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2001Ò´ 5êÅ

½ÇÁú±Ý¸® °áÁ¤¸ðÇü¿¡¼ÀÇ ±¸Á¶º¯ÈºÐ¼®

Àü´öºó*¡¤¹Ú´ë±Ù*

Structural Change Analysis in a Real Interest Rate Model

Duk Bin Jun*¡¤Dae Keun Park*

■ Abstract ■

It is important to find the equilibrium level of real interest rate for it affects real and financial sector of economy. However, it is difficult to find the equilibrium level because like the most macroeconomic model the real interest model has parameter instability problem caused by structural change and it is supported by various theories and definitions. Hence, in order to cover these problems structural change detection model of real interest rate is developed to combine the real interest rate equilibrium model and the procedure to detect structural change points. 3 equations are established to find various effects of other interest-related macroeconomic variables and from each equation, structural changes are found.

Those structural change points are consistent with common expectation. Oil Crisis (December,1978), the starting point of Economic Stabilization Policy (January,1982), the starting point of capital liberalization (January, 1988), the starting and finishing points of Interest deregulation (January,1992 and December, 1994), Foreign Exchange Crisis (December,1997) are detected as important points. From the equation of fisher and real effect, real interest rate level is estimated as 4.09% (October,1998) and dependent on the underlying model, it is estimated as 0%~13.56% (October,1998), so it varies so much.

It is expected that this result is connected to the large scale simultaneous equations to detect the parameter instability in real time, so induces the flexible economic policies.

1. ¸Ó¸®¸»

½ÇÁú±Ý¸®´Â ½Ç¹°°ú ±ÝÀ¶¹Î®¿¡¼ Áß¿äÇÑ ¿ªÇÒÀ» ÇÏ´Â °ÍÀ½ºÀ°æÁ¦º¯¼ö·Î¼ ±× ±ÕÇü¼öÁØÀ» ÆÄ¾ÇÇÏ´Â °ÍÀÌ Áß¿äÇÏ´Ù. ±×·¸Áö¸¸, ½ÇÁú±Ý¸®´Â ±× Á¤ÀÇ¿Í ÀÌ·ÐÀÌ ´Ù¾çÇÏ±â ¶§¹®¿¡ ±× ¼öÁØÀ» ÆÄ¾ÇÇÏ±â°¡ ¾î

* ÇÑ±¹°úÇÐ±â¼ú¿ø Å×Å©³ë°æ¿µ´ëÇÐ¿ø

·Æ´Ù. ´õ°Ò¾î, ´ë°Î°ÐÀÇ °Å½Ã°æÁ¦ ¸ðÇüµé°ú °°ÀÌ ½ÇÁú±Ý¸® °áÁ¤¸ðÇüµéµµ °æÁ¦ ¿ÜÀûÀÎ Ãæ°Ý¿¡ ÀÇÇØ ¸ð¼öÀÇ °Ò¾ÈÁ¤¼º ¹®Á¦¸¦ °¡Áö°Ô µÈ´Ù. µû¶ó¼, °æÁ¦ ¿ÜÀûÀÎ Ãæ°Ý¿¡ À¯¿¬ÇÑ ½ÇÁú±Ý¸®¸ðÇüÀÇ °³¹ßÀÌ ÇÊ¿äÇÏ´Ù.

¿ì¼± ¸í¸ñ±Ý¸®¿Í °Å½Ã°æÁ¦º¯¼ö£ÀÇ °ü°è¸¦ ¸ðÇü ÈÇÑ ÇÔÁ¤È£¿Í ÃÖ¿î±Ô[5], ±è¼¼Á÷°ú ÀÌÁõ¶ô[1], ±×¸®°í ÀåÈ«¹ü[3] µîÀÇ ¸ðÇü¿¡ ±Ù°ÅÇÏ¿© ÇÇ¼ÈÈ¿°ú, ÇÇ¼Å¿Í ½Ç¹°È¿°ú, ¼Òµæ´È¿°ú¿Í À¯µ¿¼ºÈ¿°ú¸¦ °³°ºÀûÀ¸·Î °í·ÁÇÑ 3°³ÀÇ ¹æÁ¤½ÄÀ» ÀÌ¿ëÇÏ¿© ½ÇÁú±Ý¸®¸ðÇüÀ» ¼ö³ÇÑ´Ù.

±¸Á¶º¯È¿Í °ü·ÃÇÏ¿© ¼öÇàµÈ Áö±Ý±îÁöÀÇ ¿¬±¸µé Àº ¸ð¼öÀÇ °Ò¾ÈÁ¤¼º ¹®Á¦¸¦ È¸ÇÇÇÏ±â À§ÇØ ±¸°£À» ³ª´©¾î¼ ¸ðÇüÀ» ¼ö³ÇÏ¿´°í, ÀÌ¸¦ °è·®ÀûÀ¸·Î °ËÁ¤ÇÏ±â À§ÇØ Chow[11]¿Í Quandt[17], ±×¸®°í Brown, Durbin°ú Evans[10]ÀÇ ¹æ¹ýÀ» ÀÌ¿ëÇÏ¿© ¿Ô´Ù.

±×·±µ¥, ÀÌ·¯ÇÑ Åë°è·®µéÀº ¾ÈÁ¤ÀûÀÎ ½Ã°è¿°ú ÇÑ¹øÀÇ ±¸Á¶º¯È¸¦ °¡Á¤ÇÑ ¸ðÇüÀ» °¡Á¤ÇÏ°í ÀÖ±â ¶§¹®¿¡ °Ò¾ÈÁ¤ÀûÀÎ ½Ã°è¿°ú ¿©·¯ ¹øÀÇ ±¸Á¶º¯È¸¦ °¡Á¤ÇÑ ¸ðÇü¿¡ ´ëÇØ¼´Â ³í¸®ÀûÀÎ Àû¿ëÀÌ ¾î·Æ´Ù. ÀÌ¸¦ ÇØ°áÇÏ±â À§ÇØ Bai and Perron[8]´Â ¿©·¯ ¹øÀÇ ±¸Á¶º¯È¸¦ ´Ù·ç¾ú°í, Hansen[13]Àº °Ò¾ÈÁ¤ÀûÀÎ ½Ã°è¿¸¦ ´Ù·ç¾ú´Ù.

µû¶ó¼, °Ò¾ÈÁ¤ÀûÀÎ ½Ã°è¿¿¡ ¿©·¯ ¹øÀÇ ±¸Á¶º¯È°¡ Á¸ÀçÇÏ´Â ¹®Á¦¸¦ ´Ù·ç±â À§ÇØ ÇØ°áÇÏ·Á¸é Bai and Perron [8]°ú Hansen[13]ÀÇ ¹æ¹ýÀ» ÇÔ²² °í·ÁÇÏ´Â °ÍÀÌ ÇÊ¿äÇÏ´Ù. °» ¿¬±¸¿¡¼´Â Hansen[13]ÀÇ ¹æ¹ý¿¡ ¿©·¯ ¹øÀÇ °¯È¸¦ °¨ÁöÇÒ ¼ö ÀÖ´Â ¹æ¹ý·Ð°ú °³¹ßÇÏ°í ÀÌ¸¦ ½ÇÁú±Ý¸®°áÁ¤¸ðÇü°ú °áÇÕÇÏ¿© ±¸Á¶º¯È °¨Áö¸ðÇüÀ» ¼ö¸³ÇÑ´Ù.

2. ±âÁ¸ÀÌ·Ð ¹× ¿¬±¸µ¿Çâ

2.1 ½ÇÁú±Ý¸®ÀÇ Á¤ÀÇ

½ÇÁú±Ý¸®´Â ¿ø±Ý°ú ÀÌÀÚÀÇ °ñÀ²À» ±¸¸Å·Â ±âÁØ À¸·Î Ç¥½ÃÇÑ °ÍÀÌ¶ó°í Á¤ÀÇÇÒ ¼ö°¡ ÀÖ´Ù. ÀÌ·¯ÇÑ ½ÇÁú±Ý¸®´Â °üÂûÀÌ °Ò°¡´ÉÇÑ °Å½Ã°æÁ¦°¼öÀÌ±â ¶§¹®¿¡ ´ë¿ë¼öµéÀ» ÅëÇØ °£Á¢ÀûÀ¸·Î ÃßÁ¤µÈ´Ù. ´ë

°Î°ÐÀÇ ¿¬±¸¿¡¼´Â °æÁ¦ ¼º°Àå·ü¿¡ ±Ù°ÅÇÑ ½ÇÁú°æÁ¦¼ºÀå·ü, ±â¼÷ÀÚÀÇ ÀÓ±Ý¼öÁØ¿¡ ±Ù°ÅÇÑ ÀÚº»¼öÀÍ·ü, ÇÑ°è¼Òºñ¼º°ú ÇÑ°è¼Òºñ¼º ÇÔ¼ö¿¡ ±Ù°ÅÇÑ ½Ç¹°°æÁ¦ ÀÌ¼Ó°úÁ¤À» Ã³¸®ÇÏ°í ÀÖÀ¸¸ç, ÇÇ¼ÅÈ¿°ú¿¡ ±Ù°ÅÇÑ ¸í¸ñ±Ý¸®¿Í ±â´ë ¹°°¡»ó½Â·ü »çÀÌÀÇ °ü°è¸¦ ½ÇÁú±Ý¸®¸¦ ´ë¿ë°ªÀ» ¾ò´Â ¹æ¹ýÀ» »ç¿ëÇÑ´Ù.

