

出國報告(出國類別：其他)

參加 SEACEN 研訓中心 2010/2011 年度
研究計畫「金融危機期間政府政策之相
對有效性」研討會報告書

服務機關：中央銀行

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參加 SEACEN 研訓中心 2010/2011 年度研究計畫

「金融危機期間政府政策之相對有效性」研討會報告書

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附件：本國研究報告英文版-- The Relative Effectiveness of Policy Choices during Financial Crisis in R.O.C. (Taiwan)

參加 SEACEN 研訓中心 2010/2011 年度研究計畫 「金融危機期間政府政策之相對有效性」研討會報告書

一、前言

東南亞中央銀行(The South East Asian Central Banks, SEACEN)研訓中心每年核定當年度之專案研究計畫，以各會員國共同合作之方式進行專案研究，撰寫英文研究報告。每項研究計畫設有一位計畫主持人，並由各國選派代表共同參與研究；各國代表負責撰寫本國研究報告，計畫主持人則負責彙整各國研究報告後，研提完整之研究報告。SEACEN 研訓中心本(2010)年總計核定 5 項專案研究計畫，本研究計畫為其中一項，研究議題為「金融危機期間政府政策之相對有效性」(The Relative Effectiveness of Policy Choices during Financial Crisis)。本研究報告完整內容請詳英文版報告(附件)，本報告書係摘譯英文版報告而成。

本研究專案參與國家計有柬埔寨、印尼、蒙古、尼泊爾、巴布亞新幾內亞、菲律賓、斯里蘭卡及我國等 8 國，共 9 名中央銀行代表參與研究。本研究專案由計畫主持人擬定研究綱要與報告章節架構，並舉行兩次研討會，研討會行程重點如次：

1. 第一次研討會：

- (1) 計畫主持人說明研究計畫之背景、目的、重要議題、研究方法及各國報告綱要。
- (2) 各國代表簡報 1-3 章內容，並由計畫主持人評論。
- (3) 綜合討論報告內容、格式與時程。

2. 第二次研討會：

- (1) 計畫主持人綜合說明各國報告初稿內容。

(2)各國代表簡報 4-6 章內容，並由計畫主持人評論。

(3)綜合討論報告內容，並決定提交報告定稿之時程。

此外，為協助各國研究人員撰寫研究報告及與計畫主持人充分溝通，以有效提升研究報告品質並於期限內完成報告，SEACEN 研訓中心本次提供「研究人員延長停留研究計畫」，各國代表可申請於第二次研討會之前或之後最多 7 日，延長停留該中心撰寫報告。本研究之計畫主持人與 5 國代表均申請於第二次研討會之後延長停留 5-7 日，由於計畫主持人有充裕時間逐一與各國代表進行溝通，各國代表之間亦可充分討論報告內容，本項延長停留計畫確實達到預期效果。

本次參加 SEACEN 研訓中心年度專案研究計畫，實獲益良多，透過各國代表對本國經驗之實際分享，可進一步了解各國面臨金融危機情況與政策因應措施之異同；另由於本計畫舉行兩次研討會，並新設研究人員延長停留研究計畫，使得各國會員相處時間充裕，彼此討論切磋之氣氛更顯融洽。本計畫之綜合報告係由主持人彙整分析各國經驗後撰擬完成，完整呈現東南亞各國情況，極具參考價值。

以下介紹本研究專案之研究背景、架構及時程，並摘要說明本國研究報告(英文版)重點內容。本計畫有關綜合報告部分，預計由計畫領導人於 2011 年 3 月完成，並發布於 SEACEN 網站。

二、研究背景、架構及時程

(一)研究背景

SEACEN 各會員國在本次全球金融危機期間均採行寬鬆之貨幣政策與財政政策，以刺激經濟復甦，惟各國採取措施之重點有所不同。目前全球金融危機已平息，然各國寬鬆貨幣政策與財政政策之相關風險與不確定性，則尚未評估。IMF 指出，各國決策者當前面臨的挑戰為，政

府在挹注流動性(直至經濟穩定復甦且無潛在通膨威脅)以及穩健的財政收支間，應如何取得均衡。因此，決策者應檢視金融危機期間的政策措施，並評估其有效性，進而規畫適時且有序之退場策略。

本研究旨在對東南亞各國在金融危機期間採行之政策措施與退場機制，進行綜合評估，使各國決策者得以分享經驗並交換意見，作為未來決策之參考。

(二)研究架構

本研究報告分為兩部分，第一部分為綜合分析各會員國採取之政策措施及其有效性，由計畫主持人撰擬；第二部分為分析個別會員國採取之政策措施及其有效性，由各國代表撰擬。報告之章節架構如下表：

章 次	重 點 內 容
第一章 前言	概述全球金融危機前之國內經濟情勢，包括貨幣政策、財政政策及經濟基本面
第二章 文獻檢討*	金融危機時期政策選擇之相對有效性與相關議題
第三章 全球金融危機對國內經濟之影響	針對主要經濟金融指標說明其影響
第四章 政策選擇之相對有效性	說明並分析本次金融危機期間採行之政策；比較 1997/1998 危機期間採行政策之效果
第五章 政策選擇相對有效性之實證分析	計量分析
第六章 未來挑戰	退場機制、重要議題與未來展望
第七章 結論	
* 文獻檢討將於第一部分綜合報告完成，第二部分各國報告不含文獻檢討。	

另依據計畫主持人與各國代表之決定，本研究報告各章重要共同格式內容如次：

- 1.第三章全球金融危機對國內經濟之影響：應分三階段探討，第一階段為金融危機之影響，第二階段為全球經濟衰退所造成之影響，第三階段為近來發展；另主要經濟金融指標應包括經濟成長率、失業

率、財政收支、國際收支、匯率、資本流動、市場流動性、股市及產業活動等。

2.第四章政策選擇之相對有效性：除本次金融危機外，另比較其與1997/1998 亞洲金融危機之不同。

3.第五章實證分析：以誤差修正模型(error correction model, ECM)進行實證分析；樣本期間為1990年第1季至2010年第2季，取季資料，無季資料者以年資料取代。模型主要變數包括：GDP、財政收支、貨幣供給額及兩項虛擬變數(本次金融危機與1997/1998 亞洲金融危機)。

(三)研究時程

本研究計畫之重要時程如下表：

2010年 7月21-23日	第一次研討會，各國代表應： 1.簡報各國報告1-3章內容 2.提交實證資料與所有圖表之檔案
9月2日	各國報告1-3章定稿，並提交計畫主持人
10月15日	各國代表提交報告4-6章初稿
11月8日	各國代表提交第二次研討會簡報資料
11月23-25日	第二次研討會，各國代表應： 1.簡報各國報告4-6章內容並提交檔案 2.提交模型估計初步結果及圖表之資料檔案
2011年1月15日	各國代表提交經其部門主管核可之報告全文
3月間	計畫主持人完成整體研究報告

三、本國研究報告摘要

(一)全球金融危機對我國之影響 (詳英文版報告第2章)

本研究分三階段探討全球金融危機對各國之影響，各階段影響摘述如次：

1. 第一階段(2008年第1季至第3季)：經濟成長減緩；失業率上升；

經常帳維持順差；外匯存底充裕；新台幣兌美元匯率由升值轉為貶值；股市下跌且大幅波動；市場流動性持續充裕；國內銀行維持良好之資產品質與資本適足率。

2. 第二階段(2008 年第 4 季至 2009 年第 2 季，因全球經濟衰退造成之影響)：經濟明顯衰退；失業率持續上升；經常帳維持順差；外匯存底充裕；新台幣兌美元匯率維持相對穩定，惟波動幅度較大；股市自低點反彈，波動幅度減緩；金融體系維持穩定。
3. 第三階段(2009 年第 3 季至 2010 年第 2 季)：經濟明顯復甦；失業率改善；物價上升；經常帳維持順差；外匯存底充裕；股市漲跌互見。2010 年 6 月寬鬆貨幣政策退場，央行調升貼放利率 0.125%，並實施「中央銀行對金融機構辦理特定地區購屋貸款業務規定」。

(二) 金融危機期間政府採行之政策¹ (詳英文版報告第 3 章與 Table 3)

1. 貨幣政策

為提振國內需求，並充分挹注市場流動性，央行重要寬鬆貨幣政策措施如下：

- (1) 調降貼放利率：2008 年 9 月至 2009 年 2 月，央行計七次調降貼放利率，累計降幅達 2.375 個百分點，有助於減輕個人及企業資金成本，增進民間消費與投資意願，促進國內經濟成長。
- (2) 調降存款準備率：自 2008 年 9 月 18 日起，活期性及定期性存款準備率分別調降 1.25 個百分點及 0.75 個百分點，釋出約 2,000 億元資金，可增加銀行貸放動能。
- (3) 採行「擴大附買回操作機制」：2008 年 9 月 25 日央行理監事會決議採行「擴大附買回操作機制」，以充分提供金融機構所需之流動性。其主要內容包括：

¹ 參考 98 年 5 月中央銀行出版之「金融穩定報告」，第 86-90 頁。

- (i)操作對象擴大至所有證券公司及保險公司。
- (ii)操作期間由原 30 天以內，延長為 180 天以內。
- (iii)增加央行定存單(CD)為合格操作標的範圍。
- (iv)除由央行公告操作外，亦得由金融機構向央行申請核准操作。

2.金融穩定措施

為穩定金融體系，強化市場信心，並協助企業及個人取得所需融資，政府亦採行多項金融穩定措施：

- (1)實施暫時性存款全額保障：2008 年 10 月 7 日，政府宣布自 2008 年 11 月 1 日至 2009 年底(後延長至 2010 年底止)。存款人在參加存款保險金融機構之存款受全額保障，保障範圍包括原未納入存款保險之外匯存款、同業存款、同業拆款及 2005 年 6 月 23 日(含)以前發行之金融債券等。本項措施有效發揮穩定金融及強化存款人信心之成效。
- (2)穩定股市重要措施：
 - (i)暫時恢復 150 檔股票平盤以下不得放空、暫停融券及借券賣出、以及縮小股市跌幅限制。
 - (ii)鼓勵企業實施庫藏股或董監事買進自家公司股票。
 - (iii)鼓勵公股金融機構及政府四大基金逢低買進績優股票。
- (3)增加證券市場動能並擴大資本市場規模重要措施：
 - (i)2008 年 11 月 28 日起恢復可於證券市場平盤以上融券及借券賣出，12 月份成交金額因而明顯回升。
 - (ii)2009 年 1 月 5 日進一步恢復 150 檔股票平盤以下可融券及借券賣出，以及取消融券及借券賣出總量限額暫時調降之措施，有效提升市場流動性。
 - (iii)2009 年 4 月 30 日金管會發布「大陸地區投資人來臺從事證券投

資及期貨交易管理辦法」，開放大陸合格境內機構投資者(QDII)投入國內資本市場，可擴大我國資本市場規模，加速國際化與提升競爭力。

(4)協助企業籌集資金重要措施：

- (i)設立「政府協助企業經營資金專案小組」，協助解決中小企業及大型企業之融資問題。
- (ii)銀行公會訂定「自律性債權債務協商及制約機制」，對營運及繳息正常之企業，2009 年底前到期貸款本金得展延 6 個月；另訂定「銀行業配合政府振興經濟處理股票質借暫行補充原則」，放寬股票融通條件，以避免股市下跌造成企業股票質押擔保品受到強制處分。
- (iii)持續推動「本國銀行加強辦理中小企業放款方案」，預期 2008 年 7 月至 2009 年底，本國銀行對中小企業放款可望增加 3,000 億元。
- (iv)訂定「金融機構辦理振興經濟非中小企業專案貸款暨信用保證要點」，提供 6,000 億元協助非中小企業取得營運資金。
- (v)中小企業信用保證基金放寬送保企業之營授比率、負債比率相關限制並降低保證手續費率。
- (vi)為落實政府「因應景氣振興經濟方案」，訂定相關擴大保證措施：提高保證成數、提高保證融資總額度上限、擴大綜合額度，以及協助中小企業參與公共建設及增加國內投資，額外增加信用保證額度等。

(5)協助個人取得貸款重要措施：

- (i)2008 年 9 月辦理「增撥新台幣二千億元優惠購屋專案貸款」，提高每戶貸款額度及政府補貼利率，並於 2009 年 4 月持續辦理，

二次專案貸款總額度四千億元。

- (ii) 行政院優惠房貸貸款戶得個案申請延長貸款年限或本金展延，
銀行公會亦發布非自願性失業勞工之住宅房貸本金緩繳措施。

3.財政政策

為促進國內需求，維持國內經濟成長動能，我國亦採取擴張性財政政策如下：

- (1) 擴大公共建設：推動 4 年總經費 5,000 億元「振興經濟擴大公共建設投資計畫」，預估可使 2009 年實質 GDP 規模提高 0.68%。
- (2) 促進消費：2009 年 1 月每人發放 3,600 元消費券，總計約 8 百餘億元，以有效刺激消費，提振景氣。
- (3) 調降遺贈稅：自 2009 年 1 月 23 日起，遺贈稅最高稅率由 50% 大幅調降為 10%，以吸引資金回流，活絡國內市場。
- (4) 促進就業：實施「2008-2009 年短期促進就業措施」，預計 2008 與 2009 年可分別提供約 4.6 萬與 5.6 萬個就業機會；另「2009-2012 年促進就業方案」，預期 2009-2012 年每年可增加約 5 萬就業人數，將可有效降低失業率。

(三) 實證分析 (詳英文版報告第 4 章)

1. 模型設定與變數說明

本研究欲探討貨幣政策與財政政策是否影響經濟成長，設定基本模型如下：

$$Y_t = f(MP_t, FP_t) \dots \dots \dots (1)$$

(1) 式之線性關係可表達如下：

$$Y_t = C_0 + b_1 MP_t + b_2 FP_t + e_t \dots \dots \dots (2)$$

(1)、(2)式中，Y 代表衡量經濟活動之指標，MP 與 FP 分別代表衡量貨幣政策與財政政策之指標；e 為誤差項。本文選取實質 GDP 成長率(RY_GR)、實質 M2 成長率(RM2_GR)以及實質主要財政收支²(real primary balance, RPB)，作為 Y、MP 與 FP 之替代變數³。樣本期間為 1990 年第 1 季至 2010 年第 2 季。

另本文針對 1997/98 亞洲金融危機與本次金融危機造成經濟衰退之影響，分別建立 D1 與 D2 兩項虛擬變數，其中 1998 年第 1 季至第 4 季之 D1 為 1，2007 年第 4 季至 2009 年第 1 季之 D2 為 1，其餘為 0。

2.實證結果

本研究統一使用 ECM 之計量方法。依照 Engle and Granger (1987) 之方法，首先對各變數進行單根檢定，以判定各變數之整合級次(order of integration)；本文採用 ADF 單根檢定 (augmented Dickey-Fuller unit root test)。若各變數具同階整合級次，接下來將對各變數進行共整合檢定。

共整合常被詮釋為「經濟變數間具有長期均衡關係」的現象。非定態(non-stationary)變數具有共整合關係時，隱含了這些變數長期而言具有往「均衡方向調整」的特性，亦即，短期間變數可能有偏離長期均衡或失衡現象，但此種短期偏離長期均衡的現象應會逐漸縮小。此種造成偏離長期均衡得以逐漸縮小的機制，就是「誤差修正機能」(Error Correction Mechanism)。

2.1 單根檢定 (Unit root test)

ADF單根檢定結果顯示，RY_GR、RM2_GR以及RPB均為I(1)非定態時間序列(即具有單根)，須以差分方式處理；經取一階差分後，3項變數均為定態時間序列。(英文版報告Table 11)

² 主要財政收支係指，不含債務舉借與以前年度歲計賸餘移用之「歲入」，減去不含債務償還之「歲出」。

³ 本文經嘗試各種不同的變動組合，其中以實質 GDP 成長率、實質 M2 成長率以及實質主要財政收支組合之迴歸結果最佳。

2.2 共整合檢定 (Co-integration test)

由於各變數均為 I(1)，本節進行共整合檢定，以尋找各變數長期均衡關係。檢定結果顯示，在 5% 顯著水準下，變數間存在 1 組共整合向量，故可確定 RY_GY 與 RM2_GR、RPB 變數間存在一長期均衡關係。(英文版報告 Table 12)

經過標準化 (normalization) 後，對應最大特徵值(Eigenvalue)的 1 組 RY_GR 長期均衡(共整合)關係如下：

$$RY_GR = 5.311257 + 0.177907 RM2_GR + 3.66189RPB \dots \dots \dots (3)$$

(3)式顯示，實質 M2 成長率與實質 GDP 成長率的長期關係為正向，與理論預期相符；惟實質主要財政收支與實質 GDP 成長率的長期關係為正向，似與擴張財政支出可刺激經濟成長之理論預期不符⁴。這或許意味著，兼顧財政收入的健全財政政策，方有利於經濟成長。

