stuck to its positive objective too long. Likewise, during the inflation peak in 2008, the bank did wait until effective inflation had topped out to revise the objective upward. In 2011's spike, the SBV raised objective in time but stayed too far from the effective number.

**Figure 4.2 Inflation and SBV inflation objective**



Source: GSO, SBV, Author's calculation

#### 4.3.2. *Inflation and predictors*

Before estimating the model, it is useful to investigate the relationship between inflation and its explanatory variables. Figure 4.3 displays the evolution of the inflation gap and predictors over the estimation sample. It can be seen that the output gap, money gaps and currency depreciation all share important common patterns with the inflation gap, which are though clearer in the case of the two money gaps. Moreover, while the output gap and money gaps appear to move before the inflation gap, the remaining predictor is likely to lag behind. Besides, there is no clear-cut difference in timing among leading variables, suggesting that they may all be useful to forecast inflation.

Figure 4.4 gives us some more details about the relationship between inflation gap and its determinants. It displays the correlation between the output gap, two money gaps and exchange rate changes with past, current and future values of the inflation gap. The figure shows weak contemporaneous correlation in all cases. The output and money growth gap manifest apparent leading features vis-à-vis inflation, especially in 4-quarter horizon for the output and the money growth. Meanwhile, the real money gap has weaker correlation coefficients when the lag order is positive than in the other case, and exchange rate exhibits only limited correlation with inflation.

Figure 4.3 Inflation gap and predictors

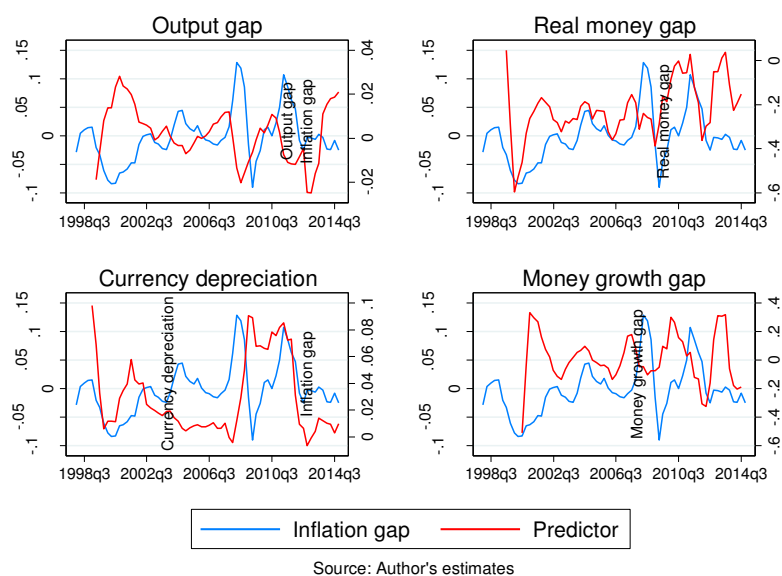
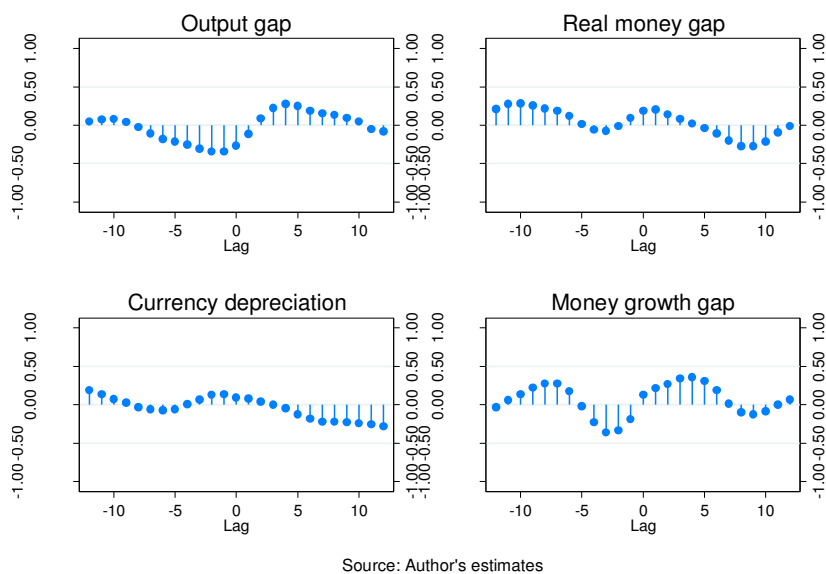


Figure 4.4 Cross-correlogram of inflation gap and predictors



### 4.3.3. Model estimation

In order to gauge the information content of each variable in inflation prevision particularly that of money stock and money growth compared to other variables', the model is estimated. To better control for the intervention of the central bank, a dummy variable  $D_t$  is added into the equation. We distinguish two cases: the central bank would react only if (i) the four-quarter average effective inflation is higher than its objective (i.e. the yearly average inflation gap is positive), or (ii) deflation takes place, or (iii) there is two-digit

inflation; otherwise it would not intervene. Indeed, every time when inflation surpasses the symbolic rate of 10%, policy makers exhibit their preoccupation and then keenly react to bring inflation down to one-digit level. The same response can be found in case of deflation, as shown in Figure 4.1. The SBV injected a great amount of money into the economy to cope with negative inflation rates during 2000-2001. The model now becomes:

$$\begin{aligned} \pi_{t+h} - \pi_{t+h}^* = & \beta_{\pi} D_t (\pi_t - \pi_t^*) + \beta_y (y_t - y_t^*) \\ & + \beta_m (m_t - m_t^*) + \beta_{\Delta m} (\Delta m_t - \Delta m_t^*) + \beta_e \Delta \log E_t + \varepsilon_{4,t} \end{aligned} \quad (4.5)$$

$$\text{for } h = 4 \text{ or } 8, \text{ and } D_t = 1 \text{ if } \begin{cases} \sum_{k=1}^4 (\pi_{t-k} - \pi_{t-k}^*) / 4 > 0 \\ \pi_t < 0 \\ \pi_t > 0.1 \end{cases}, D_t = 0 \text{ otherwise}$$

Firstly, the four- and eight-quarter ahead inflation gap is regressed on the output gap, each money gap and currency depreciation individually. By relying on the adjusted R-squared statistic, we can compare the explanatory power of money, in stock or growth, to that of the other determinants. Next, the output gap stays in the equation permanently where we add each money gap and both of them consecutively. If the adjusted R-squared increases compared to that of equation with output gap alone, it is clear that some extra demand pressure is retained in money variables, and that they still have valuable information on future inflation.

According to preliminary estimations, OLS cannot deliver consistent, unbiased results since residuals bear significant heteroscedasticity and autocorrelation, together with endogeneity problem lied within the model. The generalized method of moments (GMM) with standard errors corrected for heteroscedasticity and autocorrelation will therefore be employed to overcome all these handicaps. Two lags of each explanatory variable are used as instruments. Besides, to control for the information which could dispose other macro-economic variables but to guarantee a parsimonious summary of that content, I benefit from recent successful application of dynamic factor models (DFM) to instrument the GMM regression. This results in the Factor-GMM procedure, which can enhance the efficiency of the traditional GMM estimation, as surveyed in Stock and Watson (2010).

The idea behind the DFM lies in the fact that economic indicators, apart from their idiosyncratic features, share some common trend. Estimating common factors which account for such comovement efficiently compiles information from large datasets, so making use of that information without provoking over-identification problem. Similarly, since we

cannot add as many instruments as we wish in GMM framework, common factors in this sense can improve regression precision (Favero, Marcellino, and Neglia 2005).<sup>53</sup>

In this study, macroeconomic variables are gathered to extract common factors via the Generalized Dynamic Factor Model (GDFM) of Forni et al. (2005), including credit to the economy, short term interest rates, share price index, reel effective exchange rate, components of the balance of payments, and some essential commodity prices. The number of dynamic factors extracted is determined following the method proposed by Hallin and Liska (2007). The list of variables used to compute factors can be found in the Appendix. For DFM technical details, please refer to Chapter 6, Section 6.2.1. In all, this framework gives us two factors, which as well as their two lags are included as instrumental variables.

#### 4.3.4. Results

The estimation results are given in Table 4.1. There are two panels, corresponding to the forecast horizon of the inflation gap being 4 or 8 quarters. Instruments are proved to be valid in all models by the Hansen's  $J$  test.

The current inflation gap, standing for autoregressive impacts on dependent variable, is present in all regression. In all cases, it is highly significant and has expected sign. This confirms the well documented substantial degree of inertia in Vietnam's inflation dynamics, explaining the hysteresis of high inflation in the country. The degree of persistence is lower in longer run but remains strikingly non-negligible. If in four-quarter horizon, the inflation inertia coefficients stay around 0.5 to 0.6, the elasticities fall to 0.2 to 0.3 in eight-quarter forecast. In the same manner, it is obvious that demand pressure on inflation is strong through the investigation of the output gap's estimated coefficients.

So as to assess the information content of monetary indicators in inflation forecast, estimates of the real money gap and money growth gap are compared to those of output gap and currency depreciation. Columns 1 to 4 of the panel (a) indicate that both real money and money growth gap do have some predictive value over 4-quarter ahead inflation gap. Money in stock appears to have higher explaining power than money growth, the latter's

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<sup>53</sup> Repeating the same regressions in conventional GMM method pointed out the advantage of including factors. Indeed, clearly poorer estimation of coefficients is found if no factor is used as instrument. Detailed results are provided upon request.

coefficient is only two-thirds of the former's. Although its elasticity is much lower than that of output gap and exchange rate change, the adjusted  $R^2$  of model with real money gap is the biggest, indicating its usefulness in forecasting inflation. The model including money growth gap alone has the smallest  $R^2$  statistic among the first four reported model (columns 1 to 4, panel a) but the difference is minor. We gain about 8% of goodness of fit when replacing the output gap or currency depreciation by the real money gap, but lose only 0.8% when the money growth gap enters the regression. Both money gaps' positive coefficient shows that an expansion in real money balances and money growth would lead to an increase in future inflation, as expected.

Next, the two money gaps are added one by one to case 1 (column 5 and 6). All coefficients are highly significant. Compared to column 1, the  $\bar{R}^2$  is improved by 15% in case 5 and 2% in case 6, suggesting that monetary indicators and the output gap are complementary, and money's important role in predicting inflation. The goodness of fit is also better when all four gaps are included in the equation. Interestingly,  $\bar{R}^2$  is highest when real money gap is present in the regression with the output gap.

Panel (b) reports the estimates for 8-quarter inflation forecast. Overall,  $\bar{R}^2$  statistics are lower than one-year forecast but the performance is similar to the previous panel. Regressed individually, real money gap produce the best result in terms of goodness of fit. Money growth gap is a bit less efficient compared to the output gap, which is overwhelmed by currency depreciation this time. Combining the output gap with real money gap still gives the highest adjusted  $R$ -squared of the panel. However, when including all these three gaps (column 7), the real money gap is not significant and  $\bar{R}^2$  is not improved compared to case 6.

On the whole, some comments can be made. Firstly, there is strong evidence of the tight relationship between money and inflation in Vietnam, illustrated by the fact that both money gaps are highly significant. A monetary expansion would stimulate higher inflation in the future. Even though the output gap and the inertia force are important predictors of inflation but there are straightforward advantages when adding monetary gaps. Secondly, the result suggests that irrespective of forecasting horizons, real money balance outclasses the output gap in predicting inflation whereas money growth slightly underperforms. Thirdly, the form of monetary indicators can matter. While both monetary indicators deliver clear signals of their importance, the money stock elasticity outweighs the money growth coefficient most of the time. As a consequence, it is beneficial for the

central bank to use both measures of money for its policy conduct. On the one hand, it should continue to rely on its actual intermediate target – the M2 growth rate. On the other hand, the real money balance has to be included in the SBV's function since it contains significant information content on future inflation in Vietnam.

#### 4.3.5. *Central bank's credibility*

The estimates of  $\beta_\pi$  in Equation (4.5) is always associated with inflation inertia but it can show the power of the central bank's intervention thus its credibility as well. If  $\hat{\beta}_\pi = 0$ , the monetary authority is fully credible since any excess of effective inflation from its objective is accounted for in the bank's reaction. Contrarily, the more  $\hat{\beta}_\pi$  is closer to 1, the less credible the monetary policy. The central bank in this case cannot efficiently defend its objective by bringing the inflation towards this targeted number.

The estimation results displayed in Table 4.1 show that more than a half of each percent of positive difference between effective inflation and the SBV's objective still remains after four quarters, and about one third after two years' time. In other words, each time the central bank cannot keep inflation below or equal to its objective, it would have difficulties to fix this in the future too. Only 40% of the gap can be corrected within the coming-up four quarters and about 32% more during the next year. This lack of strength in the SBV's intervention keeps its credibility at a rather low level.

This finding underscores the need to improve monetary policy efficiency in Vietnam. Besides, the calculation and adjustment mechanism of inflation objective should be revised in order to have more reliable goals. Additionally, since the headline CPI inflation can be quite volatile sometimes, the central bank may consider targeting a core measure. This could prevent overreaction and also help reduce the inflation gap, thus enhance the bank's credibility.

**Table 4.1 Factor-GMM estimates of Future inflation gap**

(a) Independent variable: $\pi_{t+4} - \pi_{t+4}^*$							
Model	1	2	3	4	5	6	7
$D_t(\pi_t - \pi_t^*)$	0.631** (0.026)	0.509** (0.012)	0.619** (0.022)	0.600** (0.015)	0.522** (0.022)	0.623** (0.025)	0.551** (0.023)
$y_t - y_t^*$	1.375** (0.272)				3.293** (0.179)	1.440** (0.268)	2.400** (0.213)
$m_t - m_t^*$		0.114** (0.008)			0.171** (0.007)		0.107** (0.010)
$\Delta m_t - \Delta m_t^*$			0.072** (0.008)			0.070** (0.008)	0.024** (0.008)
$\Delta \log E_t$				0.147** (0.052)			
$\bar{R}^2$	0.508	0.585	0.500	0.506	0.650	0.523	0.564
RMSE	0.027	0.025	0.024	0.027	0.023	0.023	0.022
$J - \text{stat}$	1.821 [0.986]	1.920 [0.983]	1.725 [0.988]	1.774 [0.987]	1.846 [0.994]	1.789 [0.994]	1.887 [0.997]
(b) Independent variable: $\pi_{t+8} - \pi_{t+8}^*$							
Model	1	2	3	4	5	6	7
$D_t(\pi_t - \pi_t^*)$	0.338** (0.031)	0.232** (0.022)	0.267** (0.026)	0.304** (0.021)	0.248** (0.026)	0.278** (0.030)	0.278** (0.033)
$y_t - y_t^*$	0.855** (0.281)				2.182** (0.287)	1.331* (0.537)	1.325** (0.507)
$m_t - m_t^*$		0.080** (0.014)			0.115** (0.010)		0.001 (0.002)
$\Delta m_t - \Delta m_t^*$			0.045** (0.009)			0.045** (0.009)	0.047** (0.008)
$\Delta \log E_t$				0.246** (0.048)			
$\bar{R}^2$	0.212	0.342	0.196	0.265	0.409	0.244	0.245
RMSE	0.024	0.022	0.020	0.024	0.021	0.019	0.019
$J - \text{stat}$	1.839 [0.986]	1.912 [0.984]	1.844 [0.985]	1.797 [0.987]	1.890 [0.993]	1.891 [0.993]	1.884 [0.997]

Note: Estimation of Equation (4.5) for  $h = 4$  and  $8$  by Factor-GMM method. Instruments: 2 lags of each explanatory variable, and current value and 2 lags of each common factor extracted from macroeconomic variables. Heteroscedasticity and Autocorrelation Consistent (HAC) standard deviations are given in parentheses. \*\* and \* denote significance at 1% and 5% respectively.  $J$ -stats are the Hansen's  $J$  test statistics for instruments' validity, p-values in brackets. Source: Author's estimates.