ÇÇ¼Å È¿°ú¿¡ ±Ù°ÅÇÏ¿© ½ÇÁú±Ý¸®¸¦ ÆÄ¾ÇÇÏ·Á¸é ±â´ë¹°°¡»ó½Â·ü°ú ±â´ë¹°°¡»ó½Â·üÀÌ ¸í¸ñ±Ý¸®¿¡ ¹Ì Ä¡´Â Á¤µµ¸¦ °áÁ¤ÇØ¾ß ÇÑ´Ù. ±×·¸Áö¸¸, ±â´ë¹°°¡»ó½Â·üÀÇ Ãß°è¹æ½ÄÀÌ ±â´ë¿¡ ´ëÇÑ °¡Á¤(ÀûÀÀÀû¿¡¼ ¾ø°ú ÇÕ¸®Àû¿¡ ¼ ±×¸®°í ¿ÏÀü¿¡¼)¿¡ µû¶ó ´Ù¸£°í, ±â´ë¹°°¡»ó½Â·üÀÌ ¸í¸ñ±Ý¸®¿¡ ¹ÌÄ¡´Â È¿°ú¿¡ °Ò¸íÈ®ÇÏ±â ¶§¹®¿¡ ½ÇÁú±Ý¸®ÀÇ ¼öÁØÀ» ÆÄ¾ÇÇÏ±â°¡ ¾î·Æ´Ù.

±è¼¼Á÷°ú ÀÌÁõ¶ô[1]Àº ¿ÏÀü¿¹Ãø°¡Á¤ÇÏ¿¡ ½ÇÇöµÈ ¹°°¡»ó½ÂÀ» ±â´ë¹°°¡»ó½Â·ü ÀÌ¿ëÇÏ°í Á¦¾à¾ø´Â ÇÇ¼ÅÈ¿°ú¸¦ °¡Á¤ÇÏ¿© ½ÇÁú±Ý¸®¸¦ ¸ðÇüÈÇÏ¿´°í, ÇÔÁ¤È£¿Í ÃÖ¿î±Ô[5], ÀåÈ«¹ü[3]Àº ÀûÀÀÀû±â´ë¸¦ ¿ÏÈÇÑ °æÁ¦ÀûÀÎ ÇÕ¸®Àû ±â´ë °¡Á¤ÇÏ¿¡ ¹°°¡»ó½Â·ü·Î¸ðÇü¿¡ ±â´ë¹°°¡»ó½Â·ü 1´Ü°è ÀÌ¹æ ¿¹ÃøÄ¡¸¦ ±â´ë¹°°¡»ó½Â·ü·Î ÀÌ¿ëÇÏ°í Á¦¾à¾ø´Â ÇÇ¼ÅÈ¿°ú¸¦ °¡Á¤ÇÏ¿© ½ÇÁú±Ý¸®¸¦ ¸ðÇüÈÇÏ¿´´Ù.

°» ¿¬±¸¿¡¼´Â °¡Àå °£´ÜÇÑ ÇüÅÂÀÇ ÀûÀÀÀû ±â´ë ¸¦ °¡Á¤ÇÏ¿© ±â´ëÀÇ ¹°°¡»ó½ÂÀ» ±â´ë¹°°¡»ó½Â·ü ·Î ÀÌ¿ëÇÏ°í ¼±Çà¿¬±¸µé°ú ¸¶Âù°¡Áö·Î Á¦¾à¾ø´Â ÇÇ¼ÅÈ¿°ú¸¦ °¡Á¤ÇÏ¿© ½ÇÁú±Ý¸®¸¦ ¸ðÇüÈÇÑ´Ù.

2.2 ±Ý¸®°áÁ¤¸ðÇü

¸í¸ñ±Ý¸®¿¡ ¹ÌÄ¡´Â È¿°ú´Â °üÁ¡¿¡ µû¶ó ´Ù¾çÇÏ °Ô ÆÄ¾ÇÇÒ ¼ö°¡ ÀÖ´Ù. ½Ç¹°Î¹®ÀÇ ±ÕÇüÀ¸·Î ÆÄ¾ÇÇÏ ´Â ÇÇ¼ÅÈ¿°ú(±â´ë¹°°¡»ó½Â·ü È¿°ú)¿Í ½Ç¹°È¿°ú(½Ç ¹°Î¹®¿¡¼ ½ÇÁú»ý»ê, ½ÇÁú¼Òµæ°ú ÀÎÇÃ·¹ÀÌ¼Ç, ½ÇÁúÈ¯À² È¿ °ú), ±ÝÀ¶ºÎ°ÐÀÇ ±ÕÇüÀ¸·Î ÆÄ¾ÇÇÏ´Â ¼ÒµæÈ¿°ú(±ÝÀ¶ °Î¹®¿¡¼ ½ÇÁú»ý»ê È¿°ú)¿Í À¯µ¿¼ºÈ¿°ú(½ÇÁúÅëÈ ·® È¿°ú)ÀÌ´Ù.

ÇÔÁ¤È£¿Í ÃÖ¿î±Ô[5]´Â 75³â 1»ç°Ð±â°ÎÅÍ 90³â 4 »ç°Ð±â±îÁö ¿ÀÂ÷¼öÁ¤¸ðÇüÀ» ÀÌ¿ëÇÏ¿© Á¦¹Ý È¿°ú¸¦ °Ð¼®ÇÏ¿´´Ù. ÃßÁ¤°è¼ö¿Í ÃßÁ¤¿¡ »ç¿ëµÈ È¸±Í°¼ö ´Â <Ç¥ 1>°ú °°´Ù.

<Ç¥ 1> ÇÔÁ¤È£¿Í ÃÖ¿î±Ô(1991)ÀÇ ÃßÁ¤°è¼ö¿Í È¸±Í°¯¼ö

È¿°ú	È¸±Í°¯¼ö
ÇÇ¼ÅÈ¿°ú 0.39(8.41)*	X11Á¶Á¤ ¼Òºñ ÀÚ¹°¡·Î½á ±¸ÇÑ Àü³âµ¿±â´ë°ñÃõ°¡À²ÀÇ ARIMA¸ðÇü 1´Ü°è Àü¹æ¿¹ÃøÄ¡
½ÇÁú»ý»êÈ¿°ú 17.33(3.95)*	X11Á¶Á¤ ½ÇÁú GNP¿Í ÀáÀçGNP(½ÇÁú GNPÀÇ ±¸°£ ÆÊ±âÁ¡°ú ¸»±âÁ¡ÀÇ ¼±Çü Ãß¼¼)¿ÍÀÇ °ñÀ²
À¯µ¿¼ºÈ¿°ú -4.52(-1.56)*	X11Á¶Á¤ ÃÑÅëÈ(M2)¿Í ÀáÀçGNP¿Í ¼Òºñ ÀÚ¹°¡ÀÇ °ö¿¡ ´ëÇÑ °ñÀ²

* Áõ°¡()´Â t°ª

±è¼¼Áø°ú ÀÌÁõ¶ô[1]À° 75³â 1¿ù°ÎÅÍ 92³â 12¿ù±î Áö ¿ÀÂ÷¼öÁ¤¸ðÇüÀ» ÀÌ¿ëÇÏ¿© ÇÇ¼ÅÈ¿°ú¸¦ ÁßÁ¡ÀûÀ¸·Î °Ð¼®ÇÏ¿´´Ù. ÃßÁ¤°è¼ö¿Í ÃßÁ¤¿¡ »ç¿ëµÈ È¸±Í°¯¼ö´Â <Ç¥ 2>¿Í °°´Ù. ÀÌµéÀº ±¸°£À» ³ª´©¾î¼ Àå±â ¿Í ´Ü±âÇÇ¼ÅÈ¿°ú¸¦ °¢°¢ °Ð¼®ÇÏ¿´´Ù. ÀüÃ¼±¸°£¿¡¼ ´Â Àå±âÇÇ¼ÅÈ¿°ú°¡ 0.76(t°ª£º37.08), 75³â 1¿ù°ÎÅÍ 82³â 6¿ù±îÁöÀÇ ¼¼°Î±¸°£¿¡¼´Â 0.42(t°ª£º20.86), ±×¸®°í 83³â 1¿ù°ÎÅÍ 92³â 6¿ù±îÁö´ÂÀå±âÀûÀ¸°ú °è´Â¾ø°í ´Ü±âÀûÀ¸°ú°è¸¸ Á¸ÀçÇÏ°íÀÖ´Ù°í ¹àÇû´Ù.