2.3 ECM 估計

依據 Granger 表現定理(Granger Representation Theorem)之涵義，對任一組具共整合關係的 I(1)變數而言，可轉換成以誤差修正模型的方式呈現。依據 ECM，若前期發生失衡現象時，部分失衡會在當期予以修正，而誤差修正項係數可視為變數間在前期偏離均衡的程度(或者，誤差修正項係數代表均衡誤差對內生變數調整的修正百分比)；因此，誤差修正項係數應為負，變數之短期失衡現象才會逐漸縮小。

依據前述一組 I(1)變數間存在共整合關係之結果，本節建立一個誤差修正模型。ECM 估計結果顯示，誤差修正項的係數值為-0.725680，表示在本文設定的模型下，透過貨幣政策與財政政策的調整，體系會逐漸趨向長期均衡，而其在 1 季內調整至長期均衡的速度為 72%。(英文版報告

⁴ 當政府採取擴張財政政策，主要財政收支為下降，因此，若擴張財政政策有助於刺激經濟成長，則主要財政收支與經濟成長之關係應為負向。

Table 13 第 2 欄)

(四) 現況與未來挑戰

在全球景氣持續復甦與亞洲新興國家等主要貿易夥伴需求升溫之影響下，2009 年第 4 季以來國內經濟活動逐漸轉佳，2010 年第 1、2 季經濟成長率分別高達 13.59% 與 12.86%。

鑑於國內經濟加速復甦，銀行放款與投資持續成長，市場利率漸次走高；益以房地產價格攀升，以及物價上升，中央銀行於 2010 年 6 月調升政策利率，並實施特定地區購屋貸款業務規定，以督促金融機構控制授信風險，並促進金融穩定。此外，行政院於 2010 年 4 月通過「健全房屋市場方案」，本項購屋貸款規定係落實該項方案「不動產貸款風險控管面」之要求；惟健全房屋市場發展，仍有賴各部會相關政策之配合，方能達成政策目標。

近年來我國持續採行穩健之總體經濟政策，惟長久以來，臺灣經濟發展過於依賴國外需求，強調出口動能，在國內需求改善方面相對不足。2010 與 2011 年，政府將積極強化國內經濟成長動能，並改善投資環境；尤其是導引民間資金投資參與公共建設，以解決公共投資所需的龐大資金需求，而民間資金投入服務業，可直接帶動就業效果。

2010 年 9 月 12 日海峽兩岸經濟合作架構協議(Economic Cooperation Framework Agreement, ECFA)正式生效，ECFA 為兩岸經貿關係正常化之重要里程碑，不僅促使臺灣往亞太區域經濟整合邁出大步，也為政府正在積極推動的全球招商提供強大的誘因，更奠定了臺灣未來黃金十年發展的根基；此外，東亞的區域經濟整合已然成形，東南亞國協(ASEAN)與中、日、韓等國組成「東協加一」、「東協加三」，彼此關稅互免。透過 ECFA 簽訂，臺灣將可藉由中國大陸，融入東亞自由貿易區，強化臺灣的出口競爭力。目前政府正同步推動與美、日、星、東協、歐盟等主要貿易伙伴洽簽自由貿易協定(Free

Trade Agreement, FTA)，以利台商分散投資，進行全球布局，避免過度集中依賴大陸市場。

(五) 結論

本次全球金融危機重挫美國與歐洲經濟與金融體系，我國則因金融體系穩健，幸未發生金融中介功能喪失、流動性嚴重短缺以及資本不足之問題；惟我國屬小型開放經濟體，無可避免地，受全球金融危機引發全球經濟衰退之影響，我國經濟於 2009 年面臨嚴重衰退。

為協助維持金融穩定與刺激經濟成長，政府積極採行多項寬鬆貨幣政策、金融穩定政策以及振興經濟景氣措施，有助於促進國內需求回升。

美國引爆全球金融危機前，多數國家中央銀行貨幣政策以維持物價穩定為主，並認為維持物價穩定即可達成經濟與金融穩定。危機發生後，則體認到「僅有物價穩定仍無法確保經濟與金融穩定」，且金融管理除執行「個體審慎政策」(microprudential policy)外，亦應採行「總體審慎政策」(macroprudential policy)；中央銀行除了維持物價穩定，亦必須確保金融穩定。國際貨幣基金(IMF)與國際清算銀行(BIS)等國際組織均認為央行有促進金融穩定之職責，央行執行貨幣政策須將信用成長、資產價格訊息列入政策考量。我國央行一向以維持物價穩定為貨幣政策重要職責，我國中央銀行法亦早已將「促進金融穩定」列為重要經營目標，與上述國際金融管理趨勢一致。

附件

**The Relative Effectiveness of Policy Choices
during Financial Crisis**

Country Paper

Republic of China, Taiwan

SEACEN 2010/2011 Research Project

Hue-Heng Tao

2010/12/15

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The Relative Effectiveness of Policy Choices during Financial Crisis in R.O.C. (Taiwan)

By

Hue-Heng Tao*

1. Introduction

The current global financial crisis emanated from the subprime mortgage crisis erupted in the US in mid 2007. It extended into 2008 and in September entered a new phase of disorder following the bankruptcy of Lehman Brothers. With globalization prevailing in the financial services industry, the impact of the crisis has spread out from the US to other countries, as well as from the financial sector to the real economy. Furthermore, it resulted in a vicious circle with an adverse feedback loop between the financial system and the real economy.

Country's ability to absorb shocks depends on the strength of its economic fundamentals. Taiwan is an export-oriented economy and foreign trade has played a vital role in the economic development over the past years. The international trade activity has contributed to Taiwan's economy growth for around 60-70% in recent years, showing the importance of international trade in its economic development. Due to resource deficiency, Taiwan has been devoted to promoting the services industry and the information technology (IT) industry for a long time. Currently, the services sector dominates Taiwan's economy, making up nearly 70% of GDP. As a global leader in IT production, the export share of IT products in Taiwan has remained at around 30% in recent years, the highest share among all export categories.

The World Trade Organization (WTO) statistics data indicate that Taiwan was the 17th leading exporter and the 18th leading importer in the world in 2009. Taiwan's export-led growth has left it particularly vulnerable to changes in the international economic system. Taiwan's external trade grew steadily from its vigorous trade relations with Asian nations in 2007, despite a global economic slowdown caused by the subprime mortgage crisis in the U.S. Taiwan's economic growth accelerated to 5.98 percent in 2007 from the 5.44 percent in the previous year. As surging international commodity prices and a typhoon-induced vegetable price hike weighed on inflationary pressure, the CPI rose by 1.80 percent, a moderate level compared with other countries. The unemployment rate was 3.91 percent in 2007, the same as in the previous year and the lowest since 2001.

In 2007, the major driving forces for Taiwan's economic growth were strong exports and a pickup in private investment and consumption. External demand contributed 4.65 percentage points to economic growth. At the end of 2007, although the current account surplus hit a record high to US\$33 billion, it was less than the net outflow on the financial account. The balance of payments thus exhibited a relatively small deficit. The foreign exchange reserves amounted to US\$270.3 billion at the end of 2007, a US\$4.2 billion increase from the end of 2006 and enough to cover 14.8 months of imports. The increase was mainly attributed to a current account surplus, foreign capital inflows and a higher return on investment of foreign exchange reserves.

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Taiwan's primary deficits shrank considerably from 2004, falling to a low of US\$1.40 billion (0.35% of GDP) at the end of 2007. As governments relied on debt issuance to finance debt servicing expenditures, outstanding public debt of central and local governments increased steadily over the past decade and stood at US\$131 billion in 2007, up slightly from US\$128 billion as of the end of 2006. The ratio of outstanding public debt to annual GDP fell back to 33% in 2007, well below the internationally recognized warning level of 60%, mainly due to sustained economic growth. As for the monetary management in 2007, the CBC (Central Bank of the Republic of China (Taiwan)) focused on continuing the gradual pace of policy tightening, absorbing excess liquidity in the banking system, promoting preferential loans, and enhancing the financing mechanism for small and medium-sized enterprises (SMEs). To maintain price stability and promote sustainable economic growth, the CBC utilized the fine-tuning policy to bring down the domestic inflationary risks resulted from the global run-up in energy and raw material prices. The discount rate was raised 8 times during 2006-2007 by a total of 112.5 basis points to the levels of 3.375 percent. (See Table 1a for key indicators measuring vulnerability of economy for external shocks, and table 1b for key indicators on financial institutions soundness.)

In the second half of 2008, the impact of global financial turmoil resulted in downside risks to global economy. Taiwan did not have the toxic asset exposure that the U.S did, but because its economy is closely ties to the U.S economy, it is easily damaged by a global recession. However, as a result of fiscal and monetary stimulus in many countries, the international financial markets are stabilizing and the global economy is recovering gradually since the beginning of 2010. Against the backdrop of a recovering global economy, Taiwan's domestic economic activity has steadily picked up and has expanded strongly by 12.86% in the second quarter of 2010. Furthermore, Taiwan forecasted its GDP growth rate for 2010 at 9.98%. The CBC has gradually removed its quantitative easing policy since the second half of 2009, and the government has been working to facilitate the Plan to Enhance the Soundness of the Housing Market, which was announced in April 2010.

The recovery of the global economy has strengthened in early 2010, but is still at risk from several causes, such as the surging capital inflows in emerging-market economies and volatility in sovereign debt market. However, data so far support the importance of Taiwan's economy power to preserve its stance on the world stage (Table 2).

The remainder of this paper is organized as follows. Section 2 examines the impact of the crisis on Taiwan for three different periods. Section 3 describes policy options available and the rationale for choosing a particular policy mix that was adopted by the monetary authorities and the government. This will cover monetary policy and other macroeconomic policy measures adopted by the authorities. Section 4 examines the relative effectiveness of both monetary and fiscal policies on economic growth by using the Error Correction approach of analyzing economic time series data. Section 5 reviews important issues in formulating timely and sequential exit strategy for policies in place. The conclusion is provided in section 6.

Table 1a
Key Indicators Measuring Vulnerability of Economy for External Shocks

Indicator	1996		2007	
	(In US \$ Billions)	% of GDP	(In US \$ Billions)	% of GDP
GDP (Current) in billion US\$	287.91	--	393.13	--
Exports of Goods and Services	117.65	40.86	246.68	62.75
Foreign Currency Reserves	88.04	30.58	270.31	68.76
Imports of Goods and Services	100.11	34.77	219.25	55.77
Average Monthly Imports	8.34	2.9	18	4.58%
Months of Imports Covered	10.6 months	--	14.8 months	--
Balance on Current Account	10.92	3.79	32.98	8.39
Total Government Debt	70.52	24.49	130.99	33.32%
Foreign Debt	N.A.	--	94.53	24.05
Composition of External Liability	N.A.	--	94.53	24.04
Short term			83.28	21.18
Long term			11.24	28.60
Debt Service Payment (foreign)	N.A.	--	6.71	1.71
Primary Balance(Fiscal Deficit)	-8.73	-3.02%	-1.40	-0.35

Table 1b
Key Indicators on Financial Institutions Soundness

Category	Sub-category	Data (End of 2007)
Bank soundness (domestic banks)	Avg. NPL ratio	1.83%
	Avg. NPL coverage ratio	64.07%
	Avg. capital adequacy ratio	10.80%
	Avg. ratio of Tier I capital to risk-weighted assets	8.50%
	Avg. ROA	0.28%
	Avg. ROE	4.32%
	Loan/deposit ratios	78.70
Bank efficiency	Bank assets as share of GDP	226.45%
	Bank output as share of GDP	5.6%
	Financial services output as share of GDP	9.25%

Source: CBC

Table 2
Real GDP Growth –by Expenditure Components (%)

Year	Economic growth rate	Domestic demand			Net foreign demand	
		Consumption		Gross fixed capital formation	Exports of goods & services	Imports of goods & services
		Private	Gov't			
2005	4.70	2.90	0.19	2.66	7.78	3.16
2006	5.44	1.49	0.71	0.07	11.41	4.57
2007	5.98	2.08	2.09	0.55	9.55	2.98
2008	0.73	-0.57	0.68	-11.17	0.56	-3.12
2009	-1.93	1.08	3.88	-11.01	-8.71	-12.83
2010(f)	9.98	3.43	0.88	23.12	24.35	27.27
2008 Q1	6.88	2.14	1.32	3.60	12.37	9.51
Q2	5.38	0.65	1.68	-9.32	9.12	-0.47
Q3	-0.80	-2.78	-0.54	-14.65	1.87	-2.34
Q4	-7.11	-2.18	0.49	-21.85	-17.93	-17.94
2009 Q1	-8.56	-2.12	4.11	-28.79	-25.53	-32.86
Q2	-7.23	-0.75	3.20	-21.79	-17.20	-18.87
Q3	-1.21	2.01	4.44	-6.09	-8.29	-11.04
Q4	9.24	5.30	3.79	15.49	19.66	16.08
2010 Q1	13.59	3.02	2.91	28.61	39.11	49.32
Q2	12.86	4.32	1.33	31.98	32.89	34.04

Source: Directorate General of Budget, Accounting and Statistics (DGBAS), R.O.C.

2. The Impact of Global Financial Crisis on Taiwan

This section reviews the impact of global financial crisis on Taiwan for three periods: (1) the first round effects of global financial crisis (2008Q1-Q3); (2) the second round effects (due to global recession) (2008Q4-2009Q2); (3) current developments (2009Q3-2010Q2).

2.1 The First Round Effects of Global Financial Crisis (2008Q1-Q3)

2.1.1 Economic Growth Slowed

Taiwan's economy exhibited resilience supported by a sustained current account surplus, ample foreign exchange reserves and strong short-term external debt servicing capacity despite increases in the scale of external debt. The robust export growth helped Taiwan's economic growth reach 5.40% in the first half of 2008. However, as the momentum in export growth waned in the face of the global economic downturn, along with sluggish consumer spending and lackluster private investment, Taiwan's economy turned to a negative growth of -0.8% in the third quarter of 2008 (Table 2, Figure 1).

2.1.2 Unemployment Rate Trended Upward

Taiwan's labor market witnessed an unfavorable trend of rising unemployment rates amid an economic slowdown under the impact of the global financial crisis in 2008. In the first half of the year, employment grew at a healthy pace with steady economic expansion. However, the labor market softened from September, with slower employment growth and increasing unemployment rates. The average unemployment rate for 2008 stood at 4.14 percent, the highest level since 2005 (Figure 2).

2.1.3 Current Account Remained in Surplus, and Foreign Exchange Reserves Stayed Sufficient

For the first three quarters of 2008, the current account showed a surplus of US\$17.43 billion, the financial account exhibited a net outflow of US\$4.74 billion, and the overall balance registered a surplus of US\$13.31 billion, reflecting an increase in the Bank's reserve assets (Figure 3).

For the third quarter of 2008, in terms of the current account, exports and imports reached the second highest and the highest quarterly figures, respectively. Exports grew by 7.7% in value from the same period of the previous year, bolstered by a steady increase in exports to neighboring Asian countries. Imports expanded by 20% year on year due to a substantial increase in imports of crude petroleum and other minerals, as well as iron and steel products. Goods trade recorded a surplus of US\$1.51 billion, a large decrease of US\$6.39 billion, or 80.9%, compared to the same period of the previous year.

The financial account balance tends to be more volatile, because capital flows are sensitive to the changing domestic and global economy as well as market conditions. For the third quarter of 2008, with regard to the financial account, both direct and portfolio investment showed net outflows with respective values of US\$1.19 billion and US\$11.06 billion. Residents' portfolio investment abroad turned into a net inflow of US\$4.17 billion, the first net inflow since the fourth quarter of 1990, as residents liquidated their investment in foreign financial products amid the global financial turmoil. Non-residents' portfolio investment hit the largest quarterly net outflow on record at US\$15.23 billion. This was primarily because foreign institutional investors slashed their holdings of local stocks and government bonds to inject funds into their parent companies or to meet

redemption pressures from fund investors. Other investment exhibited a net inflow of US\$5.74 billion, as the private sector withdrew overseas deposits and the banking sector brought in funds from their overseas branches.

External debt reached US\$107.5 billion at the end of September 2008, fueled by a significant rise in private short-term debts that mainly emanated from increased deposits of overseas correspondent banks and foreigners. Meanwhile, the ratio of external debt to annual GDP stood at 26.78%, still far lower than the internationally recognized warning level of 50%. In addition, external debt as of the end of September 2008 was equivalent to 39.45% of annual exports, higher than the 38.32% registered at the end of 2007. Nevertheless, export revenues were still sufficient to cover external debt, and there was no clear sign of pressure on external debt servicing capacity.