#### 4.4. CONCLUDING REMARKS

This chapter presents a simple study of the determination of inflation in Vietnam with special focus on the role of monetary indicators. Within a partial equilibrium model, the real money balance gap and money growth gap along with output gap and currency depreciation are chosen as inflation predictors. The results clearly indicate that both monetary measures contain substantial predictive power on future inflation over one to two year horizon, though the real money gap accounts for a larger extent. The money growth gap is almost as informative as the output gap or exchange rate change, supporting the SBV's current intermediate target.

The findings in this chapter approve therefore the validation of the second condition of the monetary targeting strategy. Combined with the evidence of a stable money demand function in Chapter 3, it is convenient to conclude that monetary targeting is still appropriate for Vietnam. Even under current conditions (continuous macroeconomic, banking and financial reforms, greater exposure to global economy, among others), there is no sign of instability of demand for money. Furthermore, money is justified to be a major information variable for monetary policy setting.

This conclusion as well as the fact that the Vietnam economy has not been ready for inflation targeting implies that continuing to conduct policy in the monetary targeting framework is advantageous for the central bank. However, to improve its efficiency, the SBV should enhance its set of indicators, firstly by including the real money balance in its policy function.



## APPENDIX 1

**Table 4.2 Variable definition – Main study**

Variable	Definition
$m$	Logarithm of Real broad money, including foreign currency deposits – M2, derived by dividing M2 by $P$ (M2 in billions of VND)
$m^*$	Estimated long-run money demand, from Chapter 3
$\Delta m$	Year-on-year changes of $m$
$\Delta m^*$	Year-on-year changes of $m^*$
$P$	Consumer price index (2009=100)
$\pi$	Inflation (year-on-year changes of the price index)
$\pi^*$	SBV's inflation objective
$y$	Logarithm of Real output, derived by dividing Gross Domestic Product (GDP) by $P$ (GDP in billions of VND)
$y^*$	Potential output, HP filtered version of $y$
$E$	Nominal VND/USD exchange rate, quarterly average
Sources	IMF International Financial Statistics (provided by Macrobond) Macrobond database State Bank of Vietnam

**Table 4.3 Summary statistics, 1999Q2 - 2014Q3**

Variable	Mean	Standard deviation	Min.	Max.	Skewness	Kurtosis	Obs.
$m$	8.994	0.958	7.092	10.305	-0.502	2.054	71
$m^*$	9.458	0.762	6.631	10.480	-1.061	4.537	63
$\Delta m$	0.183	0.128	-0.068	0.569	0.895	5.058	67
$\Delta m^*$	0.184	0.298	-0.196	1.962	3.973	23.726	59
$\pi$	0.070	0.057	-0.024	0.245	1.016	4.240	68
$\pi^*$	0.070	0.023	0.040	0.150	1.556	5.746	72
$y$	8.889	0.325	8.147	9.522	-0.037	2.379	63
$y^*$	8.868	0.361	8.041	9.477	-0.410	2.496	63
$\log E$	2.797	0.168	2.423	3.059	0.033	2.314	72

Sources: IMF IFS, Macrobond, SBV and Author's calculations

**Table 4.4 ADF unit root test**

Variable	No trend	With trend
$\pi - \pi^*$	0.006	0.010
$m - m^*$	0.001	0.000
$\Delta m - \Delta m^*$	0.000	0.002
$y - y^*$	0.001	0.001
$\Delta \log E$	0.000	0.001

Models contain an intercept.

Statistics presented are p-value of the ADF tests

Source: Author's estimates

**Table 4.5 Variable definition – DFM for Factor-Instrumental variables**

Variable	Definition
Credit	Total credit to the economy, quarterly average (logarithm) Source: IMF IFS
Deposit rates	Average short-term deposit interest rate offered by banks, quarterly average (percent). Source: IMF IFS
Lending rates	Average short-term lending interest rate demanded by banks, quarterly average (percent). Source: IMF IFS
Base rates	Primary policy rates of the SBV, quarterly average (percent) Source: IMF IFS
VNIBOR-1m	One-month Vietnam Interbank Offered rates, quarterly average (percent) (*) Source: Datastream, Macrobond
REER	Real Effective Exchange Rates, trade weighted index, quarterly Source: Vietnam General Statistic Office, Macrobond, Own calculation
Current account	Current account of Vietnam's Balance of Payment, new definition, quarterly (logarithm). Source: IMF IFS
Financial and Capital account	Financial and Capital account of Vietnam's Balance of Payment, new definition, quarterly (logarithm). Source: IMF IFS
Official reserves	Official reserves account of Vietnam's Balance of Payment, new definition, quarterly (logarithm). Source: IMF IFS
Error and Omissions	Error and Omissions account of Vietnam's Balance of Payment, new definition, quarterly (logarithm). Source: IMF IFS
VN-Index	Ho Chi Minh City Stock Exchange index, quarterly average (logarithm) Source: Macrobond
Gold price	Domestic gold price, quarterly average (thousands of VND per tael) Source: SBV, Saigon Jewellery Company
Dairy	World Dairy products index, calculated by Australian and New Zealand Banking Group, quarterly average Source: Macrobond
Wheat	US soft red winter wheat price, calculated by World Bank, quarterly average (USD/metric ton). Source: Macrobond
Vegetable oil	World Sunflower oil price, calculated by Hamburg Institute of International Economics, quarterly average (USD/metric ton). Source: Macrobond
Crude	Global WTI spot crude price, quarterly average of closing prices (USD/barrel). Source: Macrobond
Notes	* This term is chosen to have largest time span possible All variables are stationarized and normalized before extracting the common factors. Sample: 1997Q1 – 2014Q4

## APPENDIX 2

### From $P^*$ model to Phillips curve equation

From the quantity equation, we have

$$p_t = \widetilde{m}_t + v_t - y_t \quad (4.6)$$

where  $p_t$ ,  $\widetilde{m}_t$ ,  $v_t$  and  $y_t$  are the log of the price level, nominal money balance, velocity and output, respectively, at period  $t$ .

Svensson (2000) considers the long-run equilibrium (LRE) version of Equation (4.6) with the price level equal to a LRE level (for a given stock of money  $\widetilde{m}_t$ )  $p_t^*$ , output equal to potential output  $y_t^*$  and velocity equal to LRE velocity  $v_t^*$ . All variables are in natural logarithm. This gives us:

$$p_t^* = \widetilde{m}_t + v_t^* - y_t^* \quad (4.7)$$

Subtracting Equation (4.7) from (4.6), we obtain

$$p_t - p_t^* = (v_t - y_t) + (-v_t^* + y_t^*) \quad (4.8)$$

We also have

$$p_t - p_t^* = -\widetilde{m}_t + p_t + \widetilde{m}_t - p_t^* = -[(\widetilde{m}_t - p_t) - (\widetilde{m}_t - p_t^*)] = -(m_t - m_t^*) \quad (4.9)$$

where  $m_t = \widetilde{m}_t - p_t$  is real money balance and  $m_t^* = \widetilde{m}_t - p_t^*$  is the LRE real balance which by (4.8) fulfills  $m_t^* = -v_t^* + y_t^*$ .

A typical  $P^*$  model assumes that inflation  $\pi_t$  is determined by lagged inflation  $\pi_{t-1}$ , lagged LRE inflation  $\pi_{t-1}^*$ , and the lagged price gap ( $p_{t-1} - p_{t-1}^*$ ) as below:

$$\pi_t = (1 - \alpha_\pi)\pi_{t-1} + \alpha_\pi\pi_{t-1}^* - \alpha_p(p_{t-1} - p_{t-1}^*) + \varepsilon_t \quad (4.10)$$

where  $\pi_t = p_t - p_{t-1}$ ,  $\pi_t^* = p_t^* - p_{t-1}^*$ ,  $0 \leq \alpha_\pi \leq 1$ ,  $\alpha_p > 0$ , and  $\varepsilon_t$  is an iid shock with zero mean.

From (4.9), we can deduce  $\pi_t^* = \pi_t + \Delta(m_t - m_t^*)$  so that (4.10) can be rewritten as:

$$\pi_t = \pi_{t-1} + \alpha_m(m_{t-1} - m_{t-1}^*) + \alpha_{\Delta m}\Delta(m_{t-1} - m_{t-1}^*) + \varepsilon_t \quad (4.11)$$

with  $\alpha_m = \alpha_p$  and  $\alpha_{\Delta m} = \alpha_\pi$ .

Equation (4.11) is a money-based Phillips curve equation where real money gap replaces the output gap to represent demand pressures on inflation.

## PART TWO

# Monetary Policy Indicators

From previous chapters, we have seen that the monetary targeting continues to be an appropriate regime for the State Bank of Vietnam. However, monetary policy has not been so efficient and the credibility is rather low. One of the very first things that the central bank can consider to improve the situation is to upgrade its sets of indicators. Within this realm, the two chapters of this part could be meaningful for the monetary authority. Chapter 5 proposes the most relevant measure of core inflation for Vietnam among the five most used measures in the literature as well as in central banks' practice. Chapter 6 recommends the use of a financial condition index which is useful to gauge contemporaneous and future short-run evolution in the financial market, thus contains important information about future economic activity development.

## CHAPTER 5

### WHICH CORE INFLATION MEASURE FOR VIETNAM?

**Abstract** This chapter attempts to designate the most efficient core inflation measure for Vietnam. Five measures of core inflation are constructed to be considered based on different approaches proposed in the literature. They are the excluding food price, the trimmed-mean, the weighted median, the exponentially smoothed and the output-neutral inflation. They are subsequently evaluated empirically for tracking the trend, predictive power, and cointegration with the headline inflation. The key finding is that the output-neutral, which satisfies almost all of the evaluation criteria, can be a useful core inflation indicator for Vietnam. Besides, the central bank may also rely on exponentially smoothed inflation for communication purposes due to their rather simple construction.

**JEL classification** E31, E52, C13

**Keywords** Core inflation, Empirical evaluation, Monetary policy, Vietnam

## 5.1. INTRODUCTION

Central banks around the world may have their own inflation objectives and conduct of policy, quite different one from another. However, they all have to face a common problem of distinguishing between permanent and transitory price changes as these two types of price changes need not to be treated in the same way. While almost all transient price movements should be allowed to pass through, a price shock that has permanent impact on inflation requires a reaction from the monetary authority. Due to lagged effect of monetary policy onto inflation, unable to address this issue can be extremely costly as it can either dampen the price stability or penalize economic growth.

The importance of such identification has led to the development of many filtering schemes applied on aggregate prices. These methods aim to rule out all transitory price changes but keep only the permanent ones to result in a series named “core” inflation. From the popular excluding food and/or energy price inflation (initiated by Gordon, 1975), through limited influence measures (trimmed-mean and weighted median) suggested by Bryan and Cecchetti (1994), some also propose pure filtering technique such as Hodrick-Prescott filter (Hodrick and Prescott, 1997) or exponential filter of Cogley (2002). Aiming to bring economic theory to core measures, many SVAR-based core candidates have equally been introduced. Among them, the one presented by Quah and Vahey (1995) may be the most common one.

Each of these measures has a different rationale and computation method, thus different advantages and drawbacks. For example, core measures associated with statistical approaches are simple, straightforward but often lack an economic meaning. Inversely, a model-based approach is backed by a theory but complicated to construct. Among statistical approaches, some insist to remove these or those individual prices qualified too volatile, while others just filter the whole price basket to obtain the “core”. Along with the development of methods to compute core inflation, there have been a growing number of proposals on evaluation criteria for core measures. Although there has been little agreement in the literature on which criteria to use, one can still deduce that an efficient core measure should have transparency in construction and contain valuable information about future inflation movements.

Core inflation was first presented in Vietnam in January 2015 only (See Table 5.7), which is quite late given core inflation’s popularity and importance. Disclosed to the public every

month by GSO, it is computed by removing food, foodstuff, and energy inflation, and price changes of administered goods and services (health and education services) from the headline inflation. Although one may think it is now obsolete to work on this subject, it is, in my opinion, still worth considering other measures since it is common that the central bank has several measures at hand and compares them to enhance its decision making process. Being constructed differently, they can serve as comparators, thus enhance the decision making process of the central bank. Insufficient data of GSO measure do not, unfortunately, allow us to incorporate it in the evaluation exercise.

In this chapter, I wish to estimate some different measures of core inflation for Vietnam and then examine to see if there could be any qualifying candidates, useful for policy purposes. Five measures of core inflation are investigated: the excluding food price, the trimmed-mean, the weighted median, the exponentially smoothed and the output neutral inflation. Their definition will be presented in the second section of the paper, followed by the estimation in the third section. Subsequently, core candidates will be evaluated based on three sets of criteria aiming to assess their ability to track the trend inflation, their power to predict future inflation changes, and their relationship vis-à-vis headline inflation. The evaluation part is the content of the fourth section. Finally, the fifth section concludes.

## 5.2. CORE INFLATION CONCEPTS

### 5.2.1. *Excluding food price inflation*<sup>54</sup>

This core measure of inflation has been common both in literature and practice since its apparition in, say, 1975 by Gordon (Gordon, 1975). The idea behind is that by removing the most disturbing noise coming from food and/or energy price movements, one can get rid of transitory price changes but retain only the underlying inflation trend.

Let us define  $\pi_t$  annual headline inflation or year-on-year aggregate price growth, calculated from a monthly aggregate price index  $P_t$  as:

$$\pi_t = \left( \frac{P_t}{P_{t-12}} - 1 \right) \times 100 \tag{5.1}$$

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<sup>54</sup> This measure is often referred to “excluding food and energy price inflation” for most countries. Since there is unfortunately no publicly available data on energy price for Vietnam, I am obliged to take into account the food related price only.



and  $\pi_{i,t}$  annual price changes of element  $i$  in the  $N$ -component price basket from elementary price index  $P_{i,t}$ :

$$\pi_{i,t} = \left( \frac{P_{i,t}}{P_{i,t-12}} - 1 \right) \times 100 \quad (5.2)$$

and by definition, we have

$$P_t = \sum_{i=1}^N \alpha_i P_{i,t} \quad (5.3)$$

where  $\alpha_i$  is the weight of component  $i$ .