<Ç¥ 2> ±è¼¼Áø°ú ÀÌÁõ¶ô(1991)ÀÇ ÃßÁ¤°è¼ö¿Í È¸±Í°¯¼ö

È¿°ú	È¸±Í°¯¼ö
ÇÇ¼ÅÈ¿°ú 0.76(37.08)*	¼Òºñ ÀÚ¹°¡ Àü³âµ¿±â´ë°ñÃõ°¡À² ÀÌ¿ëÇÑ »çÈÄÀû¹°¡»ó½Â·ü

* Áõ°¡()´Â t°ª

<Ç¥ 3> ÀåÈ«¹ü(1996)ÀÇ ÃßÁ¤°è¼ö¿Í È¸±Í°¯¼ö

È¿°ú	È¸±Í°¯¼ö
ÇÇ¼ÅÈ¿°ú 0.89(2.70)*	X11Á¶Á¤ ¼Òºñ ÀÚ¹°¡·Î½á ±¸ÇÑ Àü±â´ë°ñÃõ°¡À²ÀÇ ARIMA¸ðÇü 1´Ü°è Àü¹æ¿¹ÃøÄ¡
Á¤°ÎÁöÃâÈ¿°ú 1.83(7.08)*	X11Á¶Á¤ Á¤°ÎÁöÃâ
À¯µ¿¼ºÈ¿°ú -2.01(-7.12)*	X11Á¶Á¤ ÃÑÅëÈ(M2)¿Í X11Á¶Á¤ GDPÀÇ °ñÀ²

* Áõ°¡()´Â t°ª

ÀåÈ«¹ü[3]À° 83³â 2»ç°Ð±â°ÎÅÍ 95³â 4/4°Ð±â±îÁö ¿ÀÂ÷¼öÁ¤¸ðÇüÀ» ÀÌ¿ëÇÏ¿© ¸í¸ñ±Ý¸® °áÁ¤¿äÀÎÀ» °Ð¼®ÇÏ¿´´Ù. ´Ù¸¥ ¿¬±¸µé°ú´Â ´Ù¸£°Ô ´Ü±âÀûÀÎ ÇÇ¼Å È¿°ú¸¦ °í·ÁÇÏ¿© °øÀû°Ð°ü°è½Ä¿¡¼´Â Æí¼ÓÇÏ°í ÀÖ Áö ¾Ê´Ù. ÃßÁ¤°è¼ö¿Í ÃßÁ¤¿¡ »ç¿ëµÈ È¸±Í°¯¼ö´Â <Ç¥ 3>°ú °°´Ù.

2.3 ±¸Á¶º¯È½ÃÁ¡

¼½ÂÈ¯°ú ÇÑ¼º½Å[4]À° PetittÀÇ °ñ¸ð¼ö ±â¹ýÀ» ÀÌ¿ëÇÏ¿© ¸í¸ñ±Ý¸®¿¡ ´ëÇØ 77³â 1/4°Ð±â°ÎÅÍ 91³â 4/4°Ð±â±îÁö ¼¼¹øÀÇ ±¸Á¶º¯È°¡ ÀÖ´Ù°í ÆÄ¾ÇÇÏ°í ÀÖ´Ù. Æ¯È÷ °æÁ¦ÀÌ·Ð¿¡ ±Ù°ÅÇÏ¿© °ü°èÀÖ´Â °¯¼öµé (±â´ë¹°°¡»ó½Â·ü°ú ¸í¸ñ±Ý¸®¿¡¼ ±â´ë¹°°¡»ó½Â·ü À» Â÷°¨ÇÑ ½ÇÁú±Ý¸®)µµ °°À° ¹æ¹ýÀ¸·Î ±¸Á¶º¯È½Ã Á¡À» ÃßÁ¤»ê¼î °¯¼öµé°£ÀÇ Àå±âÀûÀÎ °ü°è°¡ ÀÖÀ½ À» ¹àÇûÀ¸¸ç ±× °á°ú´Â <Ç¥ 4>°ú °°´Ù.

<Ç¥ 4> ¼½ÂÈ¯°ú ÇÑ¼º½Å(1992)ÀÇ ±¸Á¶º¯È½ÃÁ¡

	±¸°£	¸í¸ñ±Ý¸®¼öÁØÆò±Õ		¼³¸í
1	77 1/4-79 4/4	°í±Ý¸® (24.3%)	(22.6%)	±Ý¸®±ÔÁ¦½Ã±â
2	80 1/4-81 3/4		(27.3%)	¼®À¯ÆÄµ¿¿¡ÀÌÈÄ ¹°°¡ »ó½Â
3	81 4/4-87 4/4	Àú±Ý¸® (15.3%)	(14.7%)	´ëÃâ±Ý¸® Á¶Á¤ÀÌÈÄ
4	88 1/4-91 4/4		(16.2%)	CP±Ý¸® ÀÚÀ¯È¿Í ÀÚ°»½ÃÀå °³¹æÀÌÈÄ

±èÀÎÁø[2]À° ¸í¸ñ±Ý¸®ÀÇ Ãß¼¼¿Í ´Ù¥ °Ý½Ã°æÁ¦ °¯¼ö¿ÍÀÇ °ü°è¸¦ ÅëÇØ 1975³â 1¿ù°ÎÅÍ 1992³â 12

<Ç¥ 5> ±èÀÎÁø(1992)ÀÇ ±¸Á¶º¯È½ÃÁ¡

	±¸°£	¸í¸ñ±Ý¸®¼öÁØÆò±Õ		¼³¸í
1	75-78³â´ë	°í±Ý¸® (23.3%)	(20.5%)	±Ý¸®±ÔÁ¦½Ã±â
2	79-81³â´ë		(27.0%)	¼®À¯ÆÄµ¿ÀÌÈÄ ¹°°¡ »ó½Â, °Îµ¿»ê°¡ ±Þµî, ÃÑÀÚ°ú¿¡
3	82-87³â´ë	Àú±Ý¸® (15.1%)	(13.8%)	¾ÈÁ¤È-Á¤Ã¥(À¢Á¤±ä Ãà)ÀÇ ÃßÁø
4	88-92³â´ë		(16.3%)	°í¼ºÀå·üÁö¼Ó, ¼öÁö ÈæÀÚ, °Îµ¿»êÆø±â, ÁÖ½ÄÃÀÀåÈ°È²

¿ù±îÁö ´ÙÀ½ <Ç¥ 5>¿Í °°À° ¼¼¹øÀÇ ±¸Á¶º¯È¸¦ ¼³¸íÇÏ°í ÀÖ´Ù.

µÎ ºÐ¼®¿¡ ÀÇÇÏ¸é °øÅëÀûÀ¸·Î 78³â°ú 79³â »çÀÌ ¿Í 81³â ±×¸®°í 87³â¿¡ À¯ÀÇÇÑ ±¸Á¶º¯È°¡ ÀÖ¾úÀ½ À» ½Ã»çÇÏ°í ÀÖ´Ù. 92³â ÀÌÈÄ·Î´Â ±Ý¸®ÀÚÀ¯È¿Ï·á ¿Í IMF±¸Á¦½ÅÃ»ÀÌ¶ó´Â µÎ°¡Áö Áß¿äÇÑ °æÁ¦Àû»ç°Ç ÀÌ ÀÖ¾úÀ¸¹Ç·Î 95³â°ú 97³âÀÇ µÎ ¹øÀÇ ±¸Á¶º¯È¸¦ °¡Á¤ÇÑ´Ù¸é 5¹øÀÇ ±¸Á¶º¯È¿¡ µû¶ó ¼°°ÝÀÌ ´Ù¸¥ 6 °³ÀÇ ±¸°£ÀÌ Á¸ÀçÇÒ ¼ö ÀÖÀ½À» ½Ã»çÇÑ´Ù.

2.4 ±¸Á¶º¯ÈºÐ¼®¹æ¹ý

¼±ÇüÈ¸±Í¸ðÇü¿¡¼ ¸ð¼öÀÇ º¯È¸¦ °ËÁ¤ÇÏ´Â ¹æ¹ýÁß¿¡¼ °¡Àå °ó¹øÇÏ°Ô ¾²ÀÌ´Â ¹æ¹ýÀº Chow [11]ÀÇ ¹æ¹ýÀÌ´Ù. Chow[11]´Â ¾ÈÁ¤ÀûÀÎ ½Ã°è¿¿¡ ¼ ÇÑ¹øÀÇ ±¸Á¶º¯È¸¦ ¾È´Ù°í °¡Á¤ÇÏ°í ÀüÃ¼ ¸ð ¼öµéÀÇ ¾ÈÁ¤¼ºÀ» °ËÁ¤ÇÏ´Â Åë°è·®°ú °ËÁ÷¸¦ À¯ µµÇÏ¿´´Ù.