With sizable foreign capital inflows, Taiwan's foreign exchange reserves grew substantially in the first half of 2008 and reached a peak of US\$291.4 billion as of the end of June. The outstanding amount, however, trended generally downward as a result of net foreign capital outflows in the third quarter, and declined to US\$281.1 billion at the end of September, slightly up 4% from the end of 2007. Nevertheless, foreign exchange reserves remained adequate, enough to cover 12.91 months of imports, while the ratio of short-term external debt to foreign exchange reserves registered 33.35% at the end of September 2008. These data indicated that Taiwan's foreign exchange reserves have a strong capacity to meet payment obligations for imports and to service short-term external debt (Figure 4).

2.1.4 The NT Dollar Exchange Rate Reversed from Appreciation to Depreciation

The NT dollar exchange rate is in principle determined by market forces. Nevertheless, excess volatility and disorderly movements in exchange rates have adverse implications for economic and financial stability. Hence, when seasonal or irregular factors (such as massive flows of short-term capital) cause the NT dollar exchange rate to become more volatile than can be explained by economic fundamentals, the CBC will step in to maintain an orderly market.

After the dramatic appreciation in the first quarter of 2008, the NT dollar exchange rate generally moved in a narrow range between 30 and 31 against the US dollar in the second quarter, but then depreciated to 32.13 at the end of September, a 5.53% drop compared to the end of June, or a rise of 0.97% compared to the end of 2007. The NT dollar exchange rate turned into depreciation due mainly to continued foreign capital outflows from the Taiwan stock market and the rebound of the US dollar caused by sizable international capital inflows into the US to address a worsening financial crisis. The depreciation of the NT dollar has not only alleviated the pressure of foreign exchange losses faced by financial institutions, but has also helped to enhance the competitiveness of export industries (Figure 4).

2.1.5 Stock Prices Fell and Fluctuated Sharply

Motivated by the developments of cross-strait economic and trade issues after the presidential election in March 2008, the Taiwan Stock Exchange Weighted Index (TAIEX) of the Taiwan Stock Exchange (TWSE) market trended upward and reached a high of 9,295 in mid-May 2008. Afterward, affected by the global stock market crash, poor performance in the domestic economy, and massive sell-off from foreign investors, the TAIEX slumped to a low of 4,090 in the second half of 2008. Compared to major stock markets around the world, Taiwan was one of the hardest-hit markets, but the fall in its

stock price index in 2008 was smaller than those in Hong Kong, Singapore, Thailand and Shanghai. The TAIEX stood at 5,719 at the end of September, down 38.47% compared to its highest closing level in 2008 (Figure 5).

2.1.6 Market Liquidity Continued to Remain Ample

Against the backdrop of weak demand for funds, liquidity in the financial system continued to remain ample and reserve money grew at a modest pace. With respect to monetary aggregates, the daily average of M2 grew by 2.67 percent in 2008, a slower pace than the 4.25 percent of the preceding year, mainly reflecting net capital outflows and the sluggish growth in bank loans and investments. However, the growth rate of M2 still fell within the target zone of 2%-6% set by the CBC (Figure 6).

2.1.7 Domestic Banks Maintained Satisfactory Asset Quality and Adequate Capital Level

Domestic banks were subject to declining profitability in the first half of 2008, while asset quality continued to be improved. The average capital adequacy ratio rose slightly, whereas only a few banks had ratios below the statutory minimum. Average external credit ratings of domestic banks increased slightly on the whole. Domestic banks held ample liquidity, except for a few banks faced with a temporary problem of insufficient liquidity in the second half of 2008. However, the liquidity tensions in these banks eased afterwards.

Domestic bank credit exposures at the end of June 2008 remained concentrated in the real estate market as well as the electronics and electrical machinery manufacturing sectors. Credit risk appeared to increase as the real estate market turned to a slowdown and the global economy worsened. In respect to market risks, the VaR (value at risk) for equity risk increased as a result of the sharp fluctuations in the stock market in the third quarter of 2008. However, the impact on domestic banks was limited due to relatively small positions. The VaR for interest rate risk and foreign exchange risk once rose owing to the higher volatility in these markets. Nevertheless, both of them declined substantially when the markets gradually stabilized at the end of September 2008, leading to a considerable decrease in total VaR on domestic banks as a whole compared to the end of the previous year.

2.2 The Second Round Effects (2008Q4-2009Q2, due to global recession)

2.2.1 Seriously Contraction of Real GDP and a Higher Unemployment Rate

After the collapse of Lehman Brothers in September 2008, the global financial crisis battered economies worldwide. As heavily relying on external demand, Taiwan's economy has contracted significantly since the second half of 2008. Following the 7.11% negative growth of the fourth quarter of 2008, Taiwan's real GDP still shrank a record 9.06% in the first quarter of 2009, largely due to a sharp fall in export and private investment spending. For 2009, Taiwan's real GDP contracted by 6.85% in the second quarter, better than the first quarter (Table 2, Figure 1).

Taiwan's labor market softened from September 2008, mainly attributable to a weakened economy at home and abroad. Taiwan's unemployment rate in 2009 reached 5.85%, up 1.71 percentage points from 2008 (Figure 2).

2.2.2 Current Account Remained in Surplus; Financial Account Exhibited a Net

Inflow; Foreign Exchange Reserves Stayed Sufficient

For the first half of 2009, the current account showed a surplus of US\$22.59 billion, the financial account exhibited a net inflow of US\$3.88 billion, and the overall balance registered a surplus of US\$24.71 billion, reflecting an increase in the Bank's reserve assets (Figure 3).

Due to the rapid slowdown in the international economy caused by the global financial tsunami, Taiwan's exports have declined for fourteen consecutive months since Sep.2008. The worst situation ended in the last quarter of 2009 with exports amounting to US\$59.8 billion, an increase of 8% compared with the previous 3 quarters of consecutive growth, though it hasn't fallen back to the 2008 level.

For the second quarter of 2009, the overall balance of payments registered a surplus of US\$11.82 billion, reflecting an increase in the CBC's reserve assets. The current account posted a surplus of US\$9.92 billion (an increase by US\$2.87 billion or 41% over the same period last year) and the financial account showed a net inflow of US\$4.65 billion. In terms of the current account, both exports and imports registered a year-on-year decrease, falling by 31.9% and 37.2%, respectively, due to the global recession. However, the decline was smaller than 2008, benefiting from the gradual stabilization of the world economy supported by governments' economic stimulus efforts.

With regard to the financial account, direct and portfolio investment exhibited small net outflows of US\$0.80 billion and US\$1.10 billion, respectively. Residents' portfolio investment abroad registered a net outflow of US\$9.79 billion, mainly attributable to an increase in residents' investment in foreign mutual funds and more bond investment abroad by local insurance companies. Non-residents' portfolio investment turned into a net inflow of US\$8.68 billion after showing net outflows in the past year, induced mainly by foreign capital inflows targeting at domestic stock and bond markets. Other investment exhibited a net inflow of US\$6.03 billion, attributable to the withdrawal of overseas deposits by the private sector.

Taiwan's foreign exchange reserves continued to accumulate and reached US\$317.56 billion in June 2009, indicating that Taiwan's foreign exchange reserves have a strong capacity to meet payment obligations for imports and to service short-term external debts (Figure 4).

2.2.3 The NT Dollar Exchange Rate Remained Relatively Stable Despite Higher Volatility

The NT dollar remained relatively stable despite with higher volatility. After experiencing appreciation for six months, the NT dollar exchange rate against the US dollar turned to depreciation in the second half of 2008 due to the increasing hedging needs for US dollars and continued outward remittance by foreign investors. The NT dollar exchange rate continued to trend downward in early 2009 as the global economy worsened, exports dwindled and demand for US dollars became stronger in the domestic foreign exchange market. However, the NT dollar exchange rate began to pick up after March, led by renewed foreign capital inflows and a weaker US dollar. The NT dollar stood at 32.82 per US dollar at the end of June, 2009. Compared to major currencies, the NT dollar exchange rate was relatively stable (Figure 4).

2.2.4 Profitability and Financial Structure in the Corporate Sector Deteriorated But Began to Show Slight Improvement since the First Quarter of 2009

Against the backdrop of a sharp decline in domestic and foreign economic activities, the profitability of TWSE-listed companies shrank considerably in 2008. The return on equity (ROE) ratio dropped from 18.03% for 2007 to 8.08% for 2008, together with a marked rise in leverage ratios, indicating aggravated financial structures in the corporate sector. In the first quarter of 2009, the profitability of TWSE-listed companies still declined heavily year on year but with a smaller downward movement. Furthermore, there was a slight improvement in financial structures owing to reduced liabilities.

2.2.5 Stock Prices Bottomed Out, while Volatility Moderated after a Sharp Increase

Fueled by a sharp rise in orders for the products of domestic electronic companies and their inventory restocking, the TAIEX stabilized in early 2009. Subsequently, the TAIEX rebounded from March onwards thanks to net foreign capital inflows, a reversal of investment funds back from overseas to local equity markets and a more open policy towards China's investment in Taiwan. The Taiwan stock markets' volatility increased dramatically post July 2008, reflecting a rise in investment risks. The volatility moderated somewhat from early 2009 onwards, but investment risks arising from volatile share prices still remained at a high level (Figure 5).

2.2.6 Financial System Remained Stable

The global financial crisis set off by the US housing bubble burst had severely undermined financial systems in the US and Europe. In contrast, Taiwan's financial system remained relatively stable, financial intermediation functioned normally, and problems such as liquidity shortage and undercapitalization were generally absent.

The non-performing loan (NPL) ratio of domestic banks registered 1.50% in June 2009, reflecting a satisfactory asset quality (Figure 7). Funding remained ample in the banking system and liquidity risks were moderate on the whole. In September 2008, a few private banks temporarily experienced a large number of withdrawals and suffered funding difficulties. However, the liquidity tensions of these banks eased after the CBC's expansion of Repo facility operations and the government's blanket guarantee for deposits of all insured institutions. Amid worsened domestic economic conditions, domestic banks faced heightened credit risks in their credit exposure to the corporate sector, household sector and the real estate market, while their market risk in equity investments also increased notably.

Profitability at domestic banks posted a sharp decline of 55.68% in 2008 from the previous year, while both return on equity and return on assets fell. Bank profitability also contracted by 25% in the second quarter of 2009 on a year-on-year basis. Shrinking interest rate spreads between deposits and loans, coupled with increasing disputes and contracting wealth management business, eroded the profitability of domestic banks and posed considerable challenges to their operations. Domestic banks' capital remained adequate. Except for a few banks and life insurance companies, the majority of financial institutions played their intermediation role effectively on the back of adequate capital levels. Payment and settlement systems operated smoothly with improved efficiency. Reflecting this, the financial system in Taiwan remained stable.

2.3 Current Developments (2009Q3-2010Q2)

2.3.1 Economic Recovery and Improved Employment

The global recovery has picked up pace since the beginning of 2010. International

institutions have revised up their projections of global economic growth for 2010. Still, uncertainty remains as governments try to address challenging issues such as high unemployment and huge fiscal deficits. Economic activity in Taiwan has regained momentum since the fourth quarter of 2009. Exports and capital expenditure have both registered significant growth, largely bolstered by growing demand from emerging Asian economies and other major trade partners. In addition, a moderate increase in private expenditure has been supported by improving labor market conditions. In June 2010, the unemployment rate dipped to 5.16%, down from a high of 6.13% in August 2009. As a result, Taiwan's economy has expanded strongly by 12.86% in the second quarter of 2010 (Table 2, Figure 1 & 2).

2.3.2 A Higher CPI Growth Rate

Rising worldwide demand has pushed up the international prices of raw material, including crude oil, which has subsequently fed into domestic retail prices. Taiwan's annual CPI growth averaged 1.19% for the first six months of 2010 (Figure 1).

2.3.3 Current Account Remained in Surplus; Financial Account Exhibited a Net Inflow; Foreign Exchange Reserves Stayed Sufficient

For the first quarter of 2010, the overall balance of payments registered a surplus of US\$13.40 billion, reflecting an increase in the Bank's reserve assets. The current account posted a surplus of US\$9.93 billion, and the financial account showed a net inflow of US\$2.40 billion.

In terms of the current account, exports rose by 52.8% from the same period of the previous year, bolstered by a recovering world economy in addition to a lower base effect; imports surged by 78.2% year on year, reflecting an increase in imports of agricultural and industrial raw materials and capital equipment to meet export-derived demand. As a result of a greater increase in imports over exports, goods trade exhibited a narrower surplus of US\$6.05 billion, a decrease of US\$3.11 billion from the same period last year.

With regard to the financial account, direct and portfolio investment exhibited small net outflows of US\$0.95 billion and US\$2.63 billion, respectively. Residents' portfolio investment abroad registered a net outflow of US\$5.25 billion, mainly attributable to an increase in residents' investment in foreign mutual funds and more bond investment abroad by local insurance companies. Non-residents' portfolio investment showed a net inflow of US\$2.62 billion, induced primarily by foreign capital inflows targeting domestic stock and government bond markets. Other investment exhibited a net inflow of US\$5.96 billion, largely attributable to the withdrawal of overseas deposits by the private sector.

The foreign exchange reserves amounted to US\$362.38 billion (Figure 4) at the end of June 2010, showing an increase of US\$2.26 billion from the figure recorded at the end of the previous month. The main factor responsible for the increase in foreign exchange reserves in June 2010 was returns from foreign exchange reserves management.

2.3.4 Stock Market Fluctuated

The TAIEX closed the year 2009 up 78.3% from the end of the previous year. All industrial groups performed better for year 2009 than the previous year, with construction and textile industry shares among the strongest. However, the interplay of the brighter global economic situation and the pressure from mainland China's tightening monetary policy and European debt crisis fears have had a fluctuating effect on TAIEX since the

beginning of 2010 (Figure 5).

2.3.5 The CBC's Move in June 2010

2.3.5.1 Raising Interest Rates by 0.125%, Effective from June 25, 2010

Against a backdrop of economic recovery both at home and abroad, the CBC has gradually removed its quantitative easing policy since the second half of 2009. As domestic economic recovery accelerates, bank credit and market interest rates have increased, along with rising property and consumer prices. The CBC decided to raise the discount rate by 0.125% to 1.375% (Figure 8). The CBC believed that the policy rate increase will gradually guide market rates back to normal and support the CBC's efforts to maintain price and financial stability.