One can then deduce the core inflation measure that excludes food price changes (EF) as follows:

$$\pi_t^{EF} = \frac{1}{\sum_{i=1}^M \alpha_i} \times \sum_{i=1}^M \alpha_i \pi_{i,t} \quad (5.4)$$

where the new basket has only  $M$  components ( $M < N$ ) i.e. food and food stuff are excluded from the initial  $N$ -component basket.<sup>55</sup>

The fact that food and energy price has historically been subject to wild swings, especially during the 1970s, has led to propagated usage of this core inflation concept. In addition, its simple, straight-forward calculation has been appreciated by policymakers in order to efficiently communicate with the public.

However, one should wonder if food and energy price changes never contain any information about trend inflation, and automatically suppressing this item from the overall price growth does erase the transient noise only. Furthermore, in developing countries, food has a greater role than in advanced countries, with its weight in consumption basket exceeding 30%<sup>56</sup>. It is thus not clear whether the food inflation minimization rule applied in developed economies is suitable for low income countries.

Despite this weakness, ex-food inflation is presented in this study to serve as a proxy for GSO's core inflation. While we cannot reproduce the GSO series because of data shortage, similar construction method of the two measures could guarantee the representativeness.

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<sup>55</sup> The first right-hand-side term of Equation (5.4) is to normalize the weights of included components to sum up to 1.

<sup>56</sup> It is 39.33% for Vietnam according to 2009 CPI basket.

### 5.2.2. Trimmed-mean inflation

Consequently, as an attempt to construct a better measure of core inflation, in a series of papers and notably Bryan et al. (1997), economists at the Federal Reserve banks in Dallas and Cleveland have come up with an alternative measure by using trimmed means of the distribution of price changes.

The method is pretty simple: order the sample based on cross-sectional price changes, trim the tails of the sample distribution, and average the weighted price changes of the remaining items. There are two types of trimming: symmetric and asymmetric trim. The symmetric trim is initially introduced by Bryan and Cecchetti (1994) while some other authors propose to trim the two tails of the sample distribution unequally.<sup>57</sup> The idea behind is that a symmetric trimmed mean is an unbiased estimate of core inflation only in the absence of price distribution skewness. If the price is skewed, one needs not to treat the two tails evenly. Thus, to account for generality, we have the following three-step procedure to calculate the  $x, y$ -percent trimmed mean (TM), with  $x, y$  the percent to trim from the lower and upper tail respectively:

- (i) For each date  $t$ , sort the price changes of price index components  $\pi_i$  with  $i = 1, 2, \dots, N$  in numerically increasing order and align their associated weights  $w_i$  correspondingly<sup>58</sup>.
- (ii) Define  $W_K$  as the cumulative weight of the ordered components from 1 to  $K$ , with  $1 < K < N$ , that is  $W_K = \sum_{i=1}^K w_i$ . From this, determine the set of observations to be included in the TM, i.e. determine  $K$  such that:  $\frac{x}{100} < W_K < (1 - \frac{y}{100})$ . If  $x = y$ , then we have a symmetric trimmed-mean, otherwise asymmetric measures.
- (iii) Finally, the weighted  $x, y$ -percent TM inflation at time  $t$  can be computed as:

$$\pi_t^{TM} = \frac{1}{\sum_{i=1}^K w_{i,t}} \times \sum_{i=1}^K w_{i,t} \pi_{i,t} \quad (5.5)$$

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<sup>57</sup> See Kearns (1998), Marques and Mota (2000), Le Bihan and Sédillot (2002) for instance

<sup>58</sup>  $w_i$  is time-varying relative importance of component  $i$ , serving to compute headline inflation by  $\pi_t = \sum_{i=1}^N w_{i,t} \pi_{i,t}$ . This is linked to price index fixed weights as  $w_{i,t} = \alpha_i \frac{P_{i,t-12}}{P_{t-12}}$ .

### 5.2.3. *Weighted median inflation*

Beside the trimmed-mean, the Fed economists also propose the weighted median inflation (WM) which is obtained by setting  $x = y = 50$  percent. The weighted median core inflation  $\pi_t^{WM}$  is simply equal the price change of the first component having the cumulative weight superior or equal to 50%.

Although the trimmed-mean and weighted median are based on the same principle, they would contain different information and thus have distinct characteristics. Therefore, these two series will be investigated separately in this present study.

The trimmed-mean and weighted median are commonly called the limited influence estimators of underlying inflation as they are obtained by placing more weight on the trend in price changes, and less or no weight on the outliers among the sectoral price movements. The main argument developed in favor of these core inflation concepts is that price changes are not normally distributed but leptokurtic, making the sample mean (reported inflation) no longer be the most efficient estimator of the first moment. Therefore, systematically removing the highest and lowest price changes, of any components and not necessarily only food and energy price, presented in the tails of the distribution should yield a more robust measure of structural inflation.

### 5.2.4. *Exponentially smoothed inflation*

Putting forward that other measures of core inflation still contain a great deal of high frequency variation which are not always merely coming from some volatile components, Cogley (2002) suggests a one-sided low-pass filter to current and past movements in the price index. By this exponential smoothing method, the Cogley's core measure is said to be able to quickly adapt to occasional regime changes in mean inflation, thus forecast eventual inflation reversals better. However, one may wonder about its efficiency since the measure is inherently backward looking as shown below.

Cogley's core inflation  $\pi_t^{ES}$  is given as a one-sided geometric distributed lag of past inflation:

$$\pi_t^{ES} = g_0 \sum_{j=0}^J (1 - g_0)^j \pi_{t-j} \tag{5.6}$$

where  $g_0$ ,  $0 < g_0 < 1$ , is the gain parameter of the updating process of the mean inflation (after a regime shift).<sup>59</sup>

### 5.2.5. SVAR-based core inflation

Apart from statistical concepts that are not sophisticated but have little economic meaning, there have been attempts to bring some economic, especially monetary, theory to the measurement of core inflation. The output-neutral core inflation approach by Quah and Vahey (1995) is one of them. On the basis of a vertical long run Phillips curve, the authors define core inflation as the underlying movement in inflation being neutral to output in the (medium to) long run.

This measure is constructed using a bivariate Structural Vector AutoRegressive (SVAR) model of output and measured inflation growth ( $\Delta Y$  and  $\Delta \pi$ ). Based on the Wold representation theorem, these two series can be presented as distributed lags of serially uncorrelated (so pairwise orthogonal) disturbances  $\eta_1$  and  $\eta_2$ :

$$X_t = \begin{bmatrix} \Delta Y_t \\ \Delta \pi_t \end{bmatrix} = \sum_{p=0}^{\infty} D(p)\eta(t-p) \quad (5.7)$$

Where  $\eta = [\eta_1, \eta_2]'$  with  $\text{Var}(\eta) = I$ .

The long-run output neutrality condition is  $\sum_{p=0}^{\infty} d_{11}(p) = 0$ ; thus inflation can be decomposed as:

$$\Delta \pi_t = \sum_{p=0}^{\infty} d_{21}(p)\eta_1(t-p) + \sum_{p=0}^{\infty} d_{22}(p)\eta_2(t-p) \quad (5.8)$$

Finally, from the changes of core inflation given by  $\sum_{p=0}^{\infty} d_{21}(p)\eta_1(t-p)$ , the Quah and Vahey's measure of core inflation can be deduced.<sup>60</sup>

Unlike the first three approaches mentioned above, in the construction of output-neutral inflation, there is no need to eliminate any component of the aggregate price basket *a priori*, so less important information will be lost. Meanwhile, this concept is technically complex, thus cannot be easily understandable by the public, being its major disadvantage.

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<sup>59</sup>  $g_0$  can also be considered the rate at which the updating period is about to complete. Following the theory on exponential decay process, the half-life of the learning procedure is approximately  $t_{1/2} = \ln(2)/g_0$ . Hence, to calibrate  $g_0$ , one just needs to determine how fast the adjustment should be, then apply to the formula above to find the parameter value.

<sup>60</sup> See the original paper for a detailed description of the method

### 5.3. CORE INFLATION ESTIMATION FOR VIETNAM

#### 5.3.1. *Data and sample*

For the estimation, the Consumer Price Index (CPI) is selected as the aggregate price index since it is the only series exists for Vietnam. The 2009-based CPI participates in the computation of all measures of core inflation. Output is represented by the Industrial Production Index (IPI) which has 2005 as the base year. The choice of IPI is once again an obligation but also the best solution as we need monthly data. IPI data prior to 2008 and after 2012 are reconstructed based on month-on-month evolution published on GSO website.<sup>61</sup> To calculate the excluding food price, the trimmed-mean and the weighted median inflation, we use the price indexes of 13 components of the 2009 CPI basket and their associated weight, the list of which can be found in the Appendix. The Eating out component of before 2007M1 are not published, so it is generated using price indexes of Food, Foodstuff and their common mother – the Food total component, and 2009 weights. Likewise, Telecommunication price index prior to 2004M7 is retropolated using Tramo-Seats procedure.

Our sample contains monthly data of indexes starting from January 2003 to go through April 2015, but CPI components data only started in October 2003 and macroeconomic variables are not available after December 2014. Therefore, after preliminary arrangement, all core measures are evaluated over 2004M10 – 2014M12 period. The total CPI with its wide timespan, beginning in January 1995, allows us to take into account a sufficiently large number of lagged values of headline inflation when computing Cogley's measure. All data are taken from the GSO website.

#### 5.3.2. *Estimation*

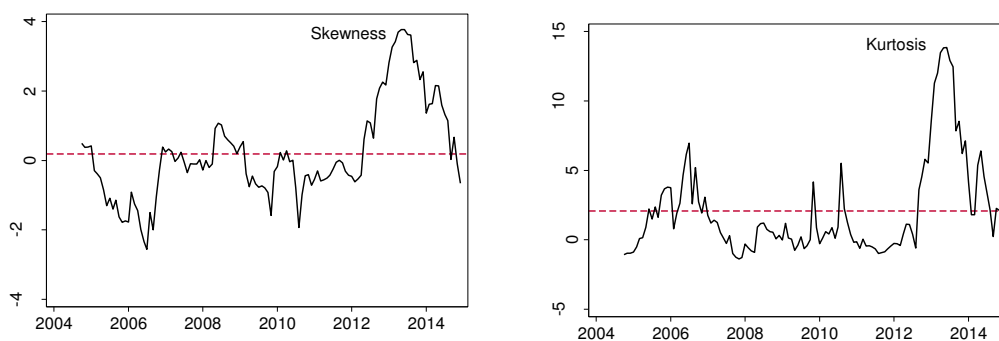
Based on definitions presented above, measures of core inflation are computed for Vietnam. The construction of EF is straightforward as shown above. Meanwhile, before estimating the limited influence measures, it is necessary to have a look at some distribution features of price changes, the cross-sectional skewness and kurtosis for example. This preparatory step is crucial to properly choose the trimming scheme.

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<sup>61</sup> IPI data prior to 2008 are not published and those published after 2012 are of different base.

Figure 5.1 shows the skewness and kurtosis of cross-section inflation as well as their mean. It is quite clear that CPI inflation is not skewed, at least during the examined period, because the average skewness is close to zero, 0.19 in fact. On the other side, the distribution is slightly leptokurtic as the kurtosis averages 2.08 above the normally distributed value. Due to this fact, it is convenient to rely on a symmetric trimmed-mean and the weighted median to construct core inflation indicators for Vietnam.

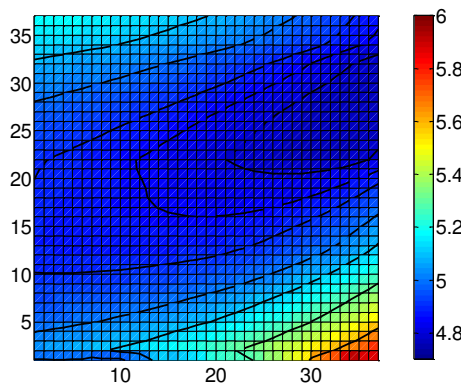
**Figure 5.1 Inflation cross-sectional distribution properties**



The dash lines are average values of the corresponding coefficient. For a cross-section distribution, the  $k^{th}$  central moment is given by:  $m_{k,t} = \sum_{i=1}^N w_{i,t} (\pi_{i,t} - \pi_t)^k$ . The skewness ( $S_t$ ) and kurtosis ( $K_t$ ) coefficients are the scaled third and fourth moments, respectively:  $S_t = \frac{m_{3t}}{(m_{2t})^{3/2}}$ ;  $K_t = \frac{m_{4t}}{(m_{2t})^2} - 3$ . Source: Author's calculation.

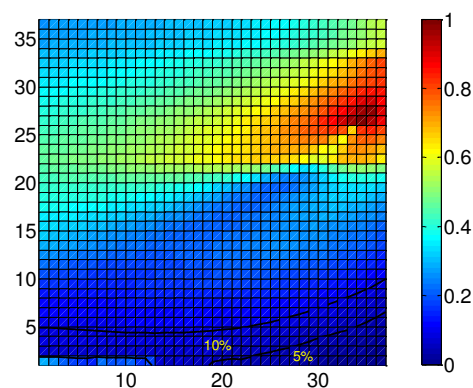
**Figure 5.2**

**RMSE of trimmed-mean inflation series**



**Figure 5.3**

**Diebold-Mariano test results on RMSE**



The two figures are the contour plots of the RMSE of the trimmed-mean inflation (Figure 5.2) and the p-value of Diebold-Mariano test on these series (Figure 5.3). Each small square represents one series having the lower-tail trim percent on horizontal axis and the upper-tail trim percent on vertical axis. Source: Author's calculation.

Nonetheless, so as to be ascertained of the choice of a symmetric TM, I still let  $x$  and  $y$  to vary independently, running from 1% to 37%<sup>62,63</sup>. I then count on empirical tests to designate the most relevant TM. First, the deviation of each TM from the 36-month centered moving average of the headline inflation<sup>64</sup> is computed through a summary statistics called the root mean square error (RMSE).<sup>65</sup> Figure 5.2 contour plots the RMSEs for the entire set of asymmetric and symmetric TM measures. The measure that delivers the lowest RMSE is TM(34,26), which excludes 34 percent of the lower tail and 26 percent of the upper tail. It in fact belongs to a relatively large area (the darkest area on the figure), where all measures have a RMSE between 4.76 and 4.85. The most efficient symmetric TM, the TM(25) can also be found in this group.