Quandt[17]´Â Chow[11]ÀÇ °¡Á¤À» ÇÑ´Ü°è ¿ÏÈ ÇÏ¿© ±¸Á¶º¯È½ÃÁ¡À» ¸ð¸¥´Ù°í °¡Á¤ÇÏ°í¼ °¡Àå À¯ÀÇÇÑ ±¸Á¶º¯È½ÃÁ¡°ú ÀüÃ¼ ¸ð¼öµéÀÇ ¾ÈÁ¤¼ºÀ» µ¿½Ã¿¡ °ËÁ¤ÇÏ´Â Åë°è·®À» Á¦½ÃÇÏ¿´´Ù. Andrews [6]´Â Quandt[11]ÀÇ Åë°è·®¿¡ ´ëÇÑ °ËÁ÷¸¦ À¯µµ ÇÏ¿´´Âµ¥, Supremum Wald Åë°è·®, Supremum Lagrangian Multiplier Åë°è·®, Supremum Likelihood Ratio Åë°è·®¿¡ °øÅëÀûÀÎ °ËÁ÷¸¦ À¯µµÇÏ¿´ ´Ù. ÀÌÀ¯µµ¿Í ±¸Á¶º¯È½ÃÁ¡ÀÇ ¾ç±Ø´Ü¿¡ ´ëÇÑ Á¦ÇÑ, ±×¸®°í À¯ÀÇ¼öÁØ¿¡ µû¸¥ ÀÓ°èÄ¡¸¦ ±¸ÇÏ¿´´Ù.

Hansen[13]À° È¸±Í°¼ö¿¡ ´ëÇÑ °¡Á¤À» ¿ÏÈÇÏ ¿© °Ò¾ÈÁ¤ÀûÀÎ È¸±Í°¼ö¿¡µµ Àû¿ëÇÒ ¼ö ÀÖ´Â Åë °è·®À» Á¦½ÃÇÏ°í ±× °ËÁ÷¸¦ À¯µµÇÏ¿´´Ù. Kuo[15] ´Â Hansen[13]ÀÇ ºÐ¼®¿¡¼ ÀüÃ¼¸ð¼ö¸¦ µ¿½Ã¿¡ °ËÁ¤ ÇÏ´Â ¹æ¹ýÀ» ¿ÏÈÇÏ¿© °Î°ÐÀûÀÎ ¸ð¼öÀÇ º¯È¸¦ °Ë Á¤ÇÒ ¼ö ÀÖ´Â ¹æ¹ýÀ» Á¦½ÃÇÏ¿´´Ù. Bai and Prron[8] À° ±¸Á¶º¯È½ÃÁ¡ÀÇ °³¼ö¿¡ ´ëÇÑ °¡Á¤À» ¿ÏÈÇÏ¿© ¿©·¯°³ÀÇ ±¸Á¶º¯È¸¦ °ËÁ¤ÇÒ ¼ö ÀÖ´Â Åë°è·®°ú °Ð Æ÷¸¦ À¯µµÇÏ¿´´Ù. Bai[7]´Â È¸±Í°¼ö¿¡ ´ëÇÑ °¡Á¤ À» ¿ÏÈÇÏ¿© ÀÚ±âÈ¸±Í°¼ö¿Í ½Ã°£ÃßÀÌ°¼ö¿¡µµ Àû ¿ëÇÒ ¼ö ÀÖ´Â Åë°è·®°ú °ÐÆ÷¸¦ Á¦½ÃÇÏ¿´´Ù.

2.5 ÃßÀ¼¼ºÈ¯°Ð¸®

ÀÚ·á¿¡ °èÀý¼ºÀÌ³ª ¼øÈ¯ÀÌ °¹ÀâÇÏ¸é ¸ðÇü¼³¸³¿¡ Àå¾Ö°¡ µÇ°í ½ÇÁ¦·Î Àå±âÀûÀÎ °ü°è¸¦ ÆÄ¾ÇÇÏ±â°¡ ¾î·Á¿ì¹Ç·Î °èÀý¼º°ú ¼øÈ¯À» Á¦°ÅÇÏ°í ÃßÀ¼¸¸ °¡ Áö°í ºÐ¼®ÇÏ´Â °ÍÀÌ ¹Ù¶÷Á÷ÇÑ °æ¿ì°¡ ÀÖ´Ù. Åë»ó, Àü³âµ¿±â´ë ºñÃõ°¡À²ÀÌ³ª °èÀýÀ» ³ªÅ¸³»´Â °¢°¢¿¡ ´ëÇÑ °¡º¯¼ö¸¦ µµÀÔÇÏ¿© ½Ã°è¿À» Á¶Á¤ÇÏ°Å³ª X11 °èÀý°ü¸µ¿ Á¶Á¤¹æ¹ýÀ» ÀÌ¿ëÇÏ¿© Á¶Á¤ÇÏ°í ÀÖ´Ù. ±× ·±µ¥, Àü³âµ¿±â´ëºñÃõ°¡À²ÀÌ³ª °¡º¯¼ö¸¦ µµÀÔÇÏ´Â ¹æ½ÄÀº È®Á¤ÀûÀÎ °èÀýÃß¼¼°¡ ÀÖÀ» °æ¿ì¿¡¸¸ °¡´É ÇÑ ¹æ¹ýÀÌ±â ¶§¹®¿¡ Á¦ÇÑÀûÀÎ »ç¿ëÀÌ °Ò°¡ÇÇÇÏ°í, X11 °èÀý°ü¸µ¿ Á¶Á¤¹æ¹ýÀº ¿ø°è¿°úÀÇ °ü°è¿¡ ´ëÇÑ °¹Àâ¾° ¶§¹®¿¡ ÇØ¼®¿¡ ´ëÇÑ ¾î·Á¿òÀÌ Á¸ÀçÇÑ´Ù.

ÃßÀ¼¿Í ¼øÈ¯À» ¸ðÇüÀ» ÅëÇØ ºÐ¸®ÇÏ´Â ¹æ¹ýÀ¸·Î ´Â Beverage and Nelson[9]ÀÇ ¹æ¹ý°ú Harvey[14] ¿Í Watson[19]ÀÇ »óÅÂ°ø°£¸ðÇüÀ» ÀÌ¿ëÇÑ ¹æ¹ýÀÌ ÀÖ´Ù. Â÷ÀÌÁ¡À° Beverage and Nelson[7]ÀÇ ¹æ¹ýÀÌ ÇÏ³ªÀÇ ¿ÀÂ÷Ç×À» °¡Á¤ÇÏ´Â ¹Ý¸é¿¡ Harvey(1985)¿Í Watson[19]ÀÇ ¹æ¹ýÀ° ÃßÀ¼¿Í ¼øÈ¯¿¡ ´ëÇØ ¿ÀÂ÷Ç× À» ´Ù¸£°Ô °¡Á¤ÇÑ´Ù´Â °ÍÀÌ´Ù.

3. ¸ðÇü¼³¸³°ú ÀÚ·áÃ³¸®

3.1 ¸ðÇü¼³¸³

°» ¿¬±¸¿¡¼´Â °¡Àå °£´ÜÇÑ ÇüÅÂÀÇ ÀûÀÀÀû ±â´ë ¸¦ °¡Á¤ÇÏ¿© ±Ý±âÀÇ ¹°°¡»ó½Â·üÀ» ±â´ë¹°°¡»ó½Â·ü ·Î ÀÌ¿ëÇÏ°í ¼±Çà¿¬±¸µé°ú ¸¶Âù°¡Áö·Î Á¦¾à¾ø´Â ÇÊ¼ÅÈ¿°ú¸¦ °¡Á¤ÇÏ¿© ½ÇÁú±Ý¸®¸¦ ¸ðÇüÈÇÑ´Ù. ½Ç Áú±Ý¸®¿Í ¸í¸ñ±Ý¸®ºü·Î ¸ðÇüÀ» 3°³ÀÇ ¹æÁ¤½ÄÀ¸·Î ¼ö¸³ÇÏ°í ¿¹»óÇÃ¡À¸·Î °í·ÁµÈ ½ÃÁ¡À» »çÀüÁ¤º¸·Î È°¿ëÇÏ¿© 5°³ÀÇ ±¸Á¶º¯È½ÃÁ¡À» °¡Á¤ÇÏ°í Hansen [13]¿¡ ±âÃÊÇÑ Á¢±Ù¹æ¹ýÀ» ÀÌ¿ëÇÏ¿© ±¸Á¶º¯È½ÃÁ¡ À» °¨ÁöÇÑ´Ù.