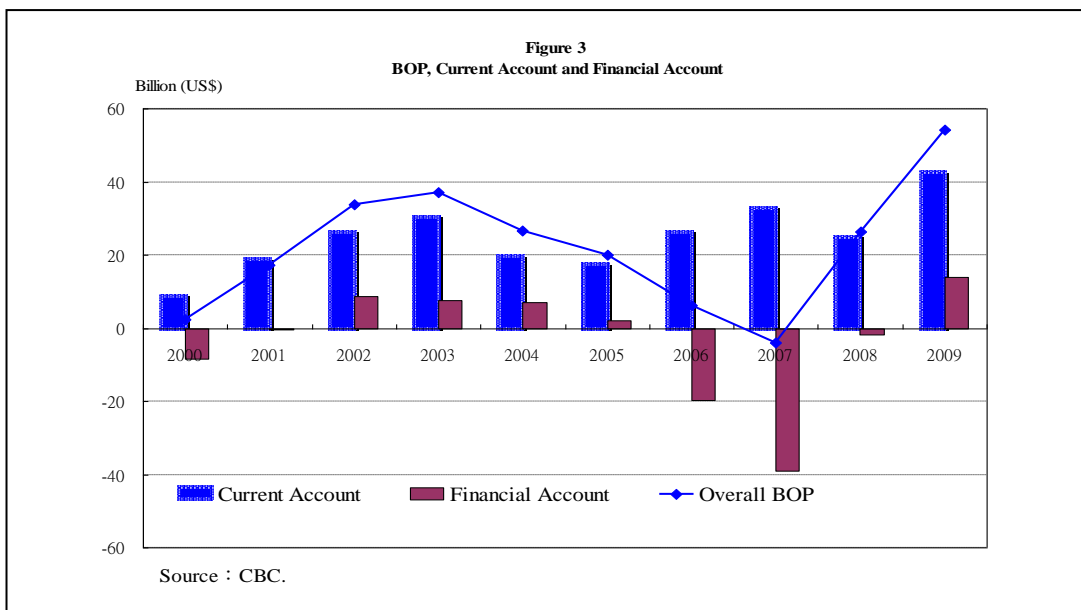
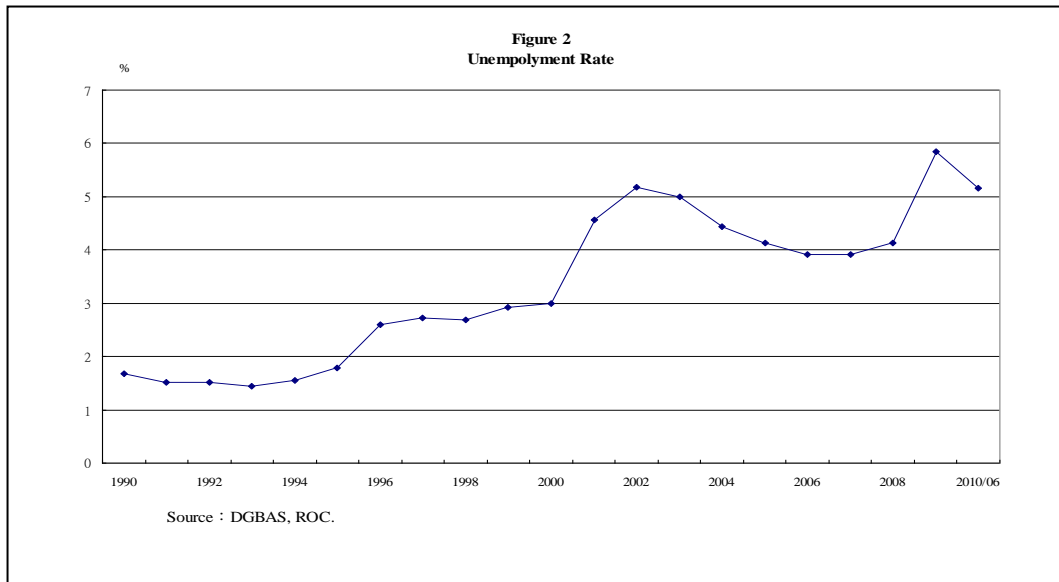
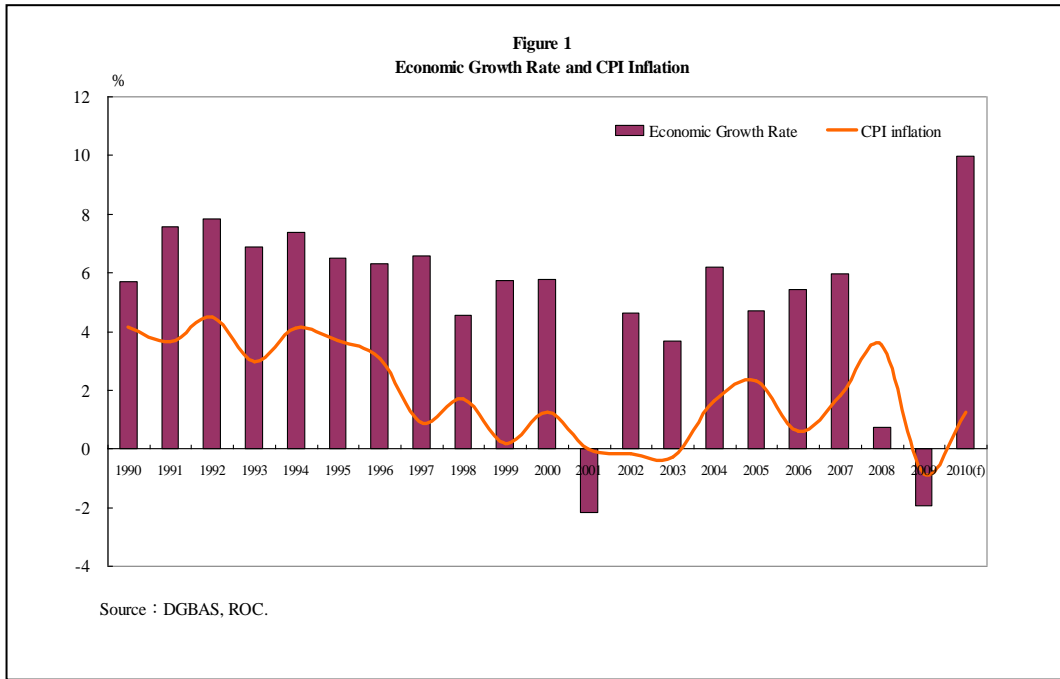
2.3.5.2 Announcing the Regulations Governing the Extension of Housing Loans in Specific Areas by Financial Institutions, Effective from June 25, 2010

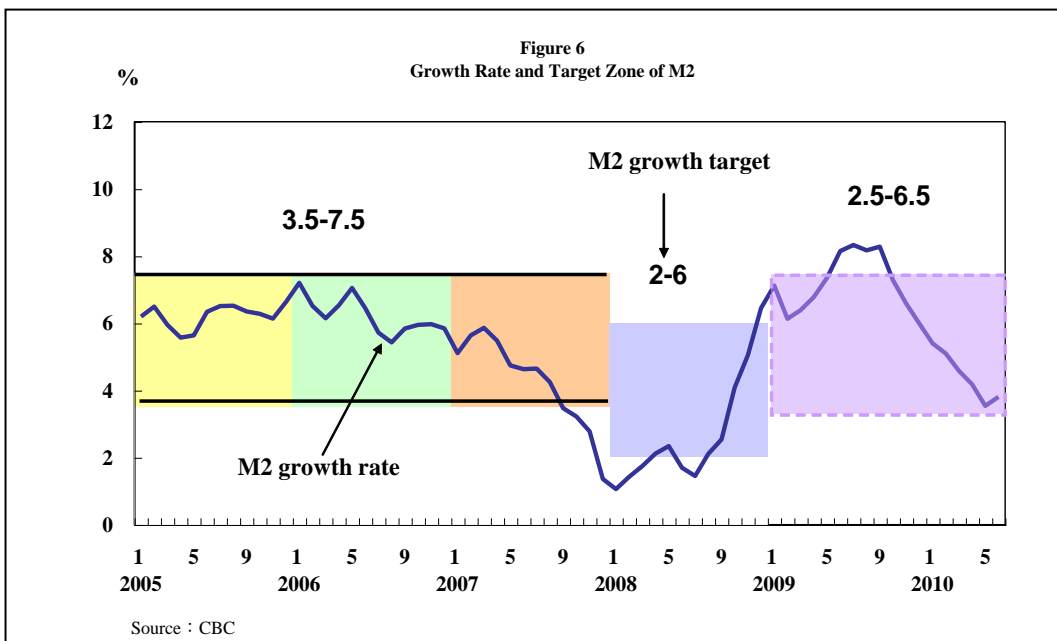
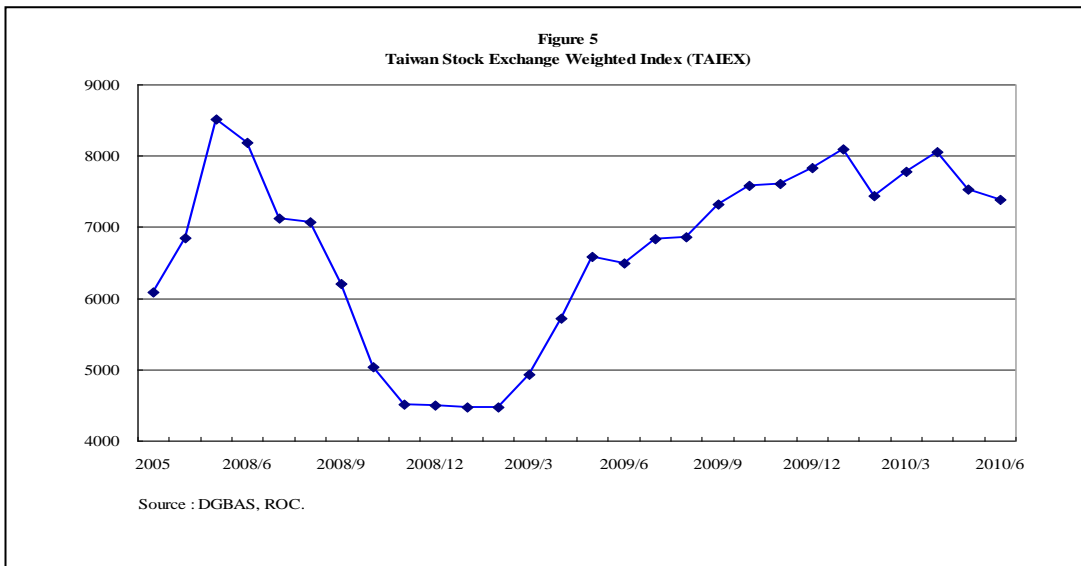
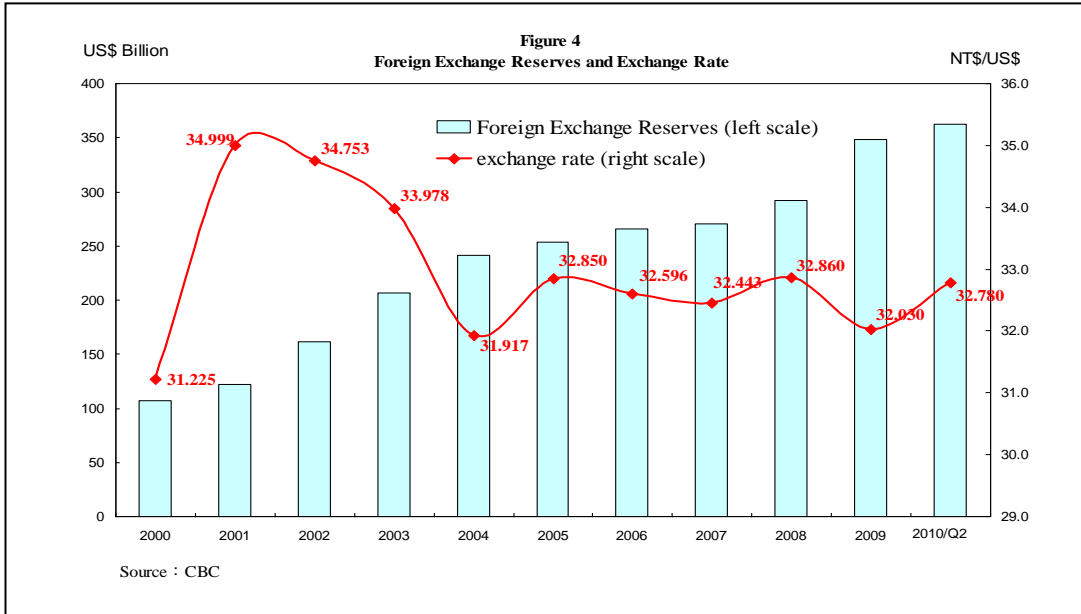
Heightened housing prices and over-concentration of mortgage loans in specific areas in Taiwan have gradually become a source of concern. To address this issue and safeguard financial stability, the CBC has actively adopted a series of targeted prudential measures since October 2009, and the government has been working to facilitate the Plan to Enhance the Soundness of the Housing Market, which was announced in April 2010.

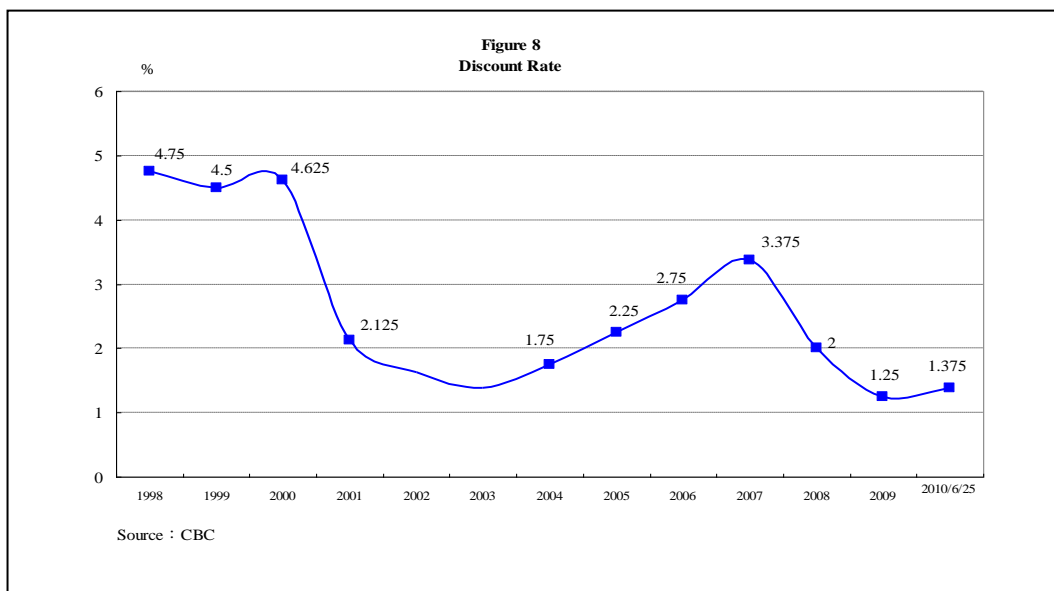
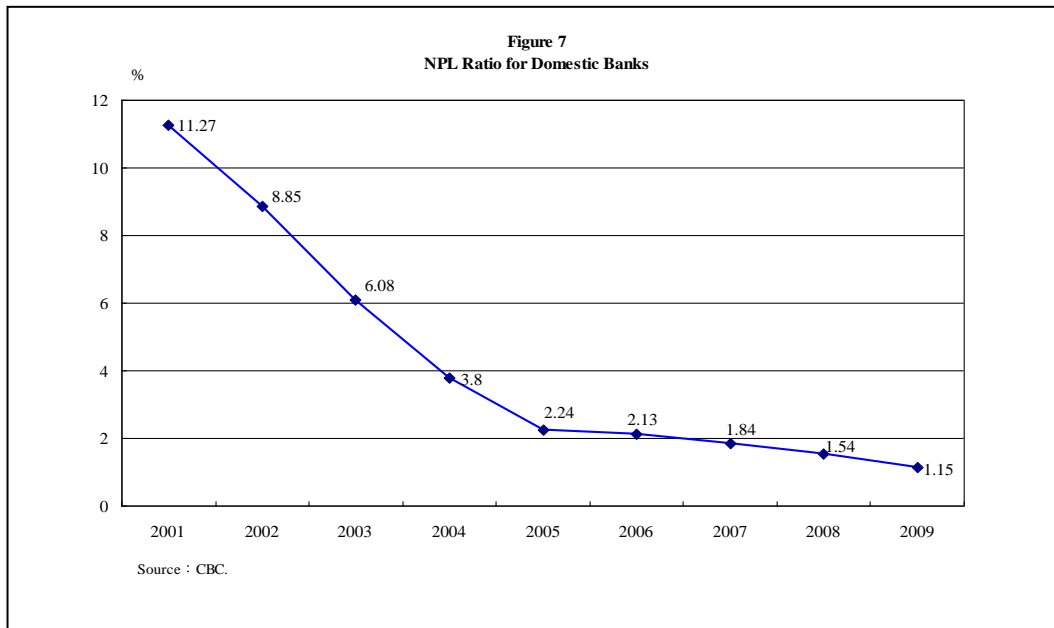
In recent years, the increase in housing prices has been more pronounced in the Taipei metropolitan area, adding to the burden of homebuyers. Moreover, this area has posted higher price-to-income (PTI) ratios and loan-to-income (LTI) ratios than elsewhere in Taiwan. The total value of real estate loans extended by all banks have amounted to 38% of their total lending, a value equivalent to 52% of GDP. Meanwhile, a large portion of newly extended mortgage loans has concentrated in or around Taipei City and 10 other cities in Taipei County. The concentration of lending may undermine the effectiveness of risk management of banks.

To urge financial institutions to better manage credit risk and to promote financial stability, the CBC judges that it is necessary to announce the Regulations Governing the Extension of Housing Loans in Specific Areas by Financial Institutions (hereinafter the Regulations), effective from June 25, 2010. The key points of the Regulations are as follows:

- (1) The Regulations apply to "newly-extended housing loans" in Specific Areas.
- (2) With regard to housing loans extended to borrowers who have taken out other outstanding housing loans, financial institutions shall:
 - approve loans not exceeding 70% of the value of the collateral,
 - remove grace periods, and
 - grant no additional loans against the same collateral for home renovations, as working capital, or for other purposes.