Next, I employ the Diebold-Mariano equality of prediction test (Diebold and Mariano, 1995) to determine whether the observed differences in these deviations are statistically significant.<sup>66</sup> The smallest-RMSE measure is considered the benchmark series for this step. Figure 5.3 summarizes the results from the test. The dark blue area shows (with 90% and 95% confidence) where one must reject the null hypothesis that TM measures track the trend inflation equally well. The remaining swath, which is quite large, confirms the indistinguishable performance between the lowest-RMSE measure and the most efficient symmetric TM. Given these findings and to be consistent with a nearly zero skewness of price distribution, the symmetric TM(25) is selected as the representative of all TM measures.

With regard to Cogley's ES inflation, values from 0.0289 to 0.4621 are respectively imposed onto the gain parameter  $g_0$  to tabulate the core measure, in the sense that the adjustment procedure after an eventual regime change would last 4 years at most or 1 quarter at least. The gain parameter  $g_0$  of 0.066 (corresponding to an adjustment time of 7 quarters) is finally chosen based on the same judgment as for the trimmed-mean, i.e. RMSE.

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<sup>62</sup> Due to limited disaggregation degree of CPI inflation, I cannot reach to 49% as wished to.

<sup>63</sup> Cases where  $x = y$  are allowed so that whenever the two trim percentages are equal we have symmetric trimmed means.

<sup>64</sup> which Bryan et al. (1997) consider as trend inflation. The idea is that we should use the most efficient core measure which best tracks the trend inflation, i.e. has the minimal deviation from the trend.

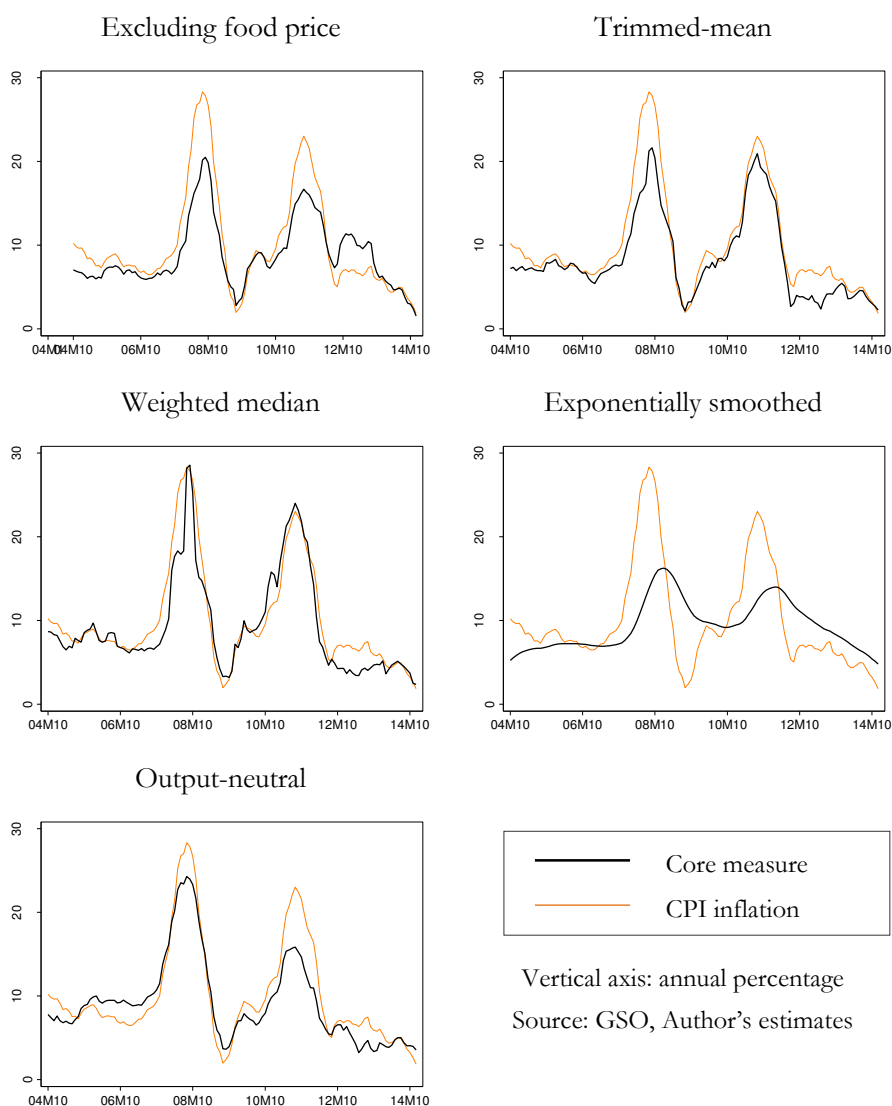
<sup>65</sup> This method of judgement will also be used in the next section to evaluate core measures of different approaches. Please refer to section 5.4.1 for more details.

<sup>66</sup> Again, please find a detailed explication of the method in section 5.4.1

Besides, the parameter  $J$  in Equation (5.5) is set to 36 months to account for medium-run effect of price changes.

Lastly, the output-neutral inflation is estimated. The ADF unit root test points out that output is  $I(1)$  but inflation is stationary, so only output enters the SVAR model in first difference form. The Blanchard-Quah (1989) decomposition is employed to resolve the system. The lag length is set to 9 according to 36-month CMA headline inflation RMSE minimization rule.

**Figure 5.4 CPI inflation and core measures**



The estimated measures of core inflation together with the headline are presented in Figure 5.4. As a very first perception, the peaks and troughs of the core candidates match well with those of the headline rate, except for the case of the ES. To my opinion, this is



a desirable property of the core inflation. If one expects a core measure as a forecaster, a “prime mover” (Quah and Vahey 1995) of the headline inflation, then the core should not stay too far away from the headline.

Since it is obviously difficult to compare and evaluate core inflation candidates only by looking at the graphics, some evaluation tests are implemented in the following section based on proposals put forward in the literature.

#### 5.4. CORE INFLATION EVALUATION

Following the abundance of core inflation candidates introduced in the literature, proposals of method and criteria to evaluate core measures have also flourished. One can find both qualitative criteria, as in Wynne (1999), and quantitative or more technical-based ones in Bryan et al. (1997), Freeman (1998), Cogley (2002), Marques et al. (2003), or Rich and Steindel (2007) among others. This great number of studies on the one hand demonstrates the importance of the subject. On the other hand, it also reflects the fact that there has been little accord on how to assess the core inflation measures. Nevertheless, most authors agree that an effective measure of core inflation should meet at least two conditions: (i) conception clarity, and (ii) informativeness. The first condition consists in the need of a core measure that is constructed clearly, in a straightforward, preferably simple manner, so that a central bank can use it in communication purposes. Moreover, it is important that a core measure can provide some information about future evolution of (objective) inflation, but the past price movements are equally useful to be taken into account.

With reference to the first condition, statistical methods seem to have superiority compared to that of model-based approach, Quah and Vahey’s measure in our case. As it is said earlier in the chapter, purging some items in the CPI basket to construct the core inflation is apparently easier to understand than working with VAR models and all of the associated estimation techniques. The fact that statistical approaches have been widely used by central banks advocates this advantage. In order to be more transparent, central banks have to communicate frequently with the public; the reliance on a less complicated core measure would facilitate this task. However, model-based methods with their valuable theoretical background can serve as a reference series, which could be beneficial for central banks.

Concerning the second condition, although the general idea of informativeness is accepted in most of the papers, the way we can examine this characteristic of core measures is very different throughout the literature. While Bryan et al. (1997) evaluate core measures based on their deviation from a reference series, named trend inflation; Cogley (2002) assesses the capability of the core candidates to account for evolutions of headline inflation in a forecasting framework. Besides, Freeman (1998) uses cointegration and error-correction techniques as his judgment basis. The technical details of these tests as well as their application to our potential core measures are presented below.

#### *5.4.1. Capturing the trend movements*

The first approach to analyze the information content of a core inflation measure involve investigating how closely a core measure can track the underlying trend of the headline inflation. This idea is put forward by Bryan and Cecchetti (1994). Since core inflation is defined to exclude all the transient price changes but incorporate only the permanent ones, which are captured by the trend inflation, an efficient core measure should therefore be close to the trend inflation. By doing in this way, the choice of benchmark is crucial.

While many studies treat the 36-month centered moving average (CMA) of the CPI inflation as their trend proxy, Meyer and Venkatu (2012) use the annualized growth rate of the headline inflation averaging over the horizon  $t$  to  $t+36$  (months) to focus on future inflation only. The authors take into account Blinder's critique of the use of a CMA: central banks have to make decision at time  $t$ , therefore they must worry about what is coming, i.e. the future inflation, not what has come and been known, i.e. past inflation (Blinder, 1997). In my opinion, for a country with historically high and persistent inflation like Vietnam especially, ignoring past inflation in such a study is not so convincing. Hence, both the past and future developments of inflation are important to be considered, though their weights should not be the same. The next 18 months would matter more to a central banker than the last 18 months; thus, the former should be attributed more weight, as Blinder's argument. However, two issues emerge here. The first one is how we could concretely determine such weights, and the second is whether forward-looking rule is always applicable for the SBV. While there has been no satisfying answer for the first question and it seems to be true that the central bank of Vietnam has been passive to react to inflation (instead of being forward-looking), it is more convenient to count on a rather simple but functional measure. Therefore, the 36-month CMA is used as my benchmark to evaluate the ability of core candidates to approximate the inflation underlying

trend. Furthermore, other  $X$ -month CMA with  $X = 18, 24$  and  $48$  will equally be employed to ensure the robustness of the results.

So as to gauge the efficiency of core measures as initiated by Bryan and Cecchetti (1994), I compute the deviation of monthly core price changes from the  $X$ -month CMA with  $X = 18, 24, 36$  and  $48$ , i.e. the root mean square error (RMSE), using this formula:

$$RMSE = \sqrt{\sum_{t=1}^T (\pi_t^{trend} - \pi_t^{core})^2 / T} \quad (5.9)$$

where  $\pi_t^{trend}$  and  $\pi_t^{core}$  are an estimate of trend inflation and core inflation at time  $t$ . The assessment is then straightforward: the smaller the RMSE of a core measure, the more efficient it is.

Table 5.1 gives us the RMSE of all core inflation candidates. To have more accurate results, two years of data from the end of the CMA series are dropped out as they are poorly estimated. As shown in the table, the ES inflation delivers the smallest deviation from the trend, for three out of four trend measures. Apart from the RMSE vis-à-vis 18-month CMA where the SVAR measure provides the lowest RMSE from the trend, the Cogley's measure gives much better results than others elsewhere. Its volatility around the trend is well smaller than that of the other measures, especially if one considers 36-month CMA as trend.<sup>67</sup> The smoothing principle should be a major factor helping ES inflation to adequately capture the trend movements. Moreover, since the ES itself is a weighted average of lagged inflation over 36 past months, its evolution could be quite close to the 36-month CMA.

Besides, exclusion-based measures, especially the TM and WM, manifest relatively poor performance. Due to their reweighting plan in the construction, not only the weight of individual price changes but also that of their proper trend is modified. This feature must have reduced the ability of these core measures to track the trend CPI inflation. Among three exclusion-based measures, ex food inflation is slightly less impacted than the other two, bringing forth less pronounced deviations. Rich and Steindel (2007) also find similar results for the US.

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<sup>67</sup> It is important to note also that due to small size of the sample, even smaller as I have to drop out data of the last two years, the RMSE of core measures are remarkably high.

**Table 5.1 Root mean square error of core measures from trend inflation**

Core measure	RMSE from $X$ -month centered moving average			
	$X=18$	$X=24$	$X=36$	$X=48$
Excluding food price	2.9710	3.3367	3.9888**	4.5294***
Trimmed-mean	2.9249	3.6046	4.7612***	5.4497***
Weighted median	3.1712	4.0955	5.4683***	6.2834***
Exponentially smoothed	3.6549*	<b>3.0910</b>	<b>2.6333</b>	<b>2.8956</b>
Output-neutral	<b>2.5085</b>	3.2148	4.3898**	5.1028**

\*\*\*, \*\* and \* denote statistically significant Diebold-Mariano test statistics at 1%, 5% and 10% respectively. The DM test considers the null hypothesis of equal root mean square error (RMSE) against the alternative hypothesis that the RMSE of a reference series (in bold) is lower. Source: Author's estimates

Aiming to properly conclude, I conduct formal tests based on Diebold and Mariano (1995) (DM) procedure to determine the statistical significance of differences in RMSE. The DM test compares the ability of trend inflation tracking of any core measure to that of the benchmark series, that with the lowest-RMSE. The null hypothesis that the two measures capture the trend equally well is considered in competition with the alternative that the benchmark series does better than the other. The test statistic is given as follows:

$$d_t = \hat{e}_{1,t}^2 - \hat{e}_{2,t}^2 \quad (5.10)$$

where  $\hat{e}_{j,t}^2 = (\pi_t^{trend} - \pi_{j,t}^{core})^2$  and  $d_t$  is the differential loss in period  $t$  using the benchmark series ( $j = 1$ ) versus the alternative series ( $j = 2$ ). Subsequently, the mean differential loss  $\bar{d}$  throughout the sample is examined for whether it is significantly different from zero.

The DM tests confirm the predominance of Cogley's measure when trend inflation is calculated using 36-month or 48-month CMA. All other measures' RMSE are significantly higher than that of the ES. The differences of RMSE are less clear-cut if 18-month or 24-month CMA is considered as trend. These results show that all five measures are equally good in tracking the 18-month or 24-month CMA inflation, but if using headline inflation averaged over larger period, the filtered inflation stands out.

### 5.4.2. Forecasting power

- Univariate framework

Appraisals of how well a core measure can forecast future movements of the headline have become popular in mostly every research in the field. One interesting and pretty simple way which is applied in Cogley (2002) inheres in testing this relationship:

$$\pi_{t+h} - \pi_t = \alpha_h + \beta_h(\pi_t - \pi_t^{core}) + \varepsilon_{t+h} \quad (5.11)$$

The current core deviation, which is the difference between headline and core inflation  $\pi_t - \pi_t^{core}$ , is supposed to be useful to predict the future developments in aggregate price changes  $\pi_{t+h} - \pi_t$  in the way that it should be negatively related to the latter. As core inflation must only contain permanent price changes, non-core movements, i.e. the core deviation, should not have any stimulating effect on future CPI inflation. In other words, if there is an increase in the non-core component of inflation at time  $t$ , one would expect a reversal move in the aggregate inflation over the next  $h$  months. This particularity is also consistent with Bryan and Cecchetti's view of core inflation for they define the core as the component that persists over the medium run (Bryan and Cecchetti, 1994).