¿ì¼± ½ÇÁú±Ý¸®´Â ÇÊ¼ÅÈ¿°ú¸¦ ¹Ý¿µÇÏ¿© ¾Æ·¡ÀÇ ½Ä (1)¿¡ ÀÇÇØ °áÁ¤µÈ´Ù°í °¡Á¤ÇÏ°í ½ÇÁú±Ý¸®´Â ½Ä (2)Ã³·³ »ó¼öÇ×°ú ¿ÀÂ÷Ç×À¸·Î ¸ðÇüÈÇÑ´Ù. ¸ð¼öµé

Àº °æÁ¦¿ÜÀûÀÎ Ãæ°Ý¿¡ ÀÇÇØ ÃßÁ¤½Ä¿¡ º¯ÈÇÏ´Â °ÍÀÌ ÀÏ¹ÝÀûÀÌ±â ¶§¹®¿¡ ÀÓÀÇÀÇ ±¸°£¿¡ ´ëÇØ °¢°¢ ´Ù¸¥ ¸ðÇü°¡ Á¸ÀçÇÑ´Ù°í °¡Á¤ÇÑ´Ù. ½Ä (1)°ú ½Ä (2)¸¦ ½ÇÁú±Ý¸®¸¦ ÀÌ¿ëÇØ Á¤¸®ÇÏ¸é ½Ä (3)°ú °°°í ½Ä (4)¿Í ÇÔ²² ÇÇ¼ÒÀÈ¿°ú ÃßÁ¤½ÄÀÌ µÈ´Ù.

Hansen[13]Àº ½Ä (3)°ú ½Ä (4)¿¡ ´ëÇØ »ó°ü°ü°è ¿Í °è¿»ó°üÀÌ ÀÖ´Â °æ¿ì¿¡ ´ëÇØ ÀÏ¹ÝÀûÀÎ Á¢±Ù¹æ ¹ýÀ» Á¦½ÃÇÏ¿´´Âµ¥, °» ¿¬±¸¿¡¼´Â ¿ÀÂ÷Ç×µéÀÌ ¼·Î µ¶¸³ÀÌ°í °è¿»ó°üÀÌ Á¸ÀçÇÏÁö ¾Ê´Â °ÍÀ¸·Î ¸ðÇüÈÇÑ´Ù.

$$i_t = r_t + a_{2k}\pi_t^e, \quad (1)$$

$$r_t = a_{1k} + \varepsilon_{1t}, \quad (2)$$

$$i_t = a_{1k} + a_{2k}\pi_t^e + \varepsilon_{1t}, \quad (3)$$

$$\pi_t^e = \pi_{t-1}^e + \varepsilon_{2t}, \quad (4)$$

¿©±â¼, r_t´Â ½ÇÁú±Ý¸®, i_t´Â ¸í¸ñ±Ý¸®, π_t^e´Â ±â´ëÀÎ°¡»ó½Â·ü, $t=1,2,\ldots n$, $k=1,2,\ldots 6$, ¿ÀÂ÷Ç×µéÀº i.i.d ¹é»öÀâÀ½°úÁ¤ÀÌ°í ¼·Î µ¶¸³ÀÌ´Ù.

½ÇÁú±Ý¸®´Â ½Ä (2)Ã³·³ ¸ðÇüÈÇÒ ¼öµµ ÀÖÁö¸¸, ½Ä (5)Ã³·³ ½ÇÁú°æÁ¦º¯¼öÀÇ ±Ô¸ðÀÇ ÇÔ¼ö·Î ¸ðÇüÈÇÒ ¼ö ÀÖ´Ù. ½Ä (1)°ú ½Ä (5)¸¦ ½ÇÁú±Ý¸®¸¦ ÀÌ¿ëÇØ Á¤¸®ÇÏ¸é ½Ä (6)°ú °°´Ù. ±×¸®°í ½Ä (3)°ú ½Ä (4)¿¡¼ »ç¿ëÇÑ µ¿ÀÏÇÑ °¡Á¤À» ÀÌ¿ëÇÑ´Ù.

$$r_t = a_{1k} + a_{3k}y_t + a_{4k}g_t + a_{5k}e_t + \varepsilon_{3t}, \quad (5)$$

$$i_t = a_{1k} + a_{2k}\pi_t^e + a_{3k}y_t + a_{4k}g_t + a_{5k}e_t + \varepsilon_{3t}, \quad (6)$$

$$\pi_t^e = \pi_{t-1}^e + \varepsilon_{2t}, \quad (4)$$

$$y_t = y_{t-1} + \varepsilon_{4t}, \quad (7)$$

$$g_t = g_{t-1} + \varepsilon_{5t}, \quad (8)$$

$$e_t = e_{t-1} + \varepsilon_{6t}, \quad (9)$$

¿©±â¼, y_t´Â ½ÇÁú»ý»ê, g_t´Â ½ÇÁúÁ¤ºÎÁöÃâ, e_t´Â ½ÇÁúÈ¯À².

½Ä (3)°ú ½Ä (6)´Â ´ÙÀ½ ½Äµé°ú ÇÔ²² ½ÇÁú±Ý¸®ÀÇ ¼öÁØÀ» °áÁ¤ÇÏ°Ô µÈ´Ù. ½Ä (10)Àº ¼ÒµæÈ¿°ú¿Í À¯µ¿¼ºÈ¿°ú¸¦ °íÃÁÇÏ±â À§ÇÑ ½ÄµéÀÌ´Ù. ÀÌ ½ÄµéÀº °£ Á¢ÀûÀ¸·Î ¸í¸ñ±Ý¸®¿Í °ü·ÃµÇ¾î ½ÇÁú±Ý¸®¿¡ ¿µÇâÀ» ÁØ´Ù.

$$i_t = b_{1k} + b_{2k}y_t + b_{3k}m_t + \varepsilon_{7t}, \quad (10)$$

$$y_t = y_{t-1} + \varepsilon_{4t}, \quad (7)$$

$$m_t = m_{t-1} + \varepsilon_{8t}, \quad (11)$$

¿©±â¼, m_t´Â ½ÇÁúÅëÈ·®.

Á¦¾ÈµÈ ½Äµé¿¡¼ ±¸Á¶º¯È¸¦ °ËÁ¤ÇÏ±â À§ÇÑ Hansen[13]ÀÇ ÀÏ¹ÝÀûÀÎ °øÀû°ÐºÐ¸ðÇü¿¡¼ÀÇ ±¸Á¶º¯ ÈÀÇ½ÄÀº ´ÙÀ½°ú °°´Ù. ½Ä (12)¿Í ½Ä (13)Àº Á¦¾ÈµÈ ¸ðÇüÀ» ÀÏ¹ÝÀû·Î ³ªÅ¸³½ ½ÄµéÀÌ´Ù.

$$y_t = A_t[1£ºx_t]^T + u_{1t} \quad t=1,2,¡¦,n, \quad (12)$$

$$x_t = x_{t-1} + u_{2t}, \quad (13)$$

¿©±â¼,

$$A_t = \begin{cases} A_1, & w \le t \\ A_2, & w > t \end{cases},$$

x_t´Â È¸±Íº¯¼öÇà·Ä $(h \times 1)$, A_t´Â °øÀû°Ð°è¼ö $(h+1) \times 1$, w´Â ¾Ë·ÁÁö Ø ÀÖÁö ¾ÊÀº ±¸Á¶º¯È½ÃÁ¡.

$$SupF = \sup_{t/n \in \Gamma} F_{nt},\ \Gamma = [0+\eta,\ 1-\eta], \quad (14)$$

$$F_{nt} = \left(\sum_{i=1}^{t} x_i\widehat{u_i}\right)^T (s^2 V_{nt})^{-1} \left(\sum_{i=1}^{t} x_i\widehat{u_i}\right),$$

$$V_{nt} = \sum_{i=1}^{t} x_i x_i^T - \sum_{i=1}^{t} x_i x_i^T \left(\sum_{i=1}^{n} x_i x_i^T\right)^{-1} \sum_{i=1}^{t} x_i x_i^T$$

¿©±â¼,

s^2£ºx_t¿¡ ´ëÇÑ Àå±âÁ¶°Ç°Î ºÐ»êÀÇ ÃßÁ¤·®

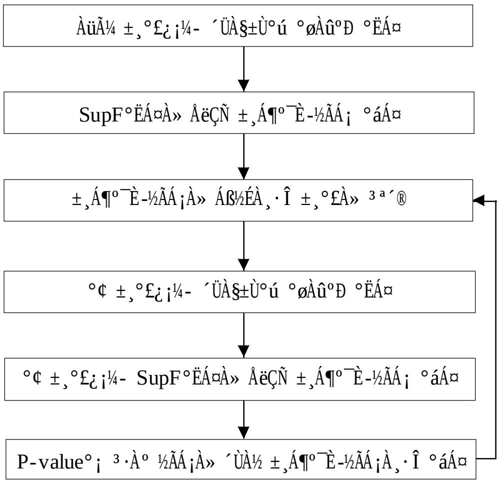
$\widehat{u_i}$£ºPhillips and Hansen(1990)ÀÇ FMÃßÁ¤¹ý ¿¡ ÀÇÇØ ±¸ÇØÁø ÀÜÂ÷.