3. The Relative Effectiveness of Policy Choices

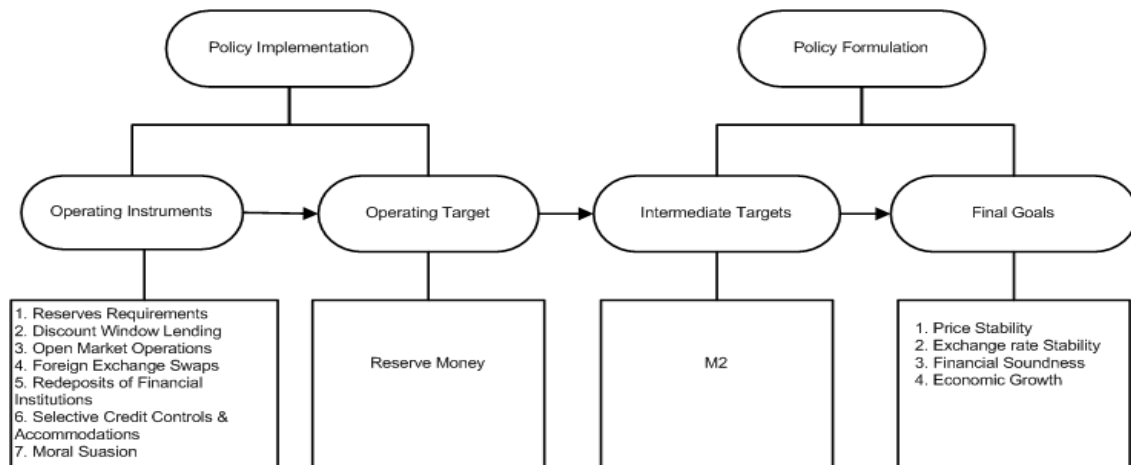
3.1 The Framework of the CBC's Monetary Policy

Monetary policy influences economic activity mainly by affecting the cost and availability of money and credit to those who produce and consume the nation's output. Through a series of financial and economic responses, the effect of monetary policy is transmitted to total output, employment and prices. Basically, the monetary policy affects economy activity through the following channels: (1) interest rate channel; (2) bank credit channel; (3) wealth channel; (4) relative asset price channel; (5) exchange rate channel. In Taiwan, commercial banks play a very important role in financial system because they dominate the channel of funds between lenders and borrowers. Therefore, the bank credit channel is relatively important in the transmission mechanism of monetary policy. However, as direct finance in capital markets becomes more essential for borrowers and investors, the function of bank intermediation will be getting weaker, which implies that the importance of the interest rate channel is expected to increase.

The CBC has the following four final goals: to promote financial stability, to guide sound banking operations, to maintain domestic price and exchange rate stability, and to foster economic development within the scope of the aforementioned objectives. Because changes in monetary policy affect the economy with considerable time lags, the CBC pays close attention to some intermediate targets such as monetary aggregates. In practice, the CBC adopts a monetary policy framework where it periodically checks whether operating targets have been achieved in the short run, and in turn measures intermediate targets to assess how effectively monetary policy is being transmitted to achieve its final goals.

Since mid-1980s, the CBC has adopted a framework of monetary targeting. The CBC chooses a broad monetary aggregate--M2-- to be the intermediate target and reserve money to be the operating target. Since 1992, the CBC has been publishing intermediate targets on a yearly basis. The CBC initially affects reserve money and inter-bank call loan rates with policy instruments, which in turn affect various monetary aggregates, interest rates and other financial and economic variables, and eventually achieves final goals of monetary policy (Chart 1).

Chart 1
Basic Framework of the CBC's Monetary Policy



Source: CBC

3.2 Policy Choices Available during the Crisis

The recent global financial crisis has had an adverse impact on Taiwan's export-oriented economy, in which the government has responded with expansionary monetary and fiscal policies to boost domestic demand. Taiwan's government launched the Economic Vitalization Package in September 2008 and implemented a succession of easy monetary policies, financial stability measures and expansionary fiscal policies in order to increase domestic demand, stabilize the financial system and maintain the momentum of economic growth (Table 3).

Table 3
Policy Measures (2008Q1-2010Q2)

Policy	2008 Q1-Q3	2008 Q4 – 2009Q2	2009Q3—2010Q2
Monetary Policy • Conventional	1.Lowering the discount rate 2.Lowering the required reserve ratios 3. Expanding the Scope of Repo Facility Operations	1.Lowering the discount rate 2.Maintaining Higher Excess Reserves	
Measures to Stabilize the Financial System	1.Coordinating Corporate Financing Support <u>Objectives/Targets:</u> (1)Expected to increase lending to SMEs by NT\$300 billion (July 2008 – Dec. 2009) (2)Providing NT\$600 billion in loans to non-SMEs (until the end of 2010) 2.Assisting Individuals to Get Loans from Banks <u>Objectives/Targets:</u> Providing preferential mortgage loans by NT\$400 billion (Sep. 2008 – Dec. 2009)	1.Adopting an Interim Blanket Deposit Guarantee 2.Initiating Approaches for Stabilizing Stock Markets 3.Increasing Securities Market Momentum and Expanding Capital Market Size 4.Temporarily Adjusting the Risk-based Capital System of the Insurance Industry	1.Extend the Interim Blanket Deposit Guarantee to the end of 2010
Fiscal Policy • Tax Measures • Expenditure Driven	Announcing the Economic Stimulus Package	1.Issuing Consumption Vouchers (NT\$80 billion) <u>Objectives/Targets:</u> Expected to increase real GDP by 0.28-0.43% in 2009. 2.Expanding Investment in Public Works <u>Objectives/Targets:</u> 2009-2012 with a total of NT\$500 billion 3.Lowering the Estate and Gift Tax Rates	
	Promoting Employment-- <u>Objectives/Targets:</u> 1. 2008-2009 Short-Term Employment Promotion Program: providing 46,000 and 56,000 job openings in 2008 and 2009, respectively. 2. 2009-2012 Employment Promotion Program: creating 50,000 employment opportunities per year from 2009 to 2012.		
External Sector • Exchange rate • Other related	Foreign Exchange Management: 1. The NT dollar follows a managed float regime, principally determined by market forces. Nevertheless, when seasonal or irregular factors cause the NT dollar exchange rate to become more volatile than can be explained by economic fundamentals, the CBC will step in to maintain an orderly market. 2. The CBC monitored cross-border capital flows closely and urged foreign investors to deploy their funds in a manner consistent with their declaration statements.		
Financial sector reforms (any proposed reforms are to be implemented)	The CBC and FSC are considering the following issues: 1. Enhancing macro-prudential supervision. 2.Increasing the quality and level of capital requirements for financial institutions. 3. Strengthening risk management in financial institutions. 4. Reforming financial institutions' remuneration systems. 5.Enhancing supervision and infrastructure for securitization and OTC derivatives. 6. Improving the surveillance and transparency of credit rating agencies.		

3.2.1 Monetary Policy Measures

3.2.1.1 Lowering the Discount Rate

The CBC lowered the discount rate by 2.375 percentage points, from 3.625% to 1.25%, in seven cuts from September 2008 to February 2009 (Table 4). Lower interest rates helped to reduce individual and corporate funding costs, encourage private consumption and investment, and stimulate domestic economic growth.

In addition, in order to prompt domestic banks to speedily lower their interest rates in line with the CBC's rate cuts, the CBC, Ministry of Finance and Financial Supervisory Commission (FSC) held meetings twice with primary mortgage banks in November 2008. With the consent of those banks, rate adjustments of mortgage loans and corporate loans could be made monthly instead of quarterly (or semiannually) without additional renewal fees before March 2009.

Table 4 CBC Discount Rate Cuts

Effective date	Change (percentage point)	Discount rate (%)
26 Sept. 2008	-0.125	3.50
9 Oct. 2008	-0.250	3.25
30 Oct. 2008	-0.250	3.00
9 Nov. 2008	-0.250	2.75
11 Dec. 2008	-0.750	2.00
7 Jan. 2009	-0.500	1.50
18 Feb. 2009	-0.250	1.25

Source: CBC

3.2.1.2 Lowering the Required Reserve Ratios

From 18 September 2008 onward, the CBC lowered the required reserve ratios on demand deposits and time deposits by 1.25 and 0.75 percentage points, respectively, releasing around NT\$200 billion of funds with a view to increasing the momentum of bank lending.

3.2.1.3 Expanding the Scope of Repo Facility Operations

To provide financial institutions with sufficient liquidity, the CBC decided to expand the scope of Repo facility operations since 25 September 2008. The following decisions were included:

- (1) Expanding eligible counterparties to securities firms and insurance companies.
- (2) Extending the term of Repo facility operations to within 180 days from 30 days to provide market access to longer-term liquidity.
- (3) Expanding eligible instruments to CDs issued by the CBC.
- (4) Allowing financial institutions, according to their funding demand, to apply for CBC Repo operations approved by the CBC, in addition to the operations announced by the CBC.

3.2.1.4 Maintaining Higher Excess Reserves

The CBC allowed the banking system to maintain higher excess reserves for ensuring

financial conditions stay accommodative enough to meet the demand of economic activities. From the fourth quarter of 2008 to the second quarter of 2009, the average excess reserves in the banking system reached as high as NT\$132 billion, much higher than the normal level of NT\$20 billion.

3.2.1.5 Foreign Exchange Management

The NT dollar follows a managed float regime and its exchange rate is principally determined by market forces. Nevertheless, when seasonal or irregular factors (such as massive flows of "hot money") cause the NT dollar exchange rate to become more volatile than can be explained by economic fundamentals, the CBC will step in to maintain an orderly market. This is consistent with the notion that managed flexible exchange rates absorb external shocks more efficiently for emerging economies with an open capital account, as pointed out by the United Nations Conference on Trade and Development early September in its Trade and Development Report, 2009.

Frequent movements of short-term capital are likely to exacerbate volatility in economic cycles and undermine financial stability. The CBC continues to monitor cross-border capital flows closely and urge foreign investors to deploy their funds in a manner consistent with their declaration statements.

3.2.2 Measures to Stabilize the Financial System

The government also implemented a number of measures to improve market confidence and assist funding needs of individual/corporate, which helped to stabilize the financial system.

3.2.2.1 Adopting an Interim Blanket Deposit Guarantee

On October 7 2008, the government first announced that it would guarantee all deposits in insured financial institutions by their full amount until the end of 2009, and then extended to the end of 2010. Additional deposits to be guaranteed included foreign currency-denominated deposits, inter-bank deposits and lending, and financial bonds issued before or on 23 June 2005. This measure effectively stabilized the market and restored the confidence of depositors.

3.2.2.2 Initiating Approaches for Stabilizing Stock Markets

The impact of global financial turmoil resulted in acute slumps in the local stock markets. In order to stabilize domestic equities prices, the government launched the following measures:

- (1) Temporarily resuming the ban on short-selling 150 listed shares below the previous day's closing price, suspending borrowed and margin stocks from short-selling, and narrowing the percentage fall limits of share prices.
- (2) Encouraging companies to buy back their own stocks as treasury stocks or company directors to purchase their companies' stocks.
- (3) Encouraging state-owned financial institutions and the four government- managed funds to purchase low-priced stocks of well-performing companies.

3.2.2.3 Coordinating Corporate Financing Support

In order to assist corporations to weather the current economic downturn and to tackle their business difficulties, the government introduced the following projects:

- (1) Organizing a Special Task Force on Facilitating Enterprises to Obtain Operational Funds to help SMEs and large corporations find financing support.
- (2) Releasing two self-disciplined mechanisms by the Bankers' Association allowing corporations that face financial difficulties but still operate normally and pay loan interest as scheduled to extend loans by six months if their expiry date is before the end of 2009, and temporarily loosening collateral requirements on margin loans to ease selling pressure from margin calls.
- (3) Extending the settlement period for dishonored checks.
- (4) Implementing the Program to Encourage Lending by Domestic Banks to SMEs, which is expected to increase SMEs' lending by NT\$300 billion from July 2008 to the end of 2009.
- (5) Providing NT\$600 billion in loans to large corporations under the Directions for the Provision of Special Loans and Credit Guarantees to non-SMEs, effective until the end of 2010.
- (6) Loosening the qualification requirements for credit guarantees, lowering guarantee fees and expanding authorized guarantee coverage by the Small and Medium Enterprise Credit Guarantee Fund of Taiwan (Taiwan SMEG), effective until June 2010.

In order to help corporations raise funds from capital markets, the government also implemented several related measures:

- (1) Relaxing the lower limit of offering prices for equity offerings.
- (2) Allowing issuers of convertible bonds which are due before the end of 2009 to set additional conversion price reset provisions or modify terms, such as extending the due date, after reaching the final decision at shareholders' meetings and negotiating with bondholders;
- (3) Allowing companies to issue new corporate bonds to pay off previous bond indentures.
- (4) Allowing public-issuing companies to repay corporate bonds using the residual funds of previous bond issues.

3.2.2.4 Assisting Individuals to Get Loans from Banks

In order to assist individuals to get loans from banks and to reduce the interest cost for homebuyers, the government introduced several measures:

- (1) Providing the preferential mortgage loans in September 2008 and April 2009 with a total of NT\$400 billion.
- (2) Allowing borrowers of preferential mortgage loans to extend the expiration date or defer principal repayment of loans if applicable, and allowing involuntarily unemployed workers to defer principal payments of their mortgage loans.

3.2.2.5 Temporarily Adjusting the Risk-based Capital System of the Insurance Industry

In view of the impact of the global financial crisis and to maintain the function of the risk-based capital system as well as the stability of the domestic insurance market, the FSC promulgated a new regulation in November 2008 to allow insurance companies to raise funds through issuing bonds with a capital nature.

The FSC also amended the risk-based capital system of the insurance industry in October and November 2008, effective until the end of 2009. The main amendments were: (1) the issuance of bonds with a capital nature can be included in eligible capital, and the maximum limit of bonds with a capital nature and preferred stock of a liability type being included in eligible capital was raised; (2) except for the cross investments among insurance companies, the funds invested in bonds with a capital nature or preferred stock of a liability type need not be deducted from eligible capital; (3) the special reserve for major events and part of unrealized gains or losses arising from investments on stocks, exchange-traded funds (ETFs) and mutual funds can be included in eligible capital.

3.2.3 Fiscal Policy Measures

In addition to the monetary policies and financial stability measures mentioned above, there are expansionary fiscal policies to promote domestic demand and maintain the momentum of domestic economic growth.

To safeguard the stability of Taiwan's economic growth by stimulating domestic demand as a means of sustaining economic growth momentum, the government first took the short-term measure of issuing consumption vouchers for an immediate stimulus effect, and followed this with the adoption of a mid-term 4-year project to expand and accelerate the implementation of public works, with the aim of creating a second wave of economic revitalization effect to augment the benefits generated by the consumption voucher scheme.

3.2.3.1 Expanding Investment in Public Works

On November 20 2009, the government announced a four year (2009-2012) project of Expanding Investment in Public Works to Revitalize the Economy with a total of NT\$500 billion. Its objectives are to: (1) create a comprehensive and rapid transit network; (2) create a safe and disaster-free environment; (3) improve the quality of the cultural and living environment; (4) strengthen infrastructure to enhance national competitiveness; (5) improve transportation facilities on outlying islands; and (6) foster education and employment. This project is expected to increase real GDP by 0.68 percentage points in 2009 and create 19,000-22,000 job opportunities.

3.2.3.2 Issuing Consumption Vouchers

The government issued consumption vouchers valued at NT\$3,600 per person starting from 18 January 2009, totaling around NT\$ 80 billion, to effectively stimulate private consumption and boost the domestic economy. This project is expected to increase real GDP by 0.28-0.43 percentage points in 2009. The consumption vouchers scheme had a marked effect in stimulating private consumption, particularly during the Chinese Lunar New Year holidays.

3.2.3.3 Lowering the Estate and Gift Tax Rates

The ceiling of the estate and gift tax rates was both lowered from 50% to 10%, and the tax-exempt thresholds was raised to NT\$12 million and NT\$2.2 million, respectively, effective from 23 January, 2009. They are expected to attract capital remitted abroad to flow back and revitalize domestic markets.

3.2.3.4 Promoting Employment

The government was alert early on to the threat of an unemployment crisis stemming

from the economic slump, and took countermeasures in advance. In October and November 2008, the government introduced the following employment promotion policies (Chart 2):

- (1) The 2008-2009 Short-Term Employment Promotion Program: It aims to provide approximately 46,000 and 56,000 job openings in 2008 and 2009, respectively.
- (2) The 2009-2012 Employment Promotion Program: It is expected to add 50,000 employment opportunities per year from 2009 to 2012, and effectively reduce the unemployment rate.

Chart 2
Employment Resource Map



Source: The Council For Economic Planning And Development (CEPD), R.O.C.