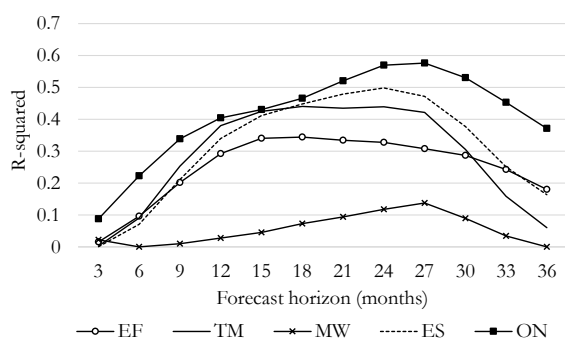
In order to meet this condition,  $\beta_h$  must be equal to  $-1$ ; in this case, core deviation is said to exactly match the future price changes. If  $|\beta_h| > 1$ , the core deviation could understate the subsequent price changes, therefore understate the transient evolutions in aggregate price changes. Inversely, if  $|\beta_h| < 1$  then it overstates the transients. Furthermore, since  $(\pi_{t+h} - \pi_t)$  and  $(\pi_t - \pi_t^{core})$  are expected to be mean zero,  $\alpha_h$  should be nil; however, as Cogley argues, this supplementary condition is trivial. Any core measure that satisfies these conditions are said to be unbiased.

Econometrically, this type of regression requires all variables to be stationary; otherwise there would be problem of spurious regression. I therefore begin the evaluation by testing for the stationarity of each series, including all  $\pi_{t+h} - \pi_t$  and  $\pi_t - \pi_t^{core}$  with  $h$  goes from 3 to 36 months and  $\pi_t^{core}$  is one of the five core candidates. The results from ADF tests (see Appendix) point out the absence of unit root in all future headline inflation changes and core deviation series. Tests for unbiasedness are then conducted at all horizons and include all core measures.

Table 5.2 reports test results for principal forecasting horizons of six months, and one, two and three years. In near term, statistics indicate evidence of unbiasedness for all core candidates but ES series. When forecasting total inflation changes over one to two year ahead, trimmed mean and output neutral inflation turn out to understate the transient price movements. At the furthest horizon, weighted median and output neutral inflation fail the  $F$ -test at 5%. Overall, only ex-food inflation exhibits unbiasedness in all tests while WM and ES miss one. SVAR-based measure, on the other hand, performs less well than do its peers.

In addition, the goodness-of-fit of the regressions, represented by  $R^2$ , is also investigated. The idea behind is that a core candidate which contains a larger part of information about future inflation development leaves out more non-core variation, and will be preferred to those that account for less (Cogley, 2002). The summary of the  $R^2$  statistics is displayed in Figure 5.5. All series have the same inversed U-shape performance in terms of explanation power, which reaches the highest values at 24- or 27-month horizon. This finding reveals that core measures are most efficient in forecasting two-year ahead headline inflation. The regressions with output-neutral inflation give the best  $R^2$  over all forecast horizons while those with weighted-median have the lowest statistics. Almost 60% of 27-month ahead total inflation are explained by Quah-Vahey's measure, compared to only 14% by median core inflation. Among the rest, trimmed-mean and exponentially smoothed inflation series are moving close to each other while excluding food price inflation's  $R^2$  are a bit smaller.

**Figure 5.5 Goodness-of-fit of forecasting equations**



Source: Author's estimates

Table 5.2 Unbiasedness test

Core measures	$\beta_6^{(i)}$	$\alpha_6^{(ii)}$	$H_0: \begin{cases} \beta_6 = -1 \\ \alpha_6 = 0 \end{cases}$	$\beta_{12}^{(i)}$	$\alpha_{12}^{(ii)}$	$H_0: \begin{cases} \beta_{12} = -1 \\ \alpha_{12} = 0 \end{cases}$	$\beta_{24}^{(i)}$	$\alpha_{24}^{(ii)}$	$H_0: \begin{cases} \beta_{24} = -1 \\ \alpha_{24} = 0 \end{cases}$	$\beta_{36}^{(i)}$	$\alpha_{36}^{(ii)}$	$H_0: \begin{cases} \beta_{36} = -1 \\ \alpha_{36} = 0 \end{cases}$
Excluding food prices	-0.68 (0.18)	0.52 (0.80)	0.38 [0.69]	-1.75 (0.33)	1.88 (3.41)	0.98 [0.38]	-2.04 (0.47)	2.67 (7.74)	1.41 [0.25]	-1.49 (0.28)	2.45 (4.41)	0.75 [0.48]
Trimmed-mean	-0.94 (0.37)	1.28 (1.29)	0.86 [0.43]	-2.89* (0.21)	0.95* (3.42)	8.59 [0.00]	-3.26* (0.37)	5.19* (5.98)	8.01 [0.00]	-0.96 (0.13)	0.57 (5.56)	0.11 [0.90]
Weighted median	-0.02 (0.38)	-0.40 (1.35)	1.47 [0.23]	-0.84 (0.54)	-0.29 (3.53)	0.04 [0.96]	-1.84 (0.47)	-0.41 (4.96)	2.44 [0.09]	0.02* (0.26)	-1.14 (4.29)	2.79 [0.07]
Exponentially smoothed	-0.32* (0.05)	-0.15 (1.18)	7.09 [0.00]	-1.06 (0.06)	0.37 (2.53)	0.05 [0.95]	-1.35 (0.04)	0.82 (3.15)	2.20 [0.12]	-0.65 (0.05)	0.21 (3.19)	1.31 [0.27]
Output neutral	-1.29 (0.13)	0.80 (1.28)	0.45 [0.64]	-2.59* (0.25)	0.25 (2.36)	5.27 [0.01]	-3.23* (0.33)	1.92 (3.11)	9.34 [0.00]	-2.05* (0.21)	0.68 (2.94)	2.85 [0.06]

- The first two columns of each block show estimated coefficients on the first line and standard errors on the second (in parentheses). The latter are calculated using Newey-West covariance matrix estimator. \* denotes the case when one cannot reject at 5% (i)  $H_0: \beta_h = -1$  or (ii)  $H_0: \alpha_h = 0$ , with  $h = 6, 12, 24$  or 36 months.

- The last column of each block displays  $F$ -stat and  $p$ -value (in brackets) of the joint test with null hypothesis presented in the header.

Source: Author's estimates.

This result, together with the one from unbiasedness tests above, gives us some idea about a possible combination of core measures in forecasting tasks. Over short-term periods, output-neutral inflation can be relied on since it can unbiasedly leave out the most transient variation. Similarly, it's the ES at one- to two-year horizons, and ex-food if one considers three-year forecasting.

- Interaction with macroeconomic variables

Core inflation alone may not account for a complete prevision of future inflation development. There could be some important information embodied in macroeconomic variables that is lacked in core inflation. That is why Equation (5.12) is re-examined in an augmented version including a macroeconomic predictor  $x_t$ :

$$\pi_{t+h} - \pi_t = \alpha_h + \beta_h(\pi_t - \pi_t^{core}) + \gamma_h x_t + \varepsilon_{t+h} \quad (5.12)$$

Going in line with previous studies, I employ only macroeconomic variables representing demand-side pressure to inflation, among those four are chosen: output gap, M2 growth, credit growth and currency depreciation. These variables have been proved to be crucial determinants of inflation in Vietnam in many researches.<sup>68</sup> The output-gap is computed using HP filter over IPI series and macroeconomic data are from Macrobond. To be as parsimonious as possible regarding our small sample, only a bivariate framework is experimented, i.e. macroeconomic variables enter Equation (5.12) on an individual basis. Besides, to account for both instantaneous and rate-of-change impact of these supplementary predictors, both level and first-differenced variables are envisaged. The predictability of core measures is evaluated based on  $R^2$ .

Some main conclusions can be deduced from the results presented in Figure 5.6. First, the goodness-of-fit of the regressions tends to be improved when adding macroeconomic variables, though the magnitude varies from one indicator of demand pressures to another. While output gap raises  $R^2$  statistics of all models in a remarkable manner, improvement brought by money growth, credit growth, and exchange rate changes is less ample. This finding suggests that the interaction between inflation and output is pronounced in Vietnam, coherent with previous studies.

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<sup>68</sup> See Chapter 4 of this thesis, Nguyen and Nguyen (2011), Bhattacharya (2013) among others

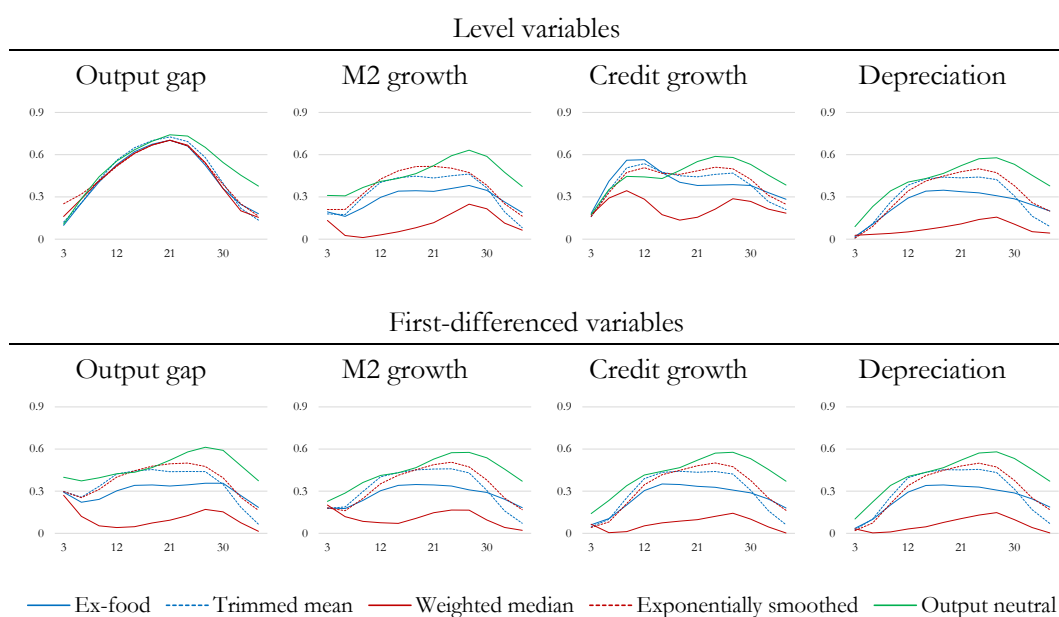


Second, in most of the cases,  $R^2$  still follows an inversed U-shape pattern along the horizons. This feature is in fact a continuation from the univariate models above.

Third, there is roughly no difference in impacts on model fitting between first-differenced variables, which are somewhat the same to those from level variables except the output gap. This points to the absence of rate-of-change effects.

Finally, core measures' order by fitting coefficient are the same as in the univariate framework. Indeed, the SVAR-based inflation preserves its top position while the second and third places go to Cogley's and trimmed-mean measures as their  $R^2$  statistics always move together. The models with weighted-median inflation benefits the most from macro variable inclusion as the goodness-of-fit increases significantly compared to previous regression. However, the gain is not sufficient to upgrade its relative performance. This core measure still occupies the last position of the list.

**Figure 5.6 Goodness-of-fit of bivariate forecast equations**



Horizontal axis – Forecast horizon (months), Vertical axis –  $R^2$  coefficient. Source: Author's estimates

### 5.4.3. Cointegration framework

Also wishing to examine the forecasting accuracy of core inflation measures but Freeman (1998) takes advantage of the cointegration framework and Granger causality tests. Since inflation series, both aggregated and core, are in general non-stationary, Freeman argues

that core measures must be cointegrated with headline inflation and have unity coefficients. This requirement guaranties a common dynamic between the two series. However, when using Granger causality tests to evaluate the predictability of alternative core measures, Freeman's observation of an ambiguous bidirectional causal relationship between core and total inflation raises some confusion. By accepting this type of causality, he must agree that not only core inflation helps forecast headline inflation but also the latter can give us information about the former, which makes the task of central banks even more complicated, if not impossible. In my opinion, an efficient core measure as a good predictor of total inflation should be an attractor of total inflation but not inversely, as in Marques et al. (2003)<sup>69</sup>.

In their paper, Marques et al. propose three testable conditions for core inflation measures. The first one is the same to Freeman's proposition. It requires the existence of cointegration relationship between core and headline inflation with unitary coefficient. The second and third conditions clarify the direction of this relation. While the second condition impose an error correction mechanism coming from core inflation to total inflation, i.e. core inflation Granger causes total inflation (through the error correction term); the third one restricts this causality to go in this direction only. More concretely, the three conditions can be presented as follow.

As the headline inflation  $\pi_t$  can be decomposed into two parts: core inflation  $\pi_t^{core}$  – accounting for the permanent changes – and  $z_t$  the transient component:

$$\pi_t = \pi_t^{core} + z_t \quad (5.13)$$

The condition (i) demands that core and headline inflation are cointegrated with unitary coefficient, i.e.  $z_t = \pi_t - \pi_t^{core}$  is stationary with zero mean. In other words, if we write in this way:

$$\pi_t - \pi_t^{core} = \alpha + (\beta - 1)\pi_t^{core} + u_t \quad (5.14)$$

then  $u_t$  must be I(0) (or  $\beta = 1$ ) and  $\alpha = 0$ .

Once condition (i) is satisfied,  $\Delta\pi_t = \pi_t - \pi_{t-1}$  may be written as:

$$\Delta\pi_t = \sum_{j=1}^m \alpha_j \Delta\pi_{t-j} + \sum_{j=1}^n \beta_j \Delta\pi_{t-j}^{core} - \gamma(\pi_{t-1} - \pi_{t-1}^{core}) + \varepsilon_t \quad (5.15)$$

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<sup>69</sup> although they do not accept forecasting power as an evaluation benchmark

Condition (ii) requires  $\gamma$  to be significantly different from zero.

To prevent the causality to go in the other direction, condition (iii) implies that in the error-correction model for  $\Delta\pi_t^{core}$ :

$$\Delta\pi_t^{core} = \sum_{j=1}^p \delta_j \Delta\pi_{t-j}^{core} + \sum_{j=1}^q \theta_j \Delta\pi_{t-j} - \lambda(\pi_{t-1}^{core} - \pi_{t-1}) + \eta_t \quad (5.16)$$

we must have  $\lambda = \theta_1 = \theta_2 = \dots = \theta_q = 0$  (condition of strong exogeneity) . If we only have  $\lambda = 0$ ,  $\pi_t^{core}$  is said to be weakly exogenous to  $\pi_t$ .

The evaluation of core inflation measures based on these three conditions is carried out in steps. First, a unit root test is applied on  $\pi_t - \pi_t^{core}$ . Since a conclusion of stationary from this test often includes a support for the rejection of unit root in  $u_t$  and the acceptance of the null hypothesis of  $\beta = 1$  in Equation (5.14), one can continue to test for  $\alpha = 0$  by a standard  $t$ -test. This can easily be done by allowing the regressions to have a constant in advance. Next, if condition (i) is established, set the model specification as Equation (5.15) and test for  $\gamma = 0$  to conclude for condition (ii). Finally, condition (iii) is envisaged. We can separately consider  $\lambda = 0$  (weak exogeneity) by  $t$ -test and  $\lambda = \theta_1 = \theta_2 = \dots = \theta_q = 0$  (strong exogeneity) by Wald test. In this study, I rely on the ADF test as the unit root test,  $\pi_t$  is the year-on-year headline inflation and  $\pi_t^{core}$  the five core candidates.