AÀÇ º¯È¸¦ °ËÁ¤ÇÏ±â À§ÇÑ Åë°è·® ½Ä (14)´Â Quandt[17]°ú Andrew[6]¿¡ ÀÇÇØ °³¹ßµÈ Supremum F Åë°è·®À¸·Î¼ °íÀüÀûÀÎ WaldÅë°è·®°ú À¯»çÇÑ Åë°è·®ÀÌ´Ù. ½Ä (14)ÀÇ Γ´Â ±¸Á¶º¯È½ÃÁ¡ ±îÁöÀÇ ÀüÃ¼Ç¥º»±â°£¿¡ ´ëÇÑ °ñÀ²ÀÌ°í, η´Â °ÐÈ÷ ÀÇ ¼ö·ÀÀ» À§ÇØ ¿©±â¼ ¾çÂÊÀ¸·Î ³¡±¸°£À» Á¦¿ÜÇÑ°´Â °ñ À²À» Ç¥½ÃÇÏ´Â º¯¼öÀÌ´Ù. Hansen[13]Àº ½Ä (12)¿Í ½Ä (13)°ú °°Àº °Ò¼ÈÁ¤ÀûÀÎ ½ÃÀ°è¿¿¡¼ Andrew[6] ¿¡ µû¶ó η¸¦ 0.15·Î °¡Á¤ÇÏ°í¼ Supremum FÀÇ °ÐÈ÷¸¦ ±¸ÇÏ¿´´Ù.

±×·±µ¥, ÀÌ¿Í °°Àº ¹æ¹ýÀº ÀÜ±¸°£¿¡¼ ÇÑ¹øÀÇ

±¸Á¶º¯È¸¦ °¡Á¤ÇÏ°í ÀÖ±â ¶§¹®¿¡ °ó¹øÇÑ ±¸Á¶º¯È¿¡ ´ëÇØ¼ Àû¿ëÇÏ±â À§ÇØ ´ÙÀ½°ú °°À º ¾Ë°í¸®Áò À» Á¦½ÃÇÑ´Ù. ¿ì¼±, Àü±¸°£¿¡¼ ÇÑ¹øÀÇ ±¸Á¶º¯È¸¦ °¨ÁöÇÑ´Ù. °¨ÁöµÈ ±¸Á¶º¯È½ÃÁ¡À» Áß½ÉÀ¸·Î µÎ ±¸°£À¸·Î ³ª´©°í, °¢ ±¸°£¿¡ ´ëÇØ µ¶¸³ÀûÀ¸·Î ±¸Á¶º¯È¸¦ °¨ÁöÇÑ´Ù. ¾ç ±¸°£¿¡¼ À¯ÀÇ¹ÌÇÑ ³ôÀº ±¸Á¶º¯È½ÃÁ¡ÀÌ ´ÙÀ½ ±¸Á¶º¯È½ÃÁ¡À¸·Î °£ÁÖÇÑ´Ù. ´Ù À½ ±¸Á¶º¯È½ÃÁ¡µµ °°Àº ÀýÂ÷·Î ¹Ýº¹Çß¿© ÀÛ¾÷À» ¿©·¯ ¹ø ³»ÀÇ ±¸Á¶º¯È½ÃÁ¡À» Ã£´Â´Ù.

±¸Á¶º¯ÈÀÇ½ÃÁ¡À» ÃßÁ¤ÇÏ±â Àü¿¡ °øÀû°Ð °ü°è ¿¡ ´ëÇÑ °¡Á¤ÀÇ Å¸´ç¼ºÀ» °ËÁõÇÏ±â À§ÇØ Augmented Dickey Fuller°ËÁ¤À» ÀÌ¿ëÇÏ¿© °¢ ½Ã°è¿ÀÇ ´ÜÀ§±Ù °ËÁ¤°ú °øÀû°Ð °ËÁ¤À» ¼öÇàÇÑ´Ù.[1] °øÀû°Ð ÀÌ ¼º¸³ÇÏ¸ö ¾Ê´Â °æ¿ì´Â µÎ °¡Áö °æ¿ì°¡ Á¸ÀçÇÑ´Ù.



<±×¸² 1> ±¸Á¶º¯È°Ð¼®¹æ¹ý ÀýÂ÷

Ã¹Â°·Î, Á¾¼Óº¯¼ö¿¡ ´ëÇÑ ´ÜÀ§±ÙÀÌ Á¸ÀçÇÏÁö¸¸, µ¶¸³º¯¼ö¿¡´Â ´ÜÀ§±ÙÀÌ Á¸ÀçÇÏÁö ¾Ê´Â °æ¿ì¿Í µ¶¸³º¯¼ö¿¡ µµ ´ÜÀ§±ÙÀÌ Á¸ÀçÇÏÁö¸¸ °øÀû°ÐÀÌ ¼º¸³ÇÏÁö ¾Ê´Â °æ¿ì, µÑÂ°·Î, Á¾¼Óº¯¼ö¿¡ ´ÜÀ§±ÙÀÌ Á¸ÀçÇÏÁö ¾Ê´Â °æ¿ìÀÌ´Ù.

Ã¹ ¹øÂ° °æ¿ì¿¡´Â Â÷ºÐÀ» ÃëÇÏ¿© °ËÁ¤ÇÏ¸ç, µÎ ¹øÂ° °æ¿ì¿¡´Â ±×´ë·Î °ËÁ¤ÇÏµÇ µÎ °æ¿ì¿¡ ÀÖ¾î ¼ ¸ðµÎ °Ð÷Ç¥´Â ¾ÈÁ¤ÀûÀÎ È¸±Í°¼ö¸¦ °¡Á¤ÇÑ Andrews[6]°¡ Á¦½ÃÇÑ °Ð÷Ç¥¸¦ »ç¿ëÇÑ´Ù.[2] ÀÌ¿Í °°À º °úÁ¤À» µµ½ÄÈÇÏ¸é ´ÙÀ½°ú °°´Ù.

3.2 ÀÚ·áÃ³¸®

Á¦¾ÈµÈ ½ÄµéÀ» Ãß·ÂÇÏ±â À§ÇÑ ´ë¸® º¯¼öµéÀº ´ÙÀ½ °°´Ù. ½Ä (3)¿¡¼ ¸í¸ñÝ¸®´Â 3³â¸¸±â ¿ùÆò ±Õ È¸»çÃ¤¼öÀÍ·ü, ±â´ë¹°°¡»ó½Â·üÀº Àü³âµ¿±â´ë¹ñ ¼Òºñ ÀÚ ¹°°¡»ó½Â·üÀ» »ç¿ëÇÑ´Ù. ½Ä (6)¿¡¼ ½ÇÁú ¼ÒµæÀº »ê¾÷»ý»êÁö¼ö(1995 = 100)¸¦, ½ÇÁúÁ¤ºÎÁö ÃâÀº ÇÑ±¹ÀºÇà¿¡¼ Áý°èµÇ´Â ¿ùÁ¤ºÎÁöÃâÀ» ¼Òºñ ÀÚ¹°°¡·Î ³ª´« °ÍÀ», ½ÇÁúÈ¯À²Àº ´ë¹ÌÈ¯À²¿¡ ¹Ì ±¹´ë ÇÑ±¹ ¼ÒºñÀÚ¹°°¡ÀÇ »ó´ëºñÀ²À» °öÇÑ °ÍÀ» »ç¿ëÇÑ´Ù. ½Ä (10)¿¡¼ ½ÇÁúÅëÈ·®Àº ÃÑÅëÈ(M2)¸¦ ¼ÒºñÀÚ¹°°¡·Î ³ª´« °ÍÀ» »ç¿ëÇÑ´Ù. º»ÆäÀÌ Å©±â ¿¡ µû¶ó Áõ°¡ÇÏ´Â ½Ã°è¿(»ê¾÷»ý»êÁö¼ö, ½ÇÁúÁ¤ °ÎÁöÃâ, ½ÇÁúÈ¯À², ½ÇÁúÅëÈ·®)À º ÀÚ¿¬´ë¼ö¸¦ Ãë ÇÑ´Ù.