3.2.4 Financial Sector Reforms

From the beginning of 2009, advanced countries and international organizations successively proposed a number of plans or recommendations on financial reform in hopes of preventing future financial crises. These include:

- (1) The *Turner Review* and the white paper on *reforming financial markets* in the UK.
- (2) A comprehensive plan for financial regulatory reform and related draft legislation proposed by the US.
- (3) Initiatives or resolutions relating to financial regulatory reform made by the G20 and the European Union (EU) summit members.
- (4) A series of proposals to enhance the Basel II framework and strengthen the liquidity risk monitoring framework announced by the Basel Committee on Banking

Supervision (BCBS).

(5) Policy recommendations issued by the IMF.

In view of these international proposals for financial reform, current financial regulation in Taiwan has, in some areas, made significant progress, such as:

- (1) All systemically important financial institutions are covered by current financial regulation.
- (2) A well-established deposit insurance scheme and resolution mechanisms for impaired financial institutions have been put in place.
- (3) Regulators have actively engaged in the improvement of consumer financial education and protection; an exclusive chapter for coping with consumer disputes involving financial services is included in a draft of the Financial Service Act.
- (4) Significant progress has already been made in facilitating anti-money laundering work. For example, anti-terrorism is governed by the Money Laundering Control Act, which was amended in 2009; the required amount of large cash transactions that should be reported by financial institutions has been lowered from NT\$1,000,000 to NT\$500,000.

In terms of the international cooperation of financial supervision, considering the internationalization with respect to either financial institutions or financial markets in Taiwan is not as developed as that of the US or European countries, the authorities can actively seek opportunities for participation in international cooperation of cross-border supervision.

With regard to other key issues and recommendations, the CBC and FSC have deliberated on some of them and are considering the feasibility and alternatives in Taiwan, such as:

- (1) enhancing macro-prudential supervision.
- (2) increasing the quality and level of capital requirements for financial institutions.
- (3) strengthening risk management in financial institutions.
- (4) reforming financial institutions' remuneration systems.
- (5) enhancing supervision and infrastructure for securitization and OTC derivatives.
- (6) improving the surveillance and transparency of credit rating agencies.

3.3 Analysis of Policy Responses

3.3.1 Use of Communication Effectively in Crisis Situation

The usual communication channels for the CBC are as follows:

(1) Moral suasion:

The CBC urges banks to fulfill their intermediary function by meeting the funding demand of well-managed enterprises and households.

(2) Press release.

(3) Publishing Financial Stability Report:

To promote the sound operation of financial institutions and safeguard financial stability, the Bank has established a financial stability evaluation framework. In 2008, the Bank began publishing Financial Stability Report and launched a study project to develop an approach to stress-testing Taiwan's financial system.

3.3.2 Monetary Policy Responses

3.3.2.1 The Impact of Crisis on Recession: 1997/98 Crisis v.s. Current Crisis

The economic performance in the 1997/1998 East Asian Financial Crisis period was relatively healthy and favorable. This may be related to the better domestic real economy, continued surplus in the current account, low external debt, high foreign exchange reserves, rapid reaction of firms, and orderly opening of the capital account.

The spread of the global financial crisis in the second half of 2008 simply resulted in relatively limited loss for domestic banks, due to less globalization and less investment in complicated new financial products of domestic banks. However, it had serious adverse impact on Taiwan's export-oriented economy.

Table 5 and Figure 9-1 to 9-5 offer some descriptive statistics on selected indicators for 1997/98 crisis and current crisis, including recession, credit growth, inflation rate, stock market index, and policy rate. Obviously, current crisis had much more serious impact on Taiwan's economy.

Table 5

Comparison Between 1997 and 2008 Crisis

--Descriptive Statistics on Selected Indicators

Indicators	1997/98 Crisis	Current Crisis
1. Recessions (Real GDP Growth Rate) (Figure 9-1)		
duration	4Q	6Q
amplitude	3.6%	16.14%
slop	10.44%	40.68%
cumulative losses	0.9%	2.69%
2. Credit Growth (M2 Growth Rate) (Figure 9-2)		
duration	2Q	3Q
amplitude	3.53%	4.5%
slop	1.765%	1.5%
cumulative losses	5.22%	8.12%
3. Inflation (CPI Growth Rate) (Figure 9-3)		
duration	2Q	4Q
amplitude	2.96%	6.95%
slop	1.48%	1.74%
cumulative losses	5.55%	17.64%
4. Stock Market Index (Figure 9-4)		
duration	4Q	5Q
amplitude	2299	4573
slop	575	915
cumulative losses	8023	9716
5. Policy Rate (Discount Rate) (Figure 9-5)		
duration	3Q	3Q
amplitude	0.75%	2.375%
slop	0.25%	0.79%
cumulative losses	1.375%	4.125%

Figure 9-1 GDP Growth Rate

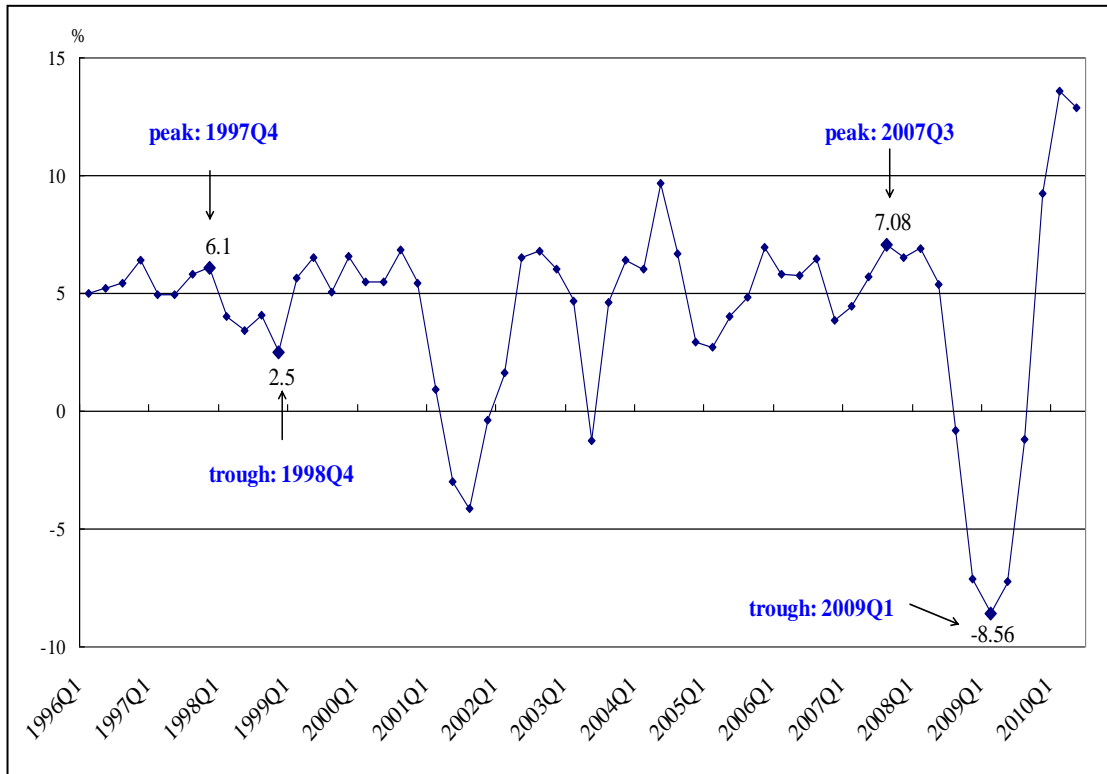


Figure 9-2 M2 Growth Rate

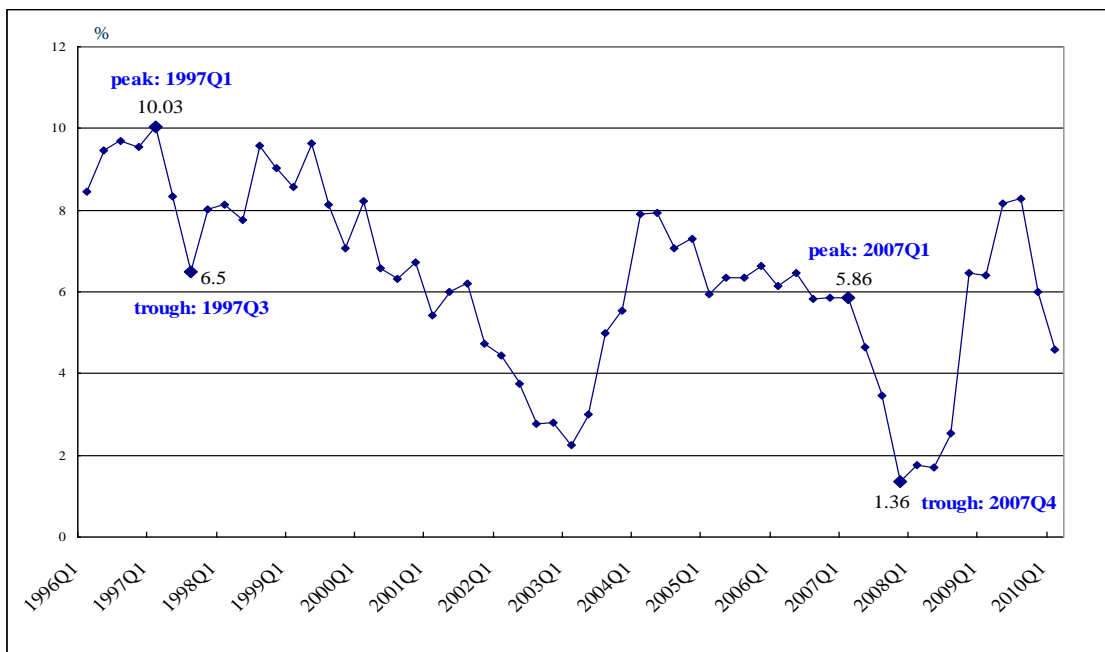


Figure 9-3 CPI Growth Rate

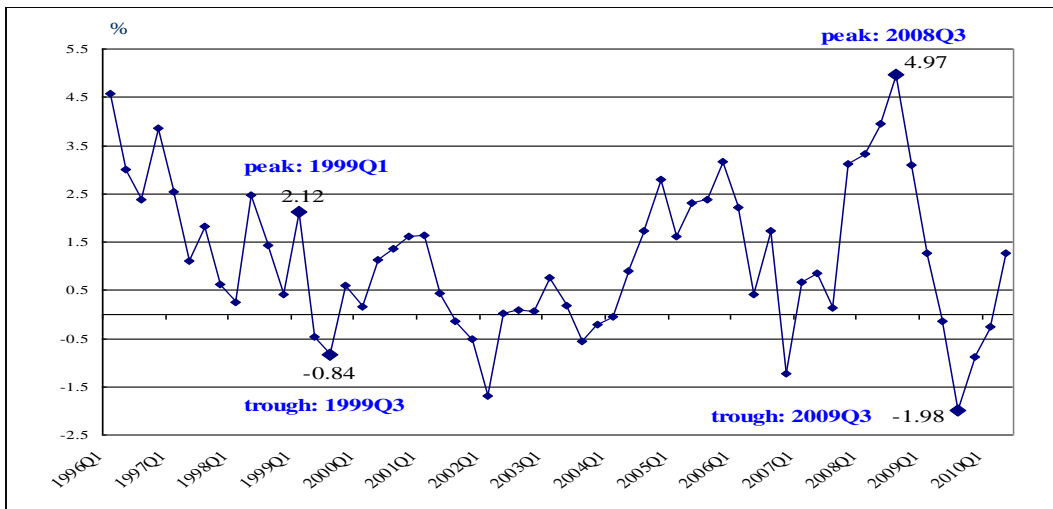


Figure 9-4 Stock Market Index

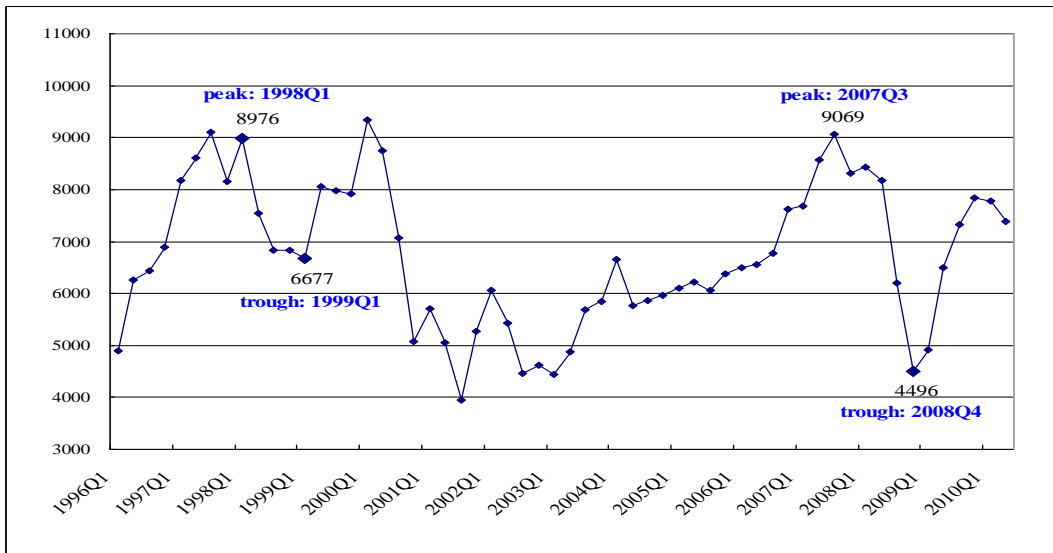
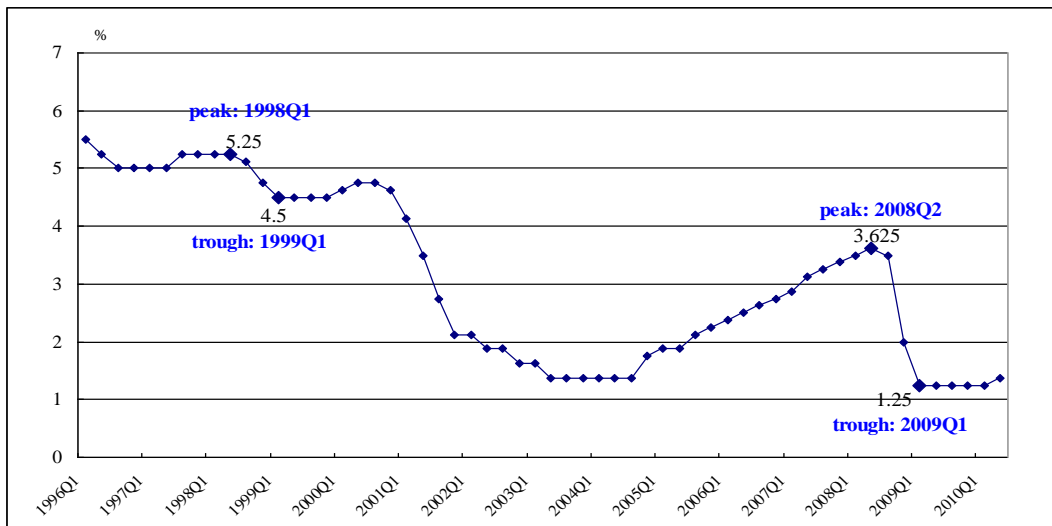


Figure 9-5 Policy Rate



3.3.2.2 Monetary Policy Management Reaction to 1997/98 Crisis⁵

During the 1997/98 crisis periods, large capital outflows from Asia exerted a downward pressure on the NT dollar, tightened Taiwan's financial conditions, and threatened the stability of the economy. The CBC took the following response measures:

(1) Reducing Depreciation Expectations of the NT Dollar

The CBC stepped in the foreign exchange market from July to October in 1997 to curb depreciation expectations of the NT dollar. As a result of heavy intervention, foreign exchange reserves fell by US\$7 billion within four months. At the same time, monetary conditions tightened, interest rates went up and stock prices fell sharply.

(2) Alleviating the Volatility in the Money Market and Conducting a Flexible Exchange Rate Policy

As the Asian financial crisis showed no signs of abating, the CBC decided to change its policy approach in order to shield the asset markets and the real economy from the damage caused by the prolonged monetary tightness. In mid-October 1997, the CBC ceased to defend the exchange rate, and at the same time lowered required reserve ratios. The NT dollar consequently exhibited a sharp downward trend from mid-October 1997 onwards and reached a low of 34.4 against the US dollar in mid-January 1998, depreciating by 17% within three months.