The results are demonstrated in Table 5.3.<sup>70</sup> Although results of unit root tests on  $\pi_t - \pi_t^{core}$  are already obtained from the forecasting framework presented above; I redo the tests on  $u_t$  to be sure of the robustness. In the first column are the results of the ADF tests on the residuals. A constant term is included in all regressions. The number of lags is chosen to minimize the Schwarz information criterion. This test confirms what have been found previously that the null hypothesis of a unit root in  $u_t$  can be rejected for all core inflation measures. They all are therefore cointegrated with the headline inflation. This outcome implies that all the core measures estimated in this study can express a consistently converging trend with the CPI inflation, satisfying the first condition.

The second column of Table 5.3 exhibits the results of  $t$ -test for  $\alpha = 0$  conditional on the stationarity of  $\pi_t - \pi_t^{core}$ . The reported p-values show that the null of  $\alpha = 0$  is not rejected

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<sup>70</sup> It is important to note that results from cointegration tests over a short time period, more than 10 years in our case, can be biased. The use of monthly data can help improve the test efficiency (Zhou, 2001) but nothing compares to a sufficiently long dataset. The revisitation of the study in the future is therefore welcomed.

for all measures but ex-food inflation. We thus conclude that all candidates, except EF, are unbiased estimators of core inflation.

The condition (ii) test outcomes are presented in the next column. Simple  $t$ -tests for  $\gamma = 0$  are carried out on the five core measures. As shown in the table, the null hypothesis is rejected for all of them. Hence, in the long run, ex-food, trimmed-mean, weighted median, exponentially smoothed and output neutral inflation are attractors of total inflation.

The weaker part of condition (iii) test results are next reported. As demonstrated, the null hypothesis that  $\lambda = 0$  cannot be rejected only for SVAR-based core inflation. It is thus weakly exogenous to headline inflation, being an attractor of total inflation but not attracted by this latter. Meanwhile, the other four fail the test, indicating a bi-directional error-correction mechanism between headline inflation and these core measures. This finding reduces significantly the attractiveness of these four core inflation measures.

Finally, strong exogeneity condition is investigated. As the p-values show, output neutral inflation cannot satisfy this condition, meaning that lagged changes in headline inflation still have some influence on this core measure. In the meantime, the other four series miss this last condition without any doubt.

All things considered, results from the cointegration framework show that although all core measures are cointegrated with headline inflation, only output neutral inflation are (weakly) exogenous to the total inflation. This efficient core inflation measure can thus be useful for the monetary authority.

**Table 5.3 Cointegration test results**

Core measures	Condition (i)		Condition (ii)	Condition (iii)	
	$u_t \sim I(0)$	$\alpha = 0$ given $u_t \sim I(0)$	$\gamma = 0$	$\lambda = 0$	$\theta_1 = \dots = \theta_q = 0$ given $\lambda = 0$
Excluding food prices	0.049 Yes	0.000 Yes	0.000 Yes	0.014 No	0.000 No
Trimmed-mean	0.034 Yes	0.919 Yes	0.000 Yes	0.003 No	0.000 No
Weighted median	0.000 Yes	0.219 Yes	0.004 Yes	0.007 No	0.000 No
Exponentially smoothed	0.001 Yes	0.803 Yes	0.000 Yes	0.004 No	0.000 No
Output neutral	0.019 Yes	0.393 Yes	0.003 Yes	0.178 Yes	0.000 No

Numbers reported are p-value of the tests with  $H_0$  presented above. Source: Author's estimates.

## 5.5. CONCLUSION

This chapter estimates various measures of core inflation for Vietnam by using both statistical and model-based approaches. They are the excluding food price, two limited influence measures (the trimmed-mean and weighted median), an exponentially smoothed series and a SVAR-based inflation. Since each of them has a different rationale and computation method, also distinct advantages and drawbacks, a clear-cut selection is quite difficult to make. This is why after being estimated, these core candidates will be evaluated empirically. I define an efficient core inflation is a close neighbor of trend inflation and a good predictor of future inflation. According to this definition, three sets of evaluation criteria are applied: ability to track the trend, predictive power and cointegration with the headline inflation. The overall result singles out the output-neutral as a useful core inflation indicator for policy purposes but also proposes a combined usage of core measures to improve forecasting power.<sup>71</sup>

In fact, for the first criterion, the SVAR inflation is only the second best measure. However, the second evaluation test results advocate the usefulness of it as a competent forecaster of future inflation changes. Forecasts by this measure are unbiased in the short run as well. Finally, within the cointegration framework, the SVAR-based once again outperforms the other candidates. It is the only one which meets almost all the proposed conditions.

Nevertheless, since the construction of such a model-based measure is complicated, it may not be appropriate to be used in the central bank's communication with the public. For that purpose, the monetary authority can count on exponentially smoothed inflation. ES measure tracks the trend efficiently and explains an important part of future inflation over one- to two-year horizon. The relatively poor performance of influence limited measures in the present study may be due to small degree of disaggregation of total inflation. Future works with a larger number of CPI components should be beneficial. The ex-food inflation, which is a proxy for GSO's measure, performs averagely compared to other candidates. Its construction is, however, questionable since food accounts for nearly 40% of Vietnam's consumer basket.

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<sup>71</sup> Aleem and Lahiani (2011) found similar results for India.

## APPENDIX

**Table 5.4 Consumer price index components**

1	Food and foodstuff
1.1	Food
1.2	Foodstuff
1.3	Eating outside
2	Beverage and Cigarette
3	Garment, Footwear and Hat
4	Housing and Construction materials
5	Household Equipment and goods
6	Medicament and Health care
7	Means of Transport
8	Postal services and Telecommunication
9	Education
10	Culture, Entertainment and Tourism
11	Other consumer goods and services

Base year 2009. Source: GSO

**Table 5.5 Unit root test results - Future CPI inflation changes**

Horizon (months)	P-value	Horizon (months)	P-value
3	0.001	21	0.002
6	0.008	24	0.004
9	0.001	27	0.001
12	0.001	30	0.005
15	0.000	33	0.029
18	0.001	36	0.026

Augmented Dickey-Fuller unit root test. Lag length is selected based on Schwartz Information Criterion. All models include a constant.

Source: Author's estimates

**Table 5.6 Unit root test results - Core deviations**

Core measure	P-value
Excluding food price	0.008
Trimmed-mean	0.010
Weighted median	0.001
Exponentially smoothed	0.005
Output neutral	0.035

Augmented Dickey-Fuller unit root test. Lag length is selected based on Schwartz Information Criterion. All models include a constant. Source: Author's estimates

**Table 5.7 Core inflation comparison January-April 2015**

Inflation measure	2015M1	2015M2	2015M3	2015M4
Headline	0.94	0.34	0.93	0.99
GSO core	2.52	2.29	2.35	2.20
Excluding food price	0.46	-0.23	-0.04	0.37
Trimmed-mean	2.10	1.34	2.20	2.02
Weighted median	2.48	2.07	2.48	2.19
Exponentially smoothed	4.46	4.10	3.80	3.54
Output neutral	3.36	3.14	4.16	4.64

Annual percentage. Source: GSO, Author's estimates



## CHAPTER 6

### A FINANCIAL CONDITIONS INDEX FOR VIETNAM

**Abstract** A Financial Conditions Index (FCI) is proposed for Vietnam by applying the innovative technique of the Generalized Dynamic Factor Model. Financial variables are assessed for their forward-looking behavior before being assembled to build up the FCI. The estimated FCI captures well the developments of economic activity, particularly during the 2008 financial crisis and the 2011 downturn. Furthermore, the index is proved to have important predictive information for business cycles through forecasting exercise and various robustness checks.

**JEL classification** E17, E44, E5

**Key words** Financial conditions index, Dynamic factor model, Leading indicator, Vietnam

## 6.1. INTRODUCTION

Through different transmission channels, monetary policy affects real economic activities by firstly influencing financial conditions of the country. This connection between monetary-financial and real economic sphere has been well-documented in the literature. In particular, the relationship has gained extensive attention after the devastating effects of the 2007-2008 financial crisis to the world economy. There has been since then great interest in quantitatively measuring the information about economic activity contained in financial variables, called financial conditions. Once this task is achieved, not only financial-real economy linkages can be identified and assessed, but also future economic activity could be forecasted. Due to forward-looking nature of the financial market, current financial conditions influence the future state of the economy, thus can play a valuable role in macroeconomic forecasting models. Besides, since several transmission channels are captured in the changes of financial conditions, quantifying these movements is helpful for the conduct of monetary policy.

However, as financial variables are numerous, one had better synthesize the information contained in these variables into a single indicator. This has led to the recent boom in financial conditions indexes (FCI) which are constructed for a wide range of countries using various technical methods (Hatzius et al. 2010).

In the same spirit, the aim of this chapter is to build up a financial conditions index for Vietnam. Although the Vietnamese financial market is still underdeveloped, it has been growing actively these recent years. Financial products have been more and more abundant; money market has considerably progressed; and capital market attractiveness has significantly increased. As a result, it is believed that once constructed, such an index can serve as a useful indicator for the central bank.

There are two main methodologies to compute FCIs: the weighted-sum and the factor model approaches. In the first approach, the FCI is a weighted sum of selected financial variables. Weights can be attributed equally for all variables (Rosenberg 2009). Or one can use weights resulted from regression-based methods through the estimation of a macroeconomic model, a reduced-form demand equation or a vector autoregression model (Hatzius et al. 2010). Meanwhile, the factor model approach is inspired by the fact that financial variables tend to move together. Therefore, a measure that accounts for this comovement could represent the state of financial conditions susceptible to reflect future

evolution of the real economy. Technically, an unobserved common factor is extracted from financial variables,<sup>72</sup> which can be done through the use of Kalman filter in time-domain estimation, or by applying a non-parametric averaging methods founded on the Principal Component Analysis, or even by combining these two techniques.<sup>73</sup>

Our FCI for Vietnam is constructed using a recent development of the factor model framework proposed by Forni et al. (2000, 2005), called the Generalized Dynamic Factor Model (GDFM). With this method, the estimated factors are able to capture all the dynamic structure of the cross-sectional panel while still preserve the consistency of the standard factor model.

The results show expansionary financial conditions until 2007Q3 when they started to deteriorate. Since the extreme tightening period in 2008, financial conditions did record another remarkable degradation in late 2011 before progressively recovered. Moreover, the calculated FCI exhibits high correlation with real activity and powerful short-term predictive power for this latter, as findings in forecasting exercises point out.

The chapter is organized as follows. The next section describes the methodology and data used in the construction of the index. Section 3 evaluates the performance of the FCI in forecasting near term production growth and considers some robustness tests. Section 4 concludes.

## 6.2. CONSTRUCTION

### 6.2.1. *Generalized dynamic factor model*

A FCI computed using a dynamic factor model (DFM) approach is defined as the common factor that captures the greatest common variation in financial variables. Consider a set of  $p$  financial variables  $x_{it}$   $\{x_{it} = (x_{1t}, \dots, x_{pt})'; p \in \mathbb{N}, t \in \mathbb{Z}\}$  retained for the study. Each variable  $x_{it}$  can be decomposed into two orthogonal parts: a common component ( $\chi_{it}$ ) and an idiosyncratic component ( $\xi_{it}$ ), as follows:

$$x_{it} = \chi_{it} + \xi_{it} = \sum_{j=1}^q b_{ij}(L)f_{jt} + \xi_{it} \quad (6.1)$$

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<sup>72</sup> It is generally assumed that the first common factor contains the most important information about financial conditions so one-factor models are usually exploited in the literature.

<sup>73</sup> See Stock and Watson (2010) for a survey on dynamic factor models.

The common component is driven by  $q$  dynamic common factors  $f_{jt}$  ( $q < p$ ), which are loaded with possibly different coefficients and lags. Therefore,  $b_{ij}(L) = B_p(L) = B_0^p + B_1^p L + \dots + B_s^p L^s$  represents the dynamic loadings of order  $s$  of each variable  $x_{it}$  in  $f_{jt}$ .

The GDFM proposed by Forni, Hallin, Lippi and Reichlin (FHLR, 2000, 2005) estimates unobserved common factors by means of dynamic principal components, which are based on the spectral density matrix (dynamic covariations<sup>74</sup>). The model has two essential properties: the order of dynamic loadings of the common factors is not restricted, and the idiosyncratic component is allowed to be weakly cross-correlated. The second characteristic is said to relax a highly unrealistic assumption in previous DFM according to the authors.

Letting  $B_p(L)f_{jt} = CF_{kt}$ ;  $k = 1, \dots, r$  and  $r \neq q$ , Equation (6.1) can be written as:

$$x_{it} = CF_{kt} + \xi_{it} \tag{6.2}$$

which is a static representation. In fact, the factor space is approximated by  $r$  static factors ( $F_{kt}$ ) instead of  $q$  dynamic factors as in Equation (6.1). These static factors are contemporaneous linear combinations of  $x_{it}$ , but based on the information of the dynamic approach. The number of static factor is equal to  $r = q(s + 1)$  with  $s$  indicating the lag order in the dynamic representation in (6.1).

The procedure in GDFM consists of two steps. In the first step, the covariance matrices of the common and idiosyncratic component are estimated through the spectral density matrices. This information is later used in the second step to construct  $r$  contemporaneous averages, where  $x_{it}$  are weighted according to their common/idiosyncratic variance ratio.

### 6.2.2. Construction procedure of the FCI

- Choice of variables

The choice of variables is based firstly on the division of domestic financial markets into three segments (money market, bond market, equity market) following the Bloomberg FCI (Rosenberg 2009). However, unlike a developed country, an emerging economy is highly influenced by (or dependent on) capital mobility. That is why the fourth group of

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<sup>74</sup> Data are shifted through time before averaging along the cross-section, taking into account the whole set of dynamic covariances.

variables is added into the dataset, representing the capital flows impact on the domestic financial conditions, always following Rosenberg (2009). Lack of alternative choices, the exchange rate volatility is enclosed in this group. Both the volatility of United States dollars – Vietnam dong (USD/VND) and euro – VND (EUR/VND) exchange rates are considered. The first volatility measure must have small values because of the actual exchange rate regime (narrow band USD peg). That is why the volatility of EUR/VND rates is included in order to better capture the movements of capital flows. Likewise, I also consider the REER<sup>75</sup> volatility. The calculation of exchange rate volatilities is detailed in the Appendix.