¸ðµç º¯¼ö´Â Àü±¸°£¿¡¼ ´ÜÀ§±ÙÀ» °¡Áö´Â °ÍÀ¸ Á¤ÀûÀÎ ½Ã°è¿ÀÌ°í, °¡Á¤ÇÑ ½ÄµéÀº °øÀû°Ð °ü°è ½ÄÀÌ µÈ´Ù. ÃßÁ¤°£ÀÇ Àå±âÀûÀÎ °ü°è¸¦ °Ð¼®ÇÏ±â

1) °» ³í¹®¿¡¼ÀÇ ´ÜÀ§±Ù °ËÁ¤Àº ¿ÀÂ÷Ç×ÀÇ ½Ã°è¿ »ó°üÀ» °í·ÁÇÏÁö ¾Ê°í ´ÙÀ½°ú °°À º ½Ä¿¡¼ $\rho = 1$ÀÌ °¡¼³À» °ËÁ¤ÇÑ´Ù.

$$\triangle y_t = \alpha + (\rho - 1) y_{t-1} + \varepsilon_t$$

°øÀû°Ð °ËÁ¤À º ÃßÁ¤µÈ ¿ÀÂ÷Ç×À» ÀÌ¿ëÇÏ¿© ´ÙÀ½°ú °°À º ½Ä¿¡¼ $\rho = 1$ÀÌ °¡¼³À» °ËÁ¤ÇÑ´Ù.

$$\triangle y_t = (\rho - 1) y_{t-1} + \varepsilon_t$$

2) Andrews[6]ÀÇ °Ð÷Ç¥´Â 10%, 5%, 1%ÀÇ À¯ÀÇ ¼öÁØ¿¡ µû¸¥ ±â°¢¿ª¿¡ ´ëÇØ¼¸¸ Á¦½ÃÇÏ°í ÀÖ¾î¼ °¢ ±¸°£ÀÇ SufF¿¡ ´ëÇÑ p-value¸¦ ±¸ÇÏÁö ¸øÇÔÀ¸·Î ½Ã Hansen[13]ÀÌ Á¦½ÃÇÑ °Ð÷Ç¥¿Í °ñ±³°¡ ¾î·Æ´Ù. µû¶ó¼, °»¹®¿¡¼´Â °Ð÷Ç¥·Î°ÎÀÍ ¼¼ Á¡À» ·ÎÁö½º°Æ½ È¸±Í¸ðÇüÀ¸·Î ÃßÁ¤ÇÏ¿© ¸ðµç supF ¿¡ ´ëÇÑ p-value¸¦ °è»êÇÑ´Ù. Hansen[13]µµ 10%, 5%, 1%ÀÇ À¯ÀÇ ¼öÁØ¿¡ µû¸¥ ±â°¢¿ª¿¡ ´ëÇØ¼¸¸ Á¦½ÃÇÏ°í ´Ù¸¥ supF¿¡ ´ëÇØ¼´Â ÃßÁ¤µÈ 3Â÷ ´ÙÇ×½ÄÀ¸·Î °è»êÇÏ°Ô ÇÏ¿´´Ù. ±×·±µ¥, ÀÌ ´ÙÇ×½ÄÀº Å« °ª¿¡ ´ëÇØ À½ÀÇ °ªÀ» ÁÖ¹Ç·Î Andrews[6]ÀÇ °Ð÷Ç¥¿¡¼¿Í °°ÀÌ ¼¼ Á¡À» ·ÎÁö½º°Æ½ È¸±Í¸ðÇüÀ¸·Î ÃßÁ¤ÇÏ¿© ¸ðµç supF¿¡ ´ëÇÑ p-value¸¦ °è»êÇÑ´Ù. ÃßÁ¤°á°ú´Â <°Î·ÏA>¸¦ ÂüÁ¶ÇÑ´Ù.

À§ÇØ Beverage and Nelson[9]ÀÇ °ÐÇØ¹æ¹ýÀ» ÀÌ¿ë ÇÏ¿© È®Á¤ÀûÀÎ ½Ã°£ÃßÁ¾¼¸ °èÀý¿äÀÎ ±×¸®°í ¼øÈ¯¿ä ÀÎÀ» Á¦°ÅÇÑ´Ù. ÃßÁ¤µÈ ARIMA ¸ðÇüÀº <°Î·ÏB>¿¡ ¼ö·ÏÇÏ¿´´Ù. ARIMA ¸ðÇüÃßÁ¤½Ã Dickey, Hasza and Fuller[12]ÀÇ °èÀý´ÜÀ§±Ù °ËÁ¤¹æ¹ý°ú Said and Dickey[18]ÀÇ ´ÜÀ§±Ù °ËÁ¤¹æ¹ýÀ» ÀÌ¿ëÇÏ¿´´Ù. Æ¯°° È÷, »ê¾÷»ý»êÁö¼ö, ½ÇÁúÁ¤°ÎÁöÃâ, ½ÇÁúÈ¯À², ½ÇÁúÀë È·®µîÀº °èÀý´ÜÀ§±ÙÀÌ Àë°èÀûÀ¸·Î´Â °ËÁ¤ÀÌ µÇÁö ¾ÊÀ¸³ª 12±â °èÀýÂ÷°ÐÇÏ¿© ¸ðÇüÈÇÏ´Â °ÍÀÌ ¸ðÇü ÀÇ °Ð»êÀ» ÁÙÀÌ±â ¶§¹®¿¡ °èÀýÂ÷°ÐÀ» ¼öÇàÇÏ¿´´Ù. ÀÚ¿¬´ë¼ö¸¦ ÃëÇÑ ½Ã°è¿ÀÌ¹Ç·Î Àü³âµ¿±â´ë°ñ Áõ°¡ À²À» »ç¿ëÇÑ °Í°ú °°Ô µÈ´Ù.

±¸°£À° È¸»çÃ¤¼öÀÎ·ü¿¡ Áý°è½ÃÀ¡¿¡ µû¶ó 1975³â 1¿ù°ÎÁÍ·Î ÇÏµÇ °èÀý¿äÀÎÀÌ Á¸ÀçÇÏ¿© ÃßÁ¤¼¸¦ ±¸ÇÏ ±â À§ÇØ ÃÊ±â°ªµéÀÌ ÇÊ¿äÇÒ °æ¿ì´Â ¾Õ¼± ±¸°£¿¡ ÀÖ´Â ÀÚ·á¸¦ È°¿ëÇÑ´Ù(±â´ë¹°°¡»óÂ÷·ü¿¡ ½ÇÁú¼Òµæ, ½ÇÁúÁ¤°ÎÁöÃâ, ½ÇÁúÈ¯À², ½ÇÁúÀëÈ·®¿¡ ´ëÇØ¼´Â 1970³â 1¿ù, ÇØ¿Ü±Ý¸®¿¡ ´ëÇØ¼´Â 1971³â 1¿ù°ÎÁÍ ÀÚ·á»ç¿ë). Æ¯°°È÷, ½ÇÁúÁ¤°ÎÁöÃâÀº 99³â 2¿ù±îÁö ÀÚ·á°¡ Á¸ÀçÇÏ±â ¶§¹®¿¡ 99³â 6¿ù±îÁö´Â ¸ðÇü¿¡ ¼ ±¸ÇÑ ¿¹ÃøÄ¡¸¦ ÀÌ¿ëÇÑ´Ù.

4. ¸ðÇüÃßÁ¤°á°ú

4.1 ÇÇ¼³Àè¿°ú

½Ä (3)À° ÇÇ¼³Àè¿°ú¸¸À» ÀÌ¿ëÇÏ¿© ½ÇÁú±Ý¸®¸¦ ÆÄ ¾ÇÇÏ´Â ½ÄÀÌ´Ù. ´Ù¸ ¹øÀÇ ±¸Á¶º¯È°¡ ¹ß»ýÇß´Ù´Â ÀüÁ¦ÇÏ¿¡ °»¹®¿¡¼ Á¦½ÃµÈ ±¸Á¶º¯È ÀÎ½Ä¹æ¹ýÀ» Àû ¿ëÇÑ´Ù. ¿ì¼±, ÀüÃ¼±¸°£¿¡¼ ¸í¸ñ±Ý¸®¿¡ ´ëÇÑ ´ÜÀ§ ±Ù °ËÁ¤Åë°è·®(DF)°ªÀº -1.67ÀÌ°í p-value´Â 0.44 ·Î¼ ´ÜÀ§±ÙÀÌ Á¸ÀçÇÑ´Ù´Â °¡¼³À» ±â°¢ÇÏÁö ¸øÇÑ ´Ù. ¸¶Âù°¡Áö·Î, ±â´ë¹°°¡»óÂ÷·ü¿¡ ´ëÇÑ ´ÜÀ§±Ù °Ë Á¤Åë°è·®(DF)°ªÀº -1.10ÀÌ°í p-value´Â 0.72·Î¼ ´ÜÀ§±ÙÀÌ Á¸ÀçÇÑ´Ù´Â °¡¼³À» ±â°¢ÇÏÁö ¸øÇÑ´Ù. µû ¶ó¼ ¸ðµÎ ´ÜÀ§±ÙÀ» °¡Áö´Â °Ò¾ÈÁ¤ÇÑ ½Ã°è¿ÀÌ ´Ù. µÎ ½Ã°è¿¿¡ ´ëÇÑ °øÀû°Ð °ËÁ¤Åë°è·®(DF)°ª À° -3.77ÀÌ°í p-value.´Â 0.00À¸·Î¼ °øÀû°ÐÀÌ ¼°¸³ÇÑ´Ù. Àû±¸°£ÀÇ SupF°ªÀ» ÅëÇØ 78³â 9¿ù(49.35, pvalue£º0.00)À» Ã¹ ¹øÂ° ±¸Á¶º¯È½ÃÁ¡À¸·Î ÃßÁ¤ ÇÑ´Ù.