Implementing a flexible exchange rate policy in mid-October 1997 was an important turning point to address financial crisis. More importantly, the CBC fended off speculative attacks in the foreign exchange market by prohibiting domestic institutional investors from engaging in non-delivery forward (NDF) transactions to block speculators' access to NT dollar funds in May 1998.

As a result, the downward pressure on the NT dollar was largely relieved, and the exchange rate of the NT dollar fluctuated between 32.0 and 34.9 against the US dollar during the remainder of the crisis period. Monetary conditions have become moderately easy. As Asian currencies rebounded strongly in September 1998, the CBC implemented a more relaxed monetary policy to stimulate domestic demand. The CBC's policy actions include lowering required reserve ratios and the discount rate, appropriating the postal savings redeposits to assist banks in extending mortgage loans to the first-time home buyers and project loans for small and medium-sized enterprises. These measures largely mitigated the negative impact of the Asian financial crisis on Taiwan's economy. The event also demonstrated the close economic ties among East Asian countries and the growing influence of international capital flows on the policies of Asian central banks.

In brief, the CBC reacted to the above-mentioned adverse conditions by removing distortions from the foreign exchange market and adopting an accommodative monetary policy. As a result, Taiwan was largely unscathed by the crisis.

3.3.2.3 Policy Effectiveness: The Interest Rates Pass Through Effect

(1) 1997/98 Crisis: downward rigidity for lending rates

Table 6 and Figure 10 indicate that the lending rate (i.e. banks' prime rate) exhibited

⁵ See Chun-Nan Liao (2010).

downward rigidity and interest rate pass through effect did not exist in financial market. Although the CBC cut the discount rate for a total of 0.75 percentage points from September 1998 to February 2000, the lending rate was just lowered by 0.253 percentage points⁶. This downward rigidity of lending rate had hampered the transmission mechanism of monetary policy.

To dress this issue, from the beginning of 2002, the CBC introduced a number of measures to facilitate the role played by the banking sector in the monetary transmission process, such as:

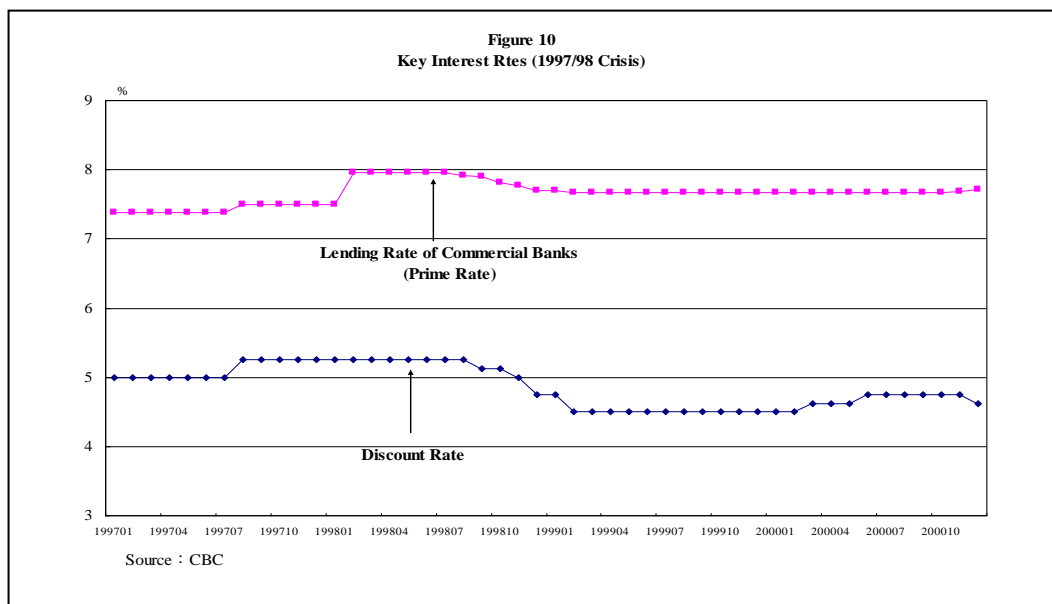
(1) Urging banks to adopt the new flexible prime rate benchmark scheme (base lending rates) so that lending rates could reflect the funding conditions of the market more efficiently.

(2) Encouraging banks to commence adjustable rate mortgages.

After working closely among the CBC and financial institutions to reform the pricing system of lending rates, new pricing system has improved transparency, introduced flexibility, and been based on actual market conditions, which help improve the effectiveness of monetary policy.

Table 6
Reduction of Key Interest Rates (1997/98 Crisis)

Interest Rate Date	Discount Rate	Average Lending Rate of Commercial Banks
1998.09(1)	5.25%	7.920%
2000.02(2)	4.50%	7.667%
(1)-(2)	0.75%	0.253%



⁶ From December 2000 to June 2003, the CBC cut the discount rate 15 times for a total of 3.375 percentage points, while the lending rate was just lowered by an average of 0.782 percentage points.

(2) Current Crisis: interest rate pass through effect may exist

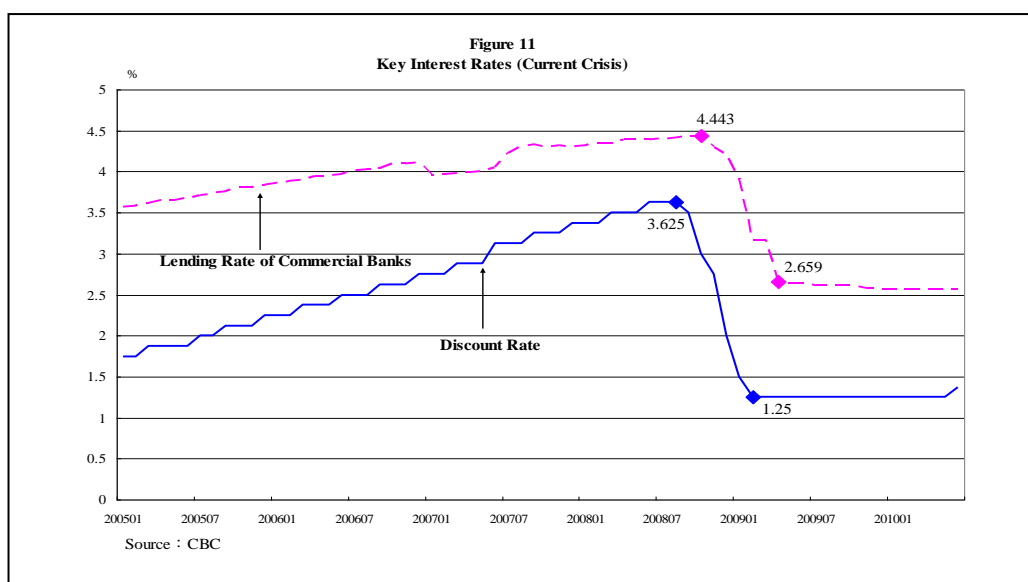
Table 6 and Figure 10 indicate that the short-term market interest rates, affected by the CBC's successive rate cuts and other operations, declined significantly. This implies that the interest rate pass through effect may exist in financial market.

The CBC's actions have helped reduce the funding costs of individuals and enterprises, bolster their demand for bank credit, and encourage banks to extend credit, and are thus expected to boost domestic demand.

Table 7
Reduction of Key Interest Rates (Current Crisis)

Interest Rate	Discount Rate	Average Lending Rate of Commercial Banks
2008.09(1)	3.625%	3.53%
2009.02*(2)	1.250%	1.95%
(1)-(2)	2.375%	1.58%

*The last discount rate cut for current crisis.



3.3.3 Fiscal Policy Responses

It is believed that a sound policy mix is required to effectively stimulate the economy. The CBC has been consistently creating an easy monetary environment and the government has also adopted expansionary fiscal policy. These coordinated policy efforts have taken effects in due course and brought economic growth back on track.

3.3.3.1 The Project to Expand Investment in Public Works

(1) Promoting economic growth

At an execution rate of 100% (Table 8), and after deduction of land purchases, it is estimated that the Project to Expand Investment in Public Works will raise real GDP by an average of 1.02% per year.

(2) Creating employment opportunities

On average, it will create around 180,000 jobs per year: 190,000 to 220,000 jobs in 2009; 200,000~230,000 jobs in 2010; 160,000~190,000 jobs in 2011; and 120,000~150,000 jobs in 2012.

Table 8

The Project to Expand Investment in Public Works - Six Main Targets

Unit: NT\$ billions

Six main targets	Sub-projects	2009	2010	2011	2012	Total
Completing a fast and convenient transportation network	18 sub-projects, including the Nangang MRT line eastern extension, the Xinyi MRT line, grade separation of railways, railway safety improvement, and widening Wuyang section of Freeway 1.	24.3426	45.0951	42.5350	26.5636	138.5363 (27.7%)
Building a safe and disaster-free environment	8 sub-projects, including the urgent rebuilding of old bridges on provincial highways, remediation of land subsidence, strengthening of old school buildings, and disaster-prevention slope management.	31.0561	40.6874	15.2111	12.3489	99.3035 (19.9%)
Raising the quality of the cultural and living environment	20 sub-projects, including extending the network of bicycle trails, reducing the piped-water leakage rate, rebuilding retail markets, constructing sewers, and regenerating farm villages.	48.3810	38.7895	20.2046	19.4346	126.8097 (25.4%)
Strengthening national competitiveness infrastructure	13 sub-projects, including the MRT link to Taoyuan Airport, the national ICT infrastructure, urban renewal related work, and coastal regeneration.	16.9719	27.6405	25.3524	24.6597	94.6245 (18.9%)
Improving offshore island transport facilities	3 sub-projects for developing offshore island transport facilities.	0.6553	1.2245	0.9930	0.5955	3.4683 (0.7%)
Fostering prime R&D manpower, and helping to stabilize schooling and employment	2 sub-projects for creating a schooling safety net and cultivating high-grade manpower to promote employment.	29.2569	7.2318	0.7690	0.000	37.2577 (7.4%)
Total	64 sub-projects	150.6638 (30.2%)	160.6688 (32.1%)	105.0651 (21.0%)	83.6023 (16.7%)	500.00

Source: CEPD, R.O.C.

3.3.3.2 The Impact of Fiscal Stimulus on Government Budget

Driven by the implementation of measures aimed at revitalizing the economy and promoting consumption from September 2008 onwards, fiscal deficits trended upwards. The primary balance⁷ to GDP ratio rose to -4.5% in 2009 and may further increase to -3.9% in 2010 (Table 9). The ratio, however, is much lower than those of the US, the UK and Japan, which all exceeded -10% in 2009.

⁷ Primary balance describes the condition where expenditures (excluding interest payment and debt redemption) are covered by revenues excluding bond revenues (deficits).

Table 9
The Impact of Fiscal Policy on Government Budget

Period	Primary Balance as a % of GDP
1990-1996 Average	-4.43
1997-1998 Average	-0.68
1999	-0.47
2000-2008 Average	-2.04
2009	-4.5
2010 (Estimates)	-3.9

Source: CEPD, R.O.C.

Accordingly, a substantial expansion of government expenditures has effectively supported domestic demand and maintained economic growth momentum in 2009. (Table 10)

Table 10
Contributions to GDP Growth (%)

Unit: percentage points

Period	Economic Growth Rate (yoy)	Domestic Demand								Demand of Rest of The World		
		Subtotal	Private Final Consumption	Government Final Consumption	Gross Fixed Capital Formation			Increase in Stocks	Subtotal	Exports of Goods and Services	Less: Imports of Goods and Services	
					Private Enterprises	Public Enterprises	Government					
2000	5.80	5.65	3.03	0.19	2.07	2.46	-0.09	-0.29	0.36	0.15	9.01	8.86
2001	-1.65	-6.21	0.62	0.27	-5.18	-4.59	0.00	-0.59	-1.93	4.56	-4.73	-9.29
2002	5.26	2.84	2.12	0.24	0.27	1.11	-0.07	-0.77	0.22	2.42	5.81	3.39
2003	3.67	2.37	1.85	-0.18	-0.02	0.31	-0.11	-0.22	0.72	1.30	5.53	4.23
2004	6.19	7.34	3.27	0.08	3.12	4.01	-0.46	-0.43	0.88	-1.15	8.86	10.01
2005	4.70	1.85	1.81	0.03	0.64	0.28	0.25	0.11	-0.63	2.86	4.86	2.00
2006	5.44	0.95	0.92	-0.09	0.02	0.59	-0.16	-0.42	0.10	4.49	7.34	2.85
2007	5.98	1.34	1.23	0.25	0.12	0.24	0.02	-0.14	-0.27	4.65	6.49	1.85
2008(r)	0.73	-2.11	-0.53	0.10	-2.61	-2.62	-0.03	0.03	0.94	2.84	0.61	-2.23
I (r)	7.55	3.94	1.27	0.39	0.49	0.51	0.11	-0.13	1.78	3.61	8.68	5.07
II (r)	5.66	-1.84	0.19	0.09	-2.32	-2.36	0.05	-0.02	0.20	7.51	6.64	-0.87
III (r)	-1.23	-4.47	-1.81	-0.31	-3.42	-3.29	-0.12	-0.01	1.07	3.24	1.72	-1.53
IV (r)	-7.53	-5.19	-1.47	0.24	-4.72	-4.85	-0.13	0.26	0.75	-2.34	-12.62	-10.28
2009(r)	-1.93	-3.17	0.61	0.45	-2.03	-2.52	0.04	0.46	-2.20	1.25	-6.13	-7.38
I (r)	-8.56	-10.25	-1.25	0.43	-5.60	-5.69	-0.33	0.43	-3.82	1.69	-18.37	-20.06
II (r)	-7.23	-5.77	-0.41	0.35	-4.08	-4.65	0.05	0.51	-1.63	-1.46	-12.55	-11.09
III (r)	-1.21	-1.74	1.11	0.52	-1.12	-1.81	0.04	0.64	-2.24	0.53	-6.10	-6.63
IV (r)	9.24	4.93	2.96	0.50	2.64	2.01	0.39	0.23	-1.17	4.30	12.36	8.06
2010(f)	9.98	8.01	1.98	0.11	3.86	3.76	0.14	-0.04	2.05	1.97	15.96	13.98
I (f)	13.59	12.78	1.91	0.34	4.33	4.71	-0.02	-0.36	6.20	0.81	22.92	22.11
II (f)	12.86	8.92	2.52	0.16	5.05	4.36	0.43	0.26	1.18	3.94	21.42	17.49
III (p)	9.80	8.38	2.55	0.04	4.15	4.36	-0.01	-0.20	1.63	1.42	13.74	12.32
IV (f)	4.70	2.95	1.05	-0.07	2.18	1.92	0.16	0.11	-0.21	1.75	7.57	5.83
2011(f)	4.51	1.35	1.91	0.09	-0.53	-0.39	-0.05	-0.09	-0.11	3.15	4.60	1.44
I (f)	3.09	0.53	2.36	0.04	-0.36	-0.23	-0.06	-0.07	-1.50	2.55	4.62	2.07
II (f)	4.27	1.76	1.91	0.12	-0.17	0.22	-0.17	-0.22	-0.09	2.50	3.71	1.21
III (f)	4.77	1.25	1.71	0.24	-0.89	-1.05	0.06	0.10	0.19	3.52	4.04	0.52
IV (f)	5.74	1.79	1.69	-0.02	-0.69	-0.47	-0.04	-0.19	0.81	3.94	5.94	2.00

Explanation : Contributions of component X at time T= $(r_{T}-r_{T-1})/r_{T-1} \times 100\%$, where r_{T} : real value of component X, r_{T-1} : real GDP, T and t represents reference period and the corresponding period of previous year.

Source: DGBAS, R.O.C.

4. The Relative Effectiveness of Policy Choices-Econometric Model

In this section, we will examine the relative effectiveness of monetary policy and fiscal policy on economic growth by Error Correction approach of analyzing economic time series.

4.1 Model Specification and Data Description

The empirical model can be specified in the following manner:

$$Y_t = f(MP_t, FP_t) \dots \dots \dots (1)$$

where Y is a measure of economic activity, MP and FP are measures of monetary and fiscal policy actions.

Considering the linear specification, equation (1) in its explicit form becomes:

$$Y_t = C_0 + b_1MP_t + b_2FP_t + e_t \dots \dots \dots (2)$$

Where⁸

Y: real GDP growth rate (RY_GR)

MP: real M2 growth rate (RM2_GR)

FP: real primary balance (RPB)

e: error term

To consider the effect of 1997/1998 crisis and the current crisis on economic activity, we create two dummy variables D1 and D2, which take a value equal to 1 for 1998Q1-Q4 and 2007Q4-2009Q1, respectively (others equal to 0).