Moreover, it is common in the literature that external variables are added to the dataset to build up the FCI. As a result, the domestic financial variables set will be augmented with S&P500 price index (SP500), S&P500 volatility index (VIX) and 3-month TED spread (TED). By doing this, we can gauge the impact of global and/or regional linkages to the domestic financial conditions.

Besides, the variable selection reflects the best solution for the tradeoff between cross-sectional and time coverage. Although there are many financial variables for Vietnam, most of them have very limited timespan. Finally, aiming to build a functional, easy up-to-date index, I only include variables that are reported in a high frequency basis (daily or monthly<sup>76</sup>).

To sum up, a set of thirteen financial variables is used to build up the FCI, including 3-month and overnight interbank interest rates (IBR and ON), the Central bank discount rate and refinancing rate standing for policy rates (PR and RR), the 5-year CDS spread on sovereign bonds (CDS), two stock exchange price indexes - the Ho Chi Minh City and Hanoi<sup>77</sup> stock exchanges (HOSE and HNX), three measures of exchange rate volatility (VDUD, VDEU and REER), and the three external variables mentioned above. The FCI is constructed over the period of 2005M2-2015M4. Data are collected from Macrobond, Bloomberg, Datastream, GSO and SBV.

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<sup>75</sup> See Chapter 2 Appendix for REER computation

<sup>76</sup> All daily data are converted to monthly ones by selecting the last observation of each month.

<sup>77</sup> The Hanoi stock exchange was not opened until July 2005. Data prior to this date are therefore retro-projected by assuming the two domestic stock exchanges had the same evolution over that period.

- Classification of financial variables

Financial variables are usually linked with expectations about future economic movements and therefore are classified as leading parameters. In order to verify this property, it is beneficial to make use of a formal test. Furthermore, different variables should not have the same behavior vis-à-vis the real economic activity; some variables may be more forward-looking than the others. Being acknowledged of those eventual differences is also useful in macroeconomic analysis.

The GDFM framework by FHLR (2000,2005) allows us to do so by firstly adding a measure of economic activity into the financial dataset. Working on monthly data, it is convenient to use the Industrial Production Index (IPI) as a proxy for GDP. The GDFM is then applied onto the extended sample. This gives us the spectral density matrix of common components at all frequencies  $\theta \in [-\pi, \pi]$  denoting  $\Sigma^x(\theta)$ . Using these estimates, I extract the cross-spectral density<sup>78</sup> of each common component  $i$  with respect to the common component of the IPI at a typical business cycle frequency  $\theta^*$ :  $\sigma_{i,IPI}(\theta^*)$ .

The typical frequency is derived from the average length of a business cycle, i.e. the sum of the length of a boom and the length of the subsequent recession. By looking at the common component of the IPI<sup>79</sup>, I divide the sample period into three sub-periods: before 2007, 2007-2009 and after 2009. Defining a boom (recession) is a period that has above (below)-local average observations and lasts at least two quarters, an average cycle length of 36 months or 3 years is obtained. Therefore,  $\theta^*$  equals  $\pi/18$ .<sup>80</sup>

From the cross-spectral density, the phase angle  $\phi_{i,IPI}(\theta^*)$  and the time shift  $\psi_{i,IPI}(\theta^*) = \phi_{i,IPI}(\theta^*)/\theta^*$  are calculated.<sup>81</sup> Variables are classified as leading if the time shift is smaller than  $-3$  months, lagging if  $\psi_{i,IPI}(\theta^*)$  is greater than 3, and coincident otherwise.

According to the results in Table 6.1, all financial variables in the dataset are leading except the three stock price indices, SP500, HOSE and HNX which fall into coincident variable

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<sup>78</sup> From the spectral density matrix at any frequency, we have on the diagonal the auto-spectra, and the cross-spectra off-diagonally.

<sup>79</sup> See Figure 6.7 in the Appendix

<sup>80</sup> The length of a cycle is  $2\pi = 36$  months, so the frequency  $\theta^* = \pi/18$  month.

<sup>81</sup> A cross-spectral density can be decomposed in its polar form as  $\sigma_{i,IPI}(\theta) = A_{i,IPI}(\theta)e^{-i\phi_{i,IPI}(\theta)}$  where  $A_{i,IPI}(\theta)$  is the amplitude (or the argument) and  $\phi_{i,IPI}(\theta)$  is the phase angle.

category. As such, among asset prices, bond prices are more forward looking than equity prices, while exchange rate volatilities are quite helpful in informing in advance the future state of the economy. In all, no financial variable is lagging compared to the IPI.

**Table 6.1 Time delay of financial variables**

Variable	Time lags with respect to IPI (months)	Category
VDEU	-12.09	Leading
VDUD	-11.07	Leading
REER	-10.72	Leading
CDS	-10.34	Leading
PR	-9.40	Leading
VIX	-9.38	Leading
RR	-9.37	Leading
IBR	-8.50	Leading
ON	-7.65	Leading
TED	-6.31	Leading
SP500	2.79	Coincident
HOSE	2.84	Coincident
HNX	2.98	Coincident

Source: Author's estimates

- Index estimation

Being ascertained about the leading feature of financial variables in the sample, the next phase involves the construction of the FCI. This task consists of two steps: the application of the GDFM and the removal of business cycle effects from the FCI.

As mentioned above, I consider one-dynamic-factor model only, i.e.  $q = 1$ . What remains to determine is the value of  $s$ , the autoregressive structure of the dynamic factor, as  $r$  can be directly deduced. Finally, dynamic factors are supposed to have lag orders  $s$  varying from 1 to 4. Thus,  $r$  takes the values of 2 to 5. All the static factors are then weighted in proportional to their share in explained variance of the dataset and averaged up to obtain the FCI. In what follows, I report the FCI with  $s = 1$ , so with  $r = 2$ . Experiments show that modifying the value of  $s$  does not affect the FCI significantly.<sup>82</sup>

<sup>82</sup> FCI variants conditional on  $s$  are provided upon request.

Furthermore, as pointed out in Hatzius et al. (2010), financial variables often reflect cyclical economic developments along with their own evolution; whereas an FCI should summarize only information extracted from financial variables about the future state of the economy, net of any influence from current and past economic activity. Therefore, after being estimated, the FCI is regressed on current and lagged output gap:

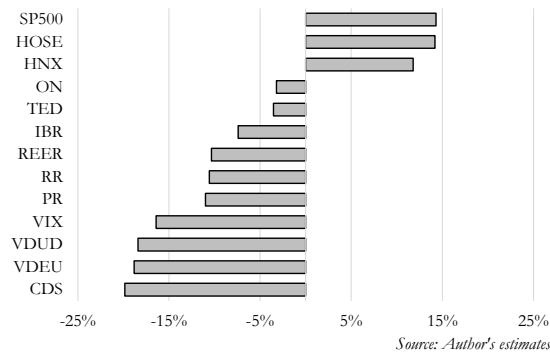
$$F_t = A(L)ygap_t + v_t \tag{6.3}$$

where  $ygap_t$  denotes the gap between the realized industrial production (IP) growth and its potential growth calculated by applying the Hodrick-Prescott filter on the former.  $v_t$ , an independent error term, is therefore the purged FCI containing only the exogenous movements in financial conditions since it is uncorrelated with the output gap and its lagged values.

### 6.2.3. Financial Conditions Index

Before applying the GDFM, it is necessary to bring some transformation to the dataset. Financial variables are firstly changed to first difference or first-difference of logarithm where appropriate. They are then standardized to have zero mean and unity variance in order to neutralize all measurement differences. Figure 6.1 displays the factor loadings which are proportional to the common / idiosyncratic variance ratio of each variable. A positive factor loading would signify that an increase in that variable corresponds to a rise in the FCI, which is the case for the three stock price indexes. Contrarily, the variable having a negative loading contributes to the FCI negatively. For example, a decline in CDS spread should be a good sign for the financial conditions, thus relates to a hike in the FCI. The same observation can be found for interest rates and spreads as well as measures of risk and volatility.

**Figure 6.1 Factor loadings**



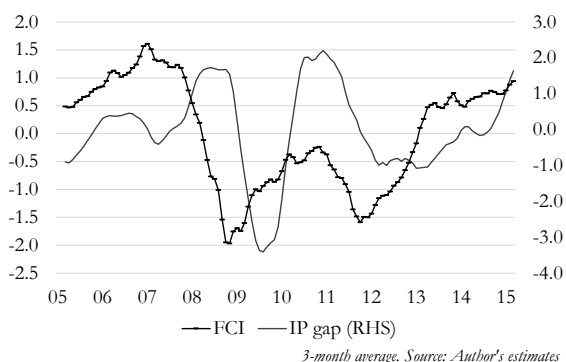


Absolute values of loadings suggest somewhat similar contribution of equity indexes to the FCI. VDUD, VDEU and CDS also have comparable loadings which are around 20%. Among interest rates, overnight interbank rate and TED spread explain a more limited part of the common variance.

The constructed FCI is plotted along with the Industrial production gap in Figure 6.2, and its four groups of components in Figure 6.3. A value above (below) zero indicates a looser (tighter) condition. Some similar patterns of financial conditions that exist in other countries can be perceived. Prior to the global financial crisis, one can recognize expansionary financial conditions in Vietnam which coincides with a good performance of the real activity lagging of almost one year. This upswing results from a combination of low interest rates and CDS spread, weak exchange rate volatility and favorable evolution of stock prices (Figure 6.3).

With the hit of the 2007-2008 crisis, financial conditions deteriorated quickly and became particularly tightened in mid-2009. Like other emerging countries, the shock arrived with a lag of 6 to 12 months compared to advanced countries.

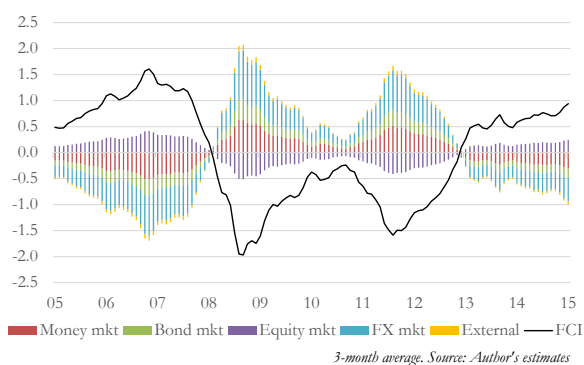
**Figure 6.2 Vietnam financial conditions index**



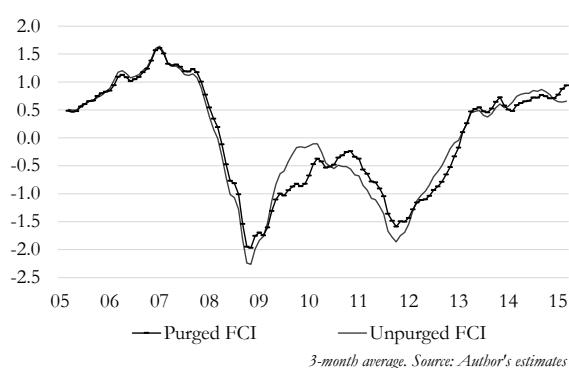
The after-crisis period is a situation that, however, can rarely be discovered elsewhere. Vietnam only recorded a slow and faint recovery since the FCI could not go beyond the zero normalcy line. The country had to suffer from another severe tightening of financial conditions in 2011. As a result, output fell down strongly while inflation surged after a brief post-crisis improvement. Characterizing this extended difficult period was a slow down on the equity market, an upturn of interest rates and the bond market worsening, all come from domestic market evolution.

The effective recovery finally arrived in 2013, signaling a resurgence of the economy in the subsequent months. After a quick and mitigated fluctuation at end-2013, the financial conditions have stabilized and followed an upward trend which indicates steadily ameliorated economic activity in the near future.

**Figure 6.3 Financial condition index decomposition**



**Figure 6.4 Purged versus unpurged FCI**



In order to assess the repercussion of the business cycle on financial conditions, the purged FCI is compared to the unpurged one, i.e. the FCI results from the GDF without the regression on  $A(L)ygap$  in Equation (6.3). Figure 6.4 demonstrates some striking differences between the two series. If before the financial turmoil, real activity seems to have modest influences on financial conditions as the two FCIs are quite close to each other, this is not the case for the next periods. In particular, during the most tightening periods, the unpurged index is significantly more negative than the purged index, suggesting that an important share of financial disruptions could be explained by the prevailing macroeconomic situation. From mid-2009 to mid-2010 the unpurged FCI advances a stronger and earlier reconstruction of financial conditions than what evokes the purged index, indicating that unfavorable financial conditions remain an impediment for economic activity during this period. For the 2011 trough, the unpurged FCI once again shows more

distressing circumstances. The two series have shown greater comovement again since the start of the recovery in mid-2012.

### 6.3. EVALUATION OF THE FINANCIAL CONDITION INDEX

In this section, the ability of the FCI to anticipate real economic activities is investigated, in comparison with the autoregressive (AR) model of economic growth and models using single financial variables (including those employed to construct the FCI). As for the robustness check, I also assess the extent to which the inclusion of some external financial variables and the econometric enhancements would improve the predictive performance of the FCI. The analysis will focus exclusively on (pseudo) out-of-sample forecasts.

Following Bernanke (1990), the following equation is estimated:

$$y_{t+h} = \alpha + \sum_{i=0}^p \phi_i y_{t-i} + \sum_{i=0}^q \gamma_i x_{t-i} + \varepsilon_t \quad (6.4)$$

where  $y_t$  denotes output gap growth – proxied by the difference between the year-on-year growth rate of industrial production index and its potential value obtained by the HP filter;  $h$  is the forecast horizon of 6 or 12 months;  $x_t$  is the FCI or a financial variable. The parameters  $p$  and  $q$  are numbers of lags of  $y$  and  $x$  used in the regressions, chosen by AIC (Akaike Information Criterion).

To carry out the out-of-sample forecast, Equation (6.4) is estimated recursively through the forecast period. Firstly, running regression on Equation (6.4) using data from the beginning of the sample through period  $t$  yields the estimated coefficients. These coefficients are then employed to calculate  $\hat{y}_{t+h}$  - the forecasted value of output at the horizon  $h$ . The process is repeated to have forecasts at  $t + 1$ , and so on until the end of the sample (2015M4). The forecasting exercise starts at the 2010M2, which means that at least 60 observations are used to obtain the output gap forecasts.

Forecasting based on the autoregressive model of output is chosen to be the benchmark model. The forecast errors of the AR model and that including the FCI are juxtaposed. Two measures of errors are reported: the mean absolute error (MAE) and root mean squared error (RMSE).

Moreover, the FCI predictive performance is also examined in comparison with that of single financial variables. On the one hand, I work with variables that were not present in

the computation of the FCI, especially those have been used by the Central bank as intermediate targets (the real M2 growth – M2 – and Credit growth – CRED<sup>83</sup>) in addition to the Bank loan-deposit interest spreads (IRS). This task will verify their usefulness in forecasting short-run economic activity, which has not been formally tested until recently. On the other hand, setting the FCI against their constituents will check if those variables, letting alone, can give better forecast results; or if some of them tend to cancel out the effectiveness of the others when being pooled. Table 6.2 summarizes how well the FCI predict economic activity, along with the AR model and single financial indicators performance over two horizons of 6 and 12 months. The results show that the FCI is efficient in forecasting the near-term industrial production gap, irrespective of the time horizons, measures of errors, and reference models. The relative MAE or RMSE of the FCI is even smaller in 12-month forecast, demonstrating its increasing relevance in 1-year-ahead prediction.

Among single variables which do not contribute to the FCI, the credit supply growth delivers slightly better outcomes than M2 growth in 12-month forecasts while IRS is always left a bit behind. However, these variables cannot outdo the AR model and the FCI. To forecast economic activities in the short run, the central bank should then rely on the FCI rather than M2 or credit growth which are more relevant in medium to long run, as shown in Chapter 3 and Chapter 4.

Moreover, there are significant benefits gained from pooling the financial variables, as no single component outperforms the composite FCI. One can then be sure that they all are complementary. Besides, what is more remarkable is that their forecast results are closer to actual output gap compared to those of both M2 and Credit growth, with the only exception of the interbank and policy rates at 6-month prediction. Finally, amongst the variables having the highest factor loadings, one can find VDUD which gives the smallest forecast errors.

### 6.3.1. *Purged versus Unpurged FCI*

I confront again these two series, this time in forecasting performance. It is not surprising that the unpurged FCI, which still contains the cyclical impacts reflected in financial variables, delivers better forecast results. This is effectively confirmed by looking at the Table

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<sup>83</sup> Real M2 growth is the first difference of logarithm of M2 deflated by consumer price index inflation. Credit growth is the first difference of logarithm of Credit supply.

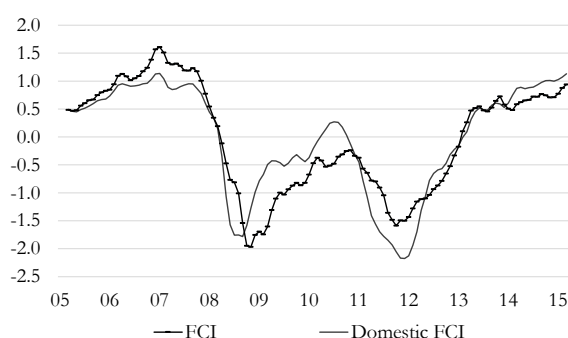
6.2. For both forecast horizons and both criteria, the unpurged FCI outperforms the purged one, except for the RMSE at 6-month forecast. However, the differences are relatively small.

### 6.3.2. Removing external variables

One may wonder if domestic variables alone are able to give more accurate forecasts of economic activity. Due to existing capital controls in Vietnam, linkages between the domestic and global financial markets could be weak or incomplete. As such, idiosyncratic evolutions cannot be efficiently reflected by foreign variables. Particularly during periods when domestic and external financial conditions are counter-cyclical, the FCI built from both national and foreign variables should not be a good leading indicator.

As a robustness test, a domestic version of the FCI, domFCI, is constructed. This index is plotted along with the extended FCI in Figure 6.5. As shown in the graph, removing external variables from the FCI alters the index significantly, reflecting non-negligible impacts of global financial conditions onto domestic market. For instance, the domestic FCI suggests a sooner and stronger recovery after 2008 crisis but more severe slowdown in 2011. Comparing forecast errors also approves the relevance of foreign financial indicators in the Vietnam FCI since the FCI including external variables outdoes the domestic index in this exercise.

**Figure 6.5 FCI using domestic variables only**



Source: Author's estimates

### 6.3.3. Use of the first static factor only

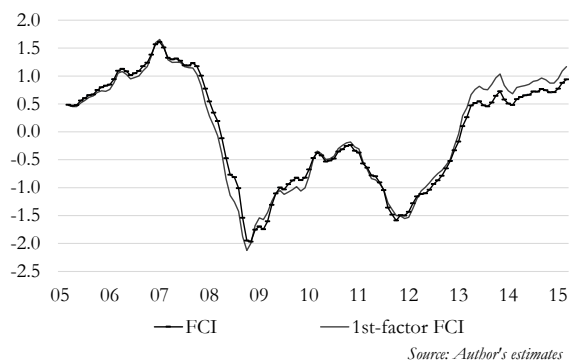
Boivin and Ng (2005) propose using only the first static factor in the GDFM which is the dynamic one since the dynamic factor is computed as the contemporaneous linear combination of financial variables. Take for example,  $s = 1$  and  $q = 1$ , we then have  $r = 2$ . Any

financial variable  $x_{it}$  can be presented as  $x_{it} = c_{i1}F_t + c_{i2}F_{t-1} + \xi_{it}$ . Boivin and Ng suggest that the dynamic factor is  $f_t = F_t$ .

To check if this method of computation changes the final outcomes, the first-factor FCI is calculated by taking into account this proposal, called FCI1. Figure 6.6 displays the FCI1 together with the initial FCI. As shown in the graph, consider only the first factor just brings in minor changes to the FCI. The two series stay close to each other over the whole sample period. The reason lies in the fact that the first factor is responsible on its own for 65% of the total variance (over 83.4% explained by both two factors).

Implementing the same prediction test on this variant of FCI gives, unsurprisingly, almost the same findings as for the initial FCI though the FCI1 appears to be a slightly better predictor in 6-month forecast. In 1-year forecast, there is no clear cut conclusion since each index outperforms the other in one exercise.

**Figure 6.6 FCI using only the first factor**



**Table 6.2 Real activity out-sample forecast errors**

Model	(a) 6-month forecast				(b) 12-month forecast			
	MAE	Relative MAE	RMSE	Relative RMSE	MAE	Relative MAE	RMSE	Relative RMSE
Autoregressive	1.086	1.000	1.262	1.000	1.151	1.000	1.404	1.000
With FCI	0.945	0.870	1.100	0.872	0.938	0.815	1.122	0.799
With unpurged FCI	0.913	0.841	1.069	0.847	0.928	0.806	1.106	0.788
With domestic FCI	1.028	0.947	1.138	0.902	1.019	0.885	1.260	0.897
With 1st-factor FCI	0.948	0.873	1.080	0.856	0.940	0.817	1.113	0.793
With M2	2.150	1.980	2.701	2.140	2.200	1.911	2.950	2.101
With CRED	2.161	1.990	2.711	2.148	2.074	1.802	2.828	2.014
With IRS	2.243	2.066	2.794	2.214	2.381	2.068	2.994	2.132

Source: Author's estimates

**Table 6.2. Real activity out-sample forecast errors (continued)**

Model	(a) 6-month forecast				(b) 12-month forecast			
	MAE	Relative MAE	RMSE	Relative RMSE	MAE	Relative MAE	RMSE	Relative RMSE
Autoregressive	1.086	1.000	1.262	1.000	1.151	1.000	1.404	1.000
With FCI	0.945	0.870	1.100	0.872	0.938	0.815	1.122	0.799
With IBR	2.398	2.209	3.082	2.442	1.920	1.668	2.272	1.618
With ON	2.053	1.891	2.694	2.135	1.861	1.617	2.205	1.571
With PR	2.234	2.058	2.976	2.358	1.947	1.691	2.272	1.618
With RR	2.212	2.037	2.865	2.270	1.905	1.655	2.196	1.564
With HOSE	2.017	1.858	2.471	1.958	1.813	1.575	2.370	1.688
With HNX	1.819	1.675	2.180	1.728	1.676	1.456	2.277	1.622
With CDS	1.836	1.691	2.143	1.698	1.660	1.442	1.941	1.382
With VDEU	2.017	1.858	2.490	1.973	2.004	1.741	2.466	1.756
With VDUD	1.467	1.351	1.848	1.464	1.288	1.119	1.459	1.039
With REER	1.602	1.476	1.916	1.518	1.906	1.656	2.178	1.551
With SP500	1.873	1.725	2.349	1.861	1.742	1.513	2.265	1.613
With TED	1.700	1.566	1.880	1.490	1.783	1.549	2.025	1.442
With VIX	2.013	1.854	2.745	2.175	1.732	1.505	2.460	1.752

Source: Author's estimates



#### 6.4. CONCLUSION

Financial variables in general contain valuable information about future state of the economy. The combination of these variables into a complex indicator, often named Financial Conditions Index, has gained much popularity recently. This has been done for a wide range of countries including a great number of emerging economies.

In this vein, the aim of this chapter is to introduce a financial conditions index for Vietnam, which can be a useful indicator for the central bank's conduct of monetary policy. The innovative technique of the Generalized Dynamic Factor Model (FHLMR 2000 and 2005) is applied on a set of variables comprising both domestic and external ones.

Despite being constrained by limited number of financial variables and time span, the FCI performs well as a leading indicator for economic activity. According to forecasting results, the model with FCI has greater explanatory power of the output gap than the autoregressive model irrespective of the forecast horizon. The robustness checks also give credit to the FCI for its outstanding performance. It is therefore beneficial for the SBV to consider this measure of financial conditions when making short-run policy decisions.

For the period ahead, with financial conditions being improved, the FCI indicates that the Vietnamese economy is gradually expanding, if there is no impactful incidents turn up.

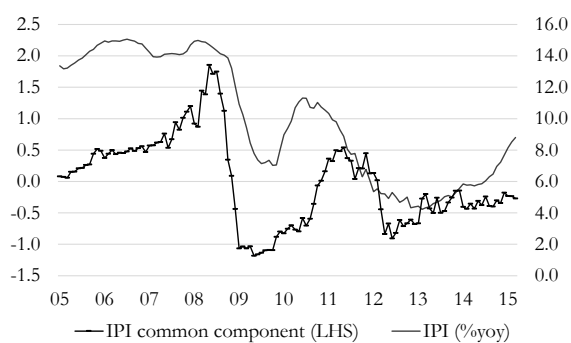
## APPENDIX

**Table 6.3 Variable definition**

Variable	Definition
IBR	Vietnam interbank 3-month offer rate
ON	Vietnam interbank overnight offer rate
PR	SBV discount rate
RR	SBV refinancing rate
CDS	Vietnam 5-year sovereign credit default swap price
HOSE	Ho Chi Minh City stock exchange index changes
HNX	Hanoi stock exchange index changes
VDUD	Nominal USD/VND exchange rate volatility
VDEU	Nominal EUR/VND exchange rate volatility
REER	Vietnam Real effective exchange rate volatility
SP500	Standard & Poor's 500 stock index changes
VIX	Standard & Poor's volatility index
TED	Unites States 3-month LIBOR and Treasury bill market bid yield spread
IPI	Vietnam industrial production year-on-year growth
M2	Money supply growth. First differenced logarithm of real broad money
CRED	Credit supply growth. First differenced logarithm of credit supply
IRS	Deposit and Lending interest rate spread
CPI	Consumer price index (2009=100)

Sources: IMF International Financial Statistics, Macrobond, SBV, GSO, Author's calculation

**Figure 6.7 Industrial production index growth and its common component**



### **Exchange rate volatility computation**

The literature on exchange rate volatility is quite rich that there is no consensus about the most appropriate proxy to represent the volatility. Following Chit et al. (2010), I use a moving window standard-deviation-based method. The procedure to compute the exchange rate volatility is presented below.

Firstly, the monthly nominal exchange rate in level is transformed into first difference of log to have the exchange rate changes. Then the exchange rate volatility for month  $t$  is calculated as the standard deviation of the exchange rate changes over the period of  $[t - 24; t]$ , that means over every two years. The time period to compute the exchange rate volatility for month  $t + 1$  is  $[t - 23; t + 1]$ , and so on until the end of the sample. This method gives us a measure of short-run volatility of exchange rates.

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## ESSAYS ON CENTRAL BANKING IN VIETNAM

**Abstract** Difficulties of the central bank of Vietnam during the last decade in controlling price inflation and securing its inflation goals have launched and nurtured a vigorous debate on whether the current monetary policy strategy, in place since 1992, remains always appropriate. Inspired of this idea, this thesis aims to examine the relevance of the quantitative monetary targeting framework. Furthermore, the thesis recommends some arrangement in order to improve monetary policy efficiency. After an introductory chapter, Chapter 2 propose the state of the art of the economy of Vietnam. Two following chapters investigate the conditions that an effective money targeting strategy requires and whether they are fully satisfied in Vietnam. Indeed, the existence of a stable money demand function in the long run is considered in Chapter 3, and a significant predictive power that money should have on inflation is tested in Chapter 4. It is proved that the money demand function is stable and the hypothesis according to which money growth may forecast future inflation cannot be rejected. The monetary targeting is therefore still relevant for Vietnam. The last two chapters compute and suggest various monetary policy indicators by means of exhaustive evaluation exercises. Different core inflation measures and a composite index of financial conditions are introduced, which are justified to be meaningful for the policy making process of the central bank.

**Key words** Monetary policy, monetary targeting, strategy choice, inflation, indicators, core inflation, financial conditions, forecasting, Vietnam, ARDL, GMM, SVAR, factor model

## ESSAIES SUR LA POLITIQUE MONÉTAIRE DU VIETNAM

**Résumé** Les difficultés rencontrées par la banque centrale du Vietnam dans la dernière décennie, qui se sont traduites par des écarts importants par rapport à l'objectif d'inflation, nourrissent le débat sur l'adéquation subsistante de l'actuelle stratégie de politique monétaire en place dans le pays depuis 1992. Partant de cette idée, cette thèse a pour objectif d'examiner la pertinence du ciblage monétaire quantitatif. De plus, celle-ci recommande quelques aménagements pour améliorer l'efficacité de la politique monétaire. Après un chapitre introductif, Chapitre 2 propose un état des lieux de l'économie du Vietnam. Les deux chapitres suivants enquêtent sur la satisfaction des exigences imposées dans le cadre du ciblage monétaire, à savoir l'existence d'une fonction stable de demande de monnaie à long terme (traitée dans Chapitre 3) et celle d'un pouvoir prédictif significatif sur l'inflation que possède la monnaie (testée dans Chapitre 4). Il s'avère que la fonction de demande de monnaie est stable, et que l'hypothèse selon laquelle l'évolution des agrégats monétaires a un pouvoir prédictif sur l'inflation n'est pas rejetée. Le ciblage monétaire se trouve ainsi toujours approprié pour le pays. Les deux derniers chapitres calculent et suggèrent les indicateurs de politique monétaire à travers des évaluations exhaustives. Il s'agit des mesures de l'inflation structurelle et d'un indice synthétique des conditions financières, qui se révèlent utile pour la prise de décision de la banque centrale.

**Mots-clés** Politique monétaire, ciblage monétaire, choix de stratégie, inflation, indicateurs, inflation structurelle, conditions financières, prévision, Vietnam, ARDL, GMM, SVAR, modèle à facteur