´ÙÀ½À° 78³â 9¿ùÀ» ÁßÁ½ÉÀ¸·Î ÇÏ¿© µÎ °³ÀÇ ±¸°£ À¸·Î ³ª´©°í °¢ ±¸°£¿¡¼ °³°º½Ã°è¿¿¡ ´ëÇÑ ´ÜÀ§ ±Ù°ú °øÀû°Ð °ËÁ¤À» ¼öÇàÇÑ´Ù. ¿ì¼± Ã¹ ¹øÂ° ±¸°£ ¿¡¼ ¸í¸ñ±Ý¸®¿¡ ´ëÇÑ ´ÜÀ§±Ù °ËÁ¤Åë°è·®(DF)°ª À° -6.37ÀÌ°í p-value´Â 0.00·Î¼ ´ÜÀ§±ÙÀÌ Á¸ÀçÇÑ ´Ù´Â °¡¼³À» ±â°¢ÇÑ´Ù. ¹Ý¸é¿¡, ±â´ë¹°°¡»óÂ÷·ü¿¡ ´ëÇÑ ´ÜÀ§±Ù °ËÁ¤Åë°è·®(DF)°ªÀº -1.39ÀÌ°í p-value´Â 0.57·Î¼ ´ÜÀ§±ÙÀÌ Á¸ÀçÇÑ´Ù´Â °¡¼³À» ±â °¢ÇÏÁö ¸øÇÑ´Ù. µû¶ó¼ ÀÌ ±¸°£¿¡¼ °øÀû°ÐÀÌ ¼°¸³ ÇÏÁö ¾Ê´Â´Ù. ÀÌ ±¸°£ÀÇ SupF´Â °ªÀÌ 4.09ÀÌ°í pvalue´Â 0.85·Î¼ À¯ÀÇÇÏÁö ¾Ê´Ù.

´Ù¸¥ µÎ ¹øÂ° ±¸°£¿¡¼ ¸í¸ñ±Ý¸®¿¡ ´ëÇÑ ´ÜÀ§±Ù °ËÁ¤Åë°è·®(DF)°ªÀº -1.55ÀÌ°í p-value´Â 0.50·Î ¼ ´ÜÀ§±ÙÀÌ Á¸ÀçÇÑ´Ù´Â °¡¼³À» ±â°¢ÇÏÁö ¸øÇÑ´Ù. ¸¶Âù°¡Áö·Î, ±â´ë¹°°¡»óÂ÷·ü¿¡ ´ëÇÑ ´ÜÀ§±Ù °ËÁ¤ Åë°è·®(DF)°ªÀº -1.13ÀÌ°í p-value´Â 0.70À¸·Î¼ ´ÜÀ§±ÙÀÌ Á¸ÀçÇÑ´Ù´Â °¡¼³À» ±â°¢ÇÏÁö ¸øÇÑ´Ù. µû¶ó¼ ¸ðµÎ ´ÜÀ§±ÙÀ» °¡Áö´Â °Ò¾ÈÁ¤ÇÑ ½Ã°è¿ ÀÌ´Ù. µÎ ½Ã°è¿¿¡ ´ëÇÑ °øÀû°Ð °ËÁ¤Åë°è·®(DF) °ªÀº -3.36ÀÌ°í p-value´Â 0.00À¸·Î¼ °øÀû°ÐÀÌ ¼°¸³ÇÑ´Ù. ÀÌ ±¸°£ÀÇ SupF°ªÀ» ÅëÇØ 81³â 12¿ù (49.19, pvalue£º0.00)À» µÎ ¹øÂ° ±¸Á¶º¯È½ÃÁ¡À¸ ·Î ÃßÁ¤ÇÑ´Ù.

´ÙÀ½¿¡´Â 78³â 9¿ù°ú 81³â 12¿ùÀ» ÁßÁ½ÉÀ¸·Î ÇÏ ¿© ¼¼ °³ÀÇ ±¸°£À¸·Î ³ª´©°í °¢ ±¸°£¿¡¼ ±¸Á¶º¯ ÈÀÌ½Ä¹æ¹ýÀ» Àû¿ëÇÑ´Ù. Ã¹ ¹øÂ° ±¸°£ÀÇ SupF´Â ÀÌ¹Ì 2´Ü°è¿¡¼ ±¸ÇÏ¿´´Ù. 78³â 10¿ù°ÎÁÍ 81³â 12 ¿ù±îÁö µÎ ¹øÂ° ±¸°£¿¡¼ ¸í¸ñ±Ý¸®¿¡ ´ëÇÑ ´ÜÀ§±Ù °ËÁ¤Åë°è·®(DF)°ªÀº -1.93ÀÌ°í p-value´Â 0.31·Î ¼ ´ÜÀ§±ÙÀÌ Á¸ÀçÇÑ´Ù´Â °¡¼³À» ±â°¢ÇÏÁö ¸øÇÑ´Ù. ¸¶Âù°¡Áö·Î, ±â´ë¹°°¡»óÂ÷·ü¿¡ ´ëÇÑ ´ÜÀ§±Ù °ËÁ¤ Åë°è·®(DF)°ªÀº -1.57ÀÌ°í p-value´Â 0.48·Î¼ ´Ü À§±ÙÀÌ Á¸ÀçÇÑ´Ù´Â °¡¼³À» ±â°¢ÇÏÁö ¸øÇÑ´Ù. µû¶ó ¼ ¸ðµÎ ´ÜÀ§±ÙÀ» °¡Áö´Â °Ò¾ÈÁ¤ÇÑ ½Ã°è¿ÀÌ´Ù. µÎ ½Ã°è¿¿¡ ´ëÇÑ °øÀû°Ð °ËÁ¤Åë°è·®(DF)°ªÀº -1.77

ÀÌ°í p-value´Â 0.07·Î¼ °øÀû°ÐÀÌ ¼°¸³ÇÑ´Ù. ÀÌ ±¸°£ÀÇ SupF°ªÀ» ÂëÇØ 80³â 12¿ù(22.81, pvalue£º 0.00)À» µÎ ¹øÂ° ±¸Á¶º¯È½ÃÁ¡ ÈÄº¸·Î µÐ´Ù.

82³â 1¿ù°ÎÅÍ 99³â 6¿ù±îÁö ¼¼ ¹øÂ° ±¸°£¿¡¼ ¸í¸ñ±Ý¸®¿¡ ´ëÇÑ ´ÜÀ§±Ù °ËÁ¤Åë°è·®(DF)°ªÀº -3.37ÀÌ°í p-value´Â 0.01·Î¼ ´ÜÀ§±ÙÀÌ Á¸ÀçÇÑ´Ù´Â °¡¼³À» ±â°¢ÇÑ´Ù. ¸¶Âù°¡Áö·Î, ±â´ë¹°°¡»ó½Â·ü¿¡ ´ëÇÑ ´ÜÀ§±Ù °ËÁ¤Åë°è·®(DF)°ªÀº -4.42ÀÌ°í p-value´Â 0.00·Î¼ ´ÜÀ§±ÙÀÌ Á¸ÀçÇÑ´Ù´Â °¡¼³À» ±â°¢ÇÑ´Ù. µû¶ó¼ ¸ðµÎ ¾ÈÁ¤ÀûÀÎ ½Ã°è¿ÀÌ´Ù. ÀÌ ±¸°£ÀÇ SupF°ªÀ» ÂëÇØ 89³â 12¿ù(94.61, pvalue£º0.00)À» µÎ ¹øÂ° ±¸Á¶º¯È½ÃÁ¡ ÈÄº¸·Î µÐ´Ù. °¢ ±¸°£¿¡¼ ±¸ÇÑ SupF Áß¿¡ °¡Àå ÀÛÀº