The model is estimated by quarterly data over the period 1990Q1- 2010Q2.

4.2 Empirical Results

The method which is proposed to use in this study is the Error Correction Model (ECM). Following Engle and Granger (1987) procedure, we start with the testing for the order of integration of the variables, which appear in our model. To characterize the time series property of the variables, the Augmented Dickey-Fuller (ADF) tests will be used. If individual series are integrated in the same order, then the co-integration test is applied to the initial level of regression.

4.2.1 Unit Root Test

Table 11 indicates that RY_GR, RM2_GR and RPB are all I(1) level non-stationary. Therefore, we take the first difference for these I(1) variables in OLS estimation.

⁸ We have tried many different measures for Y, MP and FP, and the best empirical result is the combination of real GDP growth rate, real M2 growth rate and real primary balance.

Table 11
Unit Root Test Results

Variables	ADF
RY_GR	-2.46 (4)
RM2_GR	-1.75 (5)
RPB	-2.74 (3)
D(RY_GR)	-9.06 (3) ***
D(RM2_GR)	-5.47 (4) ***
D(RPB)	-22.52 (2) ***

Note: 1. A constant term is included on ADF test equation.
 2. The numbers of parentheses refer to automatic selection of lag length based on ADF test.
 3. *, ** and *** indicate the 10%, 5% and 1% level of statistical significance (two-tailed).

4.1.2 Co-integration Test

Following the above findings that all variables are of I(1), therefore we test for possible co-integration among these variables. Both the trace test and maximum eigenvalue test show that there is only one co-integrating equation among variables at the 0.05 level (Table 12). After normalization, the co-integration relation among variables is as follows:

$$RY_GR = 5.311257 + 0.177907 RM2_GR + 3.66189 RPB \dots \dots \dots (3)$$

Table 12
Co-integration Test Results

Series: RY_GR RPB RM2_GR

Hypothesized	Eigenvalue	Trace	0.05	Prob.**	Max-Eigen	0.05	Prob.**
No. of CE(s)		Statistic	Critical Value		Statistic	Critical Value	
None *	0.440562	62.92881	35.19275	0.0000	42.98091	22.29962	0.0000
At most 1	0.170446	19.94790	20.26184	0.0552	13.82812	15.89210	0.1026
At most 2	0.079372	6.119776	9.164546	0.1817	6.119776	9.164546	0.1817

Trace test indicates 1 co-integrating eqn(s) at the 0.05 level
 Max-eigenvalue test indicates 1 co-integrating eqn(s) at the 0.05 level
 * denotes rejection of the hypothesis at the 0.05 level **MacKinnon-Haug-Michelis (1999) p-values

1 Co-integrating Equation (Log likelihood -365.3572)

Normalized co-integrating coefficients (standard error in parentheses)			
RY_GR	RPB	RM2_GR	C
1.000000	-3.66189 (0.83034)	-0.177907 (0.08241)	-5.311257 (0.83438)

Adjustment coefficients (standard error in parentheses)

D(RY_GR)	-0.725680	(0.12647)
D(RPB)	0.117113	(0.05217)
D(RM2_GR)	-0.058660	(0.11833)

4.1.3 Error Correction Models

Based on the evidence that RY_GR co-integrates with both RM2_GR and RPB, the existence of one co-integrating linear combination is, therefore, established which corresponds to a long run RY_GR function with respect to RM2_GR and RPB. Next we build a vector error correction model. In theory, the coefficient of error correction term should be negative to ensure the dynamic system stable. Table 13 reports the result of vector error correction estimates, which shows that there is a long-run equilibrium relationship among economic activity, monetary policy and fiscal policy actions.

Table 13
Vector Error Correction Estimates

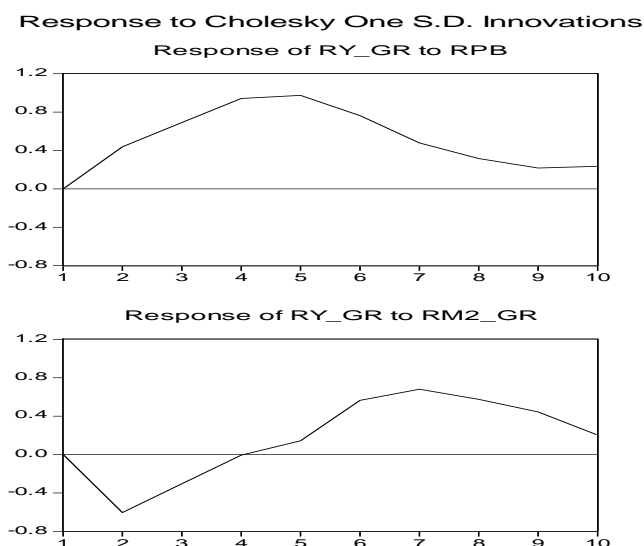
Sample (adjusted): 1992Q1 2010Q2		Included observations: 74 after adjustments		T-statistics in []
Error Correction:	D(RY_GR)	D(RPB)	D(RM2_GR)	
CointEq1	-0.725680 *** [-5.73806]	0.117113** [2.24497]	-0.058660 [-0.49574]	
D(RY_GR(-1))	0.528395*** [4.96422]	-0.125042*** [-2.84794]	-0.352674 *** [-3.54121]	
D(RY_GR(-2))	0.291637*** [2.40283]	-0.020058 [-0.40063]	-0.037827 [-0.33309]	
D(RY_GR(-3))	0.244738** [1.85844]	-0.064755 [-1.19208]	-0.027948 [-0.22682]	
D(RPB(-1))	-1.934608*** [-5.42967]	-0.612966*** [-4.17062]	-0.164624 [-0.49381]	
D(RPB(-2))	-1.334133*** [-4.74566]	-0.650953*** [-5.61346]	-0.094294 [-0.35848]	
D(RPB(-3))	-0.619176*** [-3.27337]	-0.744457*** [-9.54122]	-0.103111 [-0.58260]	
D(RM2_GR(-1))	-0.477034*** [-3.32871]	-0.001008 [-0.01704]	-0.254347** [-1.89687]	
D(RM2_GR(-2))	-0.106495 [-0.76358]	0.030824 [0.53578]	-0.147956 [-1.13382]	
D(RM2_GR(-3))	-0.070185 [-0.55792]	0.065697 [1.26605]	0.282119*** [2.39685]	
D1	-1.563624* [-1.59333]	0.141541 [0.34966]	-0.114925 [-0.12516]	
D2	-3.285556*** [-3.67085]	0.002753 [0.00746]	0.359454 [0.42923]	
R-squared	0.562843	0.862093	0.335104	
Adj. R-squared	0.485283	0.837626	0.217139	
Sum sq. resids	225.9977	38.45357	197.8481	
S.E. equation	1.909221	0.787540	1.786365	
F-statistic	7.256854	35.23451	2.840700	
Log likelihood	-146.3105	-80.78075	-141.3885	
Akaike AIC	4.278661	2.507588	4.145636	
Schwarz SC	4.652293	2.881220	4.519268	
Mean dependent	0.060405	0.001522	-0.153103	
S.D. dependent	2.661164	1.954404	2.018960	

Note: *, ** and *** indicate the 10%, 5% and 1% level of statistical significance (two-tailed).

We also use impulse response function as an additional check of the findings of

co-integration test. The function accounts the dynamic response of RY_GR to a one standard deviation shock of RM2_GR and RPB (Figure 12).

Figure 12
Impulse Response



4.3 Analysis of Empirical Results

The co-integration relation among variables (Equation (3)) shows that RM2_GR is positively correlated to RY_GR in the long run, agreeing with theoretical expectations. However, it also shows that RPB are positively correlated to RY_GR in the long run, which is not consistent with theoretical expectations⁹. This may suggest that the soundness of government financial condition, rather than the government expenditure itself, helps to improve economic growth.

The result of vector error correction estimates (Table 13) shows that there is a long-run equilibrium relationship among economic activity, monetary policy and fiscal policy actions. The implication of this is that both the monetary policy and fiscal policy maintain the GDP equilibrium through time. The negative coefficient of error correction term, -0.72568, means that the system will gradually approach long-run equilibrium within one quarter, at a significant speed of 72.568% convergence.

As for the result of impulse response function (Figure 12), it indicates that: (1) the fiscal policy has positive short-run and long-run effect on economic activity; (2) the monetary policy has negative short-run effect and positive long-run effect on economic activity.

⁹ When government expenditure increases, the PB will decrease. Therefore, when RPB are positively correlated to RY_GR, it implies that the increase of government expenditure has negative effect on economic growth.

5. Way Forward

5.1 Solid Economic Recovery

Driven by the robust growth in major trade partners, especially emerging Asian economies, Taiwan's economy returned to positive growth in the fourth quarter of 2009 and expanded strongly by 13.71% and 12.53% in the first and second quarter of 2010, respectively. Despite recent signs of moderation in the global recovery, Taiwan has showed strength in both domestic demand and foreign demand (Table 10). The unemployment rate also has declined since the fourth quarter of 2009. The DGBAS projects that Taiwan's GDP will grow by 9.98% in 2010 and by 4.51% in 2011. (Table 10, Figure 2)

5.2 Exits from Monetary Policy

Amid the economic recovery, bank credit has increased steadily and the M2 annual growth rate has remained close to the median of the 2010 target range --2.5%~6.5%. The CBC has gradually adjusted its easing policy to properly reflect economic conditions while pursuing financial stability since the second quarter of 2009.

To ensure that liquidity in the banking system is kept at appropriate levels, the CBC has, in addition to accepting banks' re-deposits and issuing short-term CDs, held auctions of 364-day CDs each month since April 2010. By the end of June 2010, the amount of 364-day CDs auctioned totaled NT\$300 billion. With the increased issuance of CDs by the CBC, excess reserves in the banking system dropped to NT\$27 billion in June 2010 from a peak of NT\$154 billion in April 2009.

In addition, the CBC has increased the policy rate and adopted "targeted prudential measures" as described in Sec.2.3.5. The CBC will continue to adopt appropriate monetary policy in a timely manner in response to new economic and financial developments.

5.3 Plan to Enhance the Soundness of Housing Market

The housing market is an important part of the overall economy, and makes a significant direct contribution to economic growth. It is also an important target of lending in the financial system, while housing constitutes a major part of the people's wealth and assets. The government has the responsibility to reasonably and effectively guide the sound development of the housing market as well as the stable growth of the economy. Therefore, CEPD has drawn up a proposal for the "Plan to Enhance the Soundness of the Housing Market" in April 2010, with the aims of promoting socio-economic stability and meeting the basic housing needs of low- and mid-income earners and members of the salaried class. This plan contains 21 working principles and 44 specific measures to address the following six tasks: achieving a balance of housing supply and demand in the Taipei metropolitan region; helping low- and mid-income earners and salaried employees increase their ability to purchase or rent a home; improving housing information; enhancing risk management for real estate loans; enhancing social fairness; and taking relevant complementary measures. The plan will be actively implemented by all government agencies and institutions.

The CBC has introduced a series of targeted prudential measures since June 2010, which are an integral part of the efforts to enhance risk management for real estate loans as in the "Plan to Enhance the Soundness of the Housing Market". However, sound

development of the housing market must rely on concerted policy efforts from various government agencies and institutions.

5.4 Opportunity and Challenges

Taiwan has maintained sound macroeconomic policies for recent years. It has kept inflation low and improved public finances, mainly on account of higher tax revenues. Nevertheless, the sharp drop in global demand owing to the global economic crisis has exposed the risks associated with Taiwan's heavy dependence on a few manufactured exports, prompting the authorities to seek new engines of economic growth and diversify the economy. Furthermore, as cross-strait economic relations have improved in recent years, China has become Taiwan's major export market and its second-largest supplier (Table 14).

In 2010 and 2011, the government will work actively to bolster domestic economic growth momentum and improve the investment environment, particularly in respect of heightening incentives for private investment and attracting investment of private capital in public works. Furthermore, the implementation of Economic Cooperation Framework Agreement (ECFA) marks a milestone in the normalization of economic relations between Taiwan and mainland China, not only representing a giant step for Taiwan toward Asia-Pacific regional economic integration but also providing the government with a powerful incentive to use in its current global push for investment. In fact, it lays the foundation for a "Golden Decade of Development" for the island. The government is currently pursuing free trade agreements (FTAs) with the US, Japan, Singapore, the ASEAN, and the European Union with the aim of helping Taiwanese companies diversify their investment and carry out globalization strategy, and avoid excessive reliance on the Chinese market. Hopefully, ECFA will allow Taiwan to reinforce its export competitiveness by using China as a gateway to integration into the East Asian free trade groupings.

Table 14
Changes in Two-way Trade with Major Trading Partners (yoy%)

	Exports					Imports				
	USA	Japan	Europe	China (incl. Hong Kong)	ASEAN 6*	USA	Japan	Middle East	China (incl. Hong Kong)	ASEAN 6*
2002	-2.7	-5.0	-5.9	29.4	7.4	-0.8	5.5	9.8	24.2	3.7
2002 Share	18.6	8.5	15.1	10.1	9.8	14.9	26.6	5.2	8.3	13.3
2003	-3.0	0.5	10.4	23.6	10.5	-6.9	19.6	43.7	30.9	5.2
2004	8.3	11.1	14.7	28.8	33.0	28.2	33.6	34.6	47.7	16.2
2005	1.3	9.4	-0.7	12.2	13.8	-2.8	5.3	36.5	16.2	3.8
2006	11.2	7.9	10.6	14.8	13.8	7.1	0.5	30.1	20.1	10.4
2007	-0.9	-2.2	9.7	12.6	16.7	17.0	-0.7	12.0	11.9	1.7
2008	-4.0	10.2	4.6	-0.8	7.3	-0.7	1.3	40.3	10.3	8.4
2009	-23.5	-17.4	-24.6	-15.9	-21.5	-31.0	-22.1	-42.1	-22.3	-22.8
2009 Share	11.6	7.1	11.1	41.1	14.8	10.4	20.8	12.9	14.7	11.3
2010 Jan-Aug	35.3	30.1	36.5	51.2	49.4	50.4	58.0	57.2	58.0	56.1

Source: DGBAS, R.O.C.

6. Conclusion

The global financial crisis set off by the US housing bust has severely undermined financial systems in the US and Europe. Fortunately, Taiwan's financial system remains stable, which implies that financial intermediation is functioning normally, and problems such as liquidity shortage and undercapitalization are absent. However, as a small and highly open economy and heavily relying on exports, the weak external demand resulted in serious contraction of Taiwan's economic growth in 2009.

In the first half of 2008, the CBC focused on monetary policy tightening to address upside risks to domestic inflation. As the US subprime mortgage debacle evolved into a global financial crisis after the third quarter of 2008, the CBC then promptly shifted to monetary policy easing. The CBC also maintained an appropriate level of liquidity in the banking system, while helping to promote preferential loans and enhance the financing mechanism for SMEs. Therefore, a sharper plunge in business and consumer confidence was averted by a substantial easing of monetary policy and a proactive crisis management framework. Overall economic resilience has been supported by strong monetary management. In the meantime, the government has actively adopted an expansionary fiscal policy to stimulate economic growth, as well as some necessary measures to stabilize the financial system. These coordinated policy efforts, together with the strong rebound in major Asian emerging countries, especially China, have helped Taiwan's economy to recover quickly.

To examine the relative effectiveness of policy choices during financial crisis, we adopt the Error Correction approach of analyzing economic time series. The empirical result shows that both the monetary policy and fiscal policy maintain the GDP equilibrium through time. The result of vector error correction estimates clearly shows a well-defined error correction term, ECM, and indicates a feedback of 73% of the previous quarter's disequilibrium from the long run money supply and primary balance elasticity of economic activity. Furthermore, the result of impulse response function shows that: (1) the fiscal policy has positive short-run and long-run effect on economic activity; (2) the monetary policy has negative short-run effect and positive long-run effect on economic activity.

The current financial crisis has given us a lesson of learning the importance of financial stability. Before the US subprime debacle triggered the global financial crisis, most central banks focused mainly on price stability as the key to economic and financial stability. Nevertheless, they have recognized that economic and financial stability cannot rely solely on stable prices. Meanwhile, effective financial regulation requires a macroprudential policy, in addition to a microprudential one. It is thus imperative for a central bank to pursue both price and financial stability. International institutions, including the IMF and the BIS, have recognized a central bank's responsibility in financial stability. To that end, credit growth and asset price movements cannot be ignored when a central bank formulates its monetary policy. The CBC notes that price stability has always been a key mandate of the CBC. Indeed, the Central Bank of the Republic of China (Taiwan) Act also stipulates financial stability as an important objective of the CBC, predating the current global trend.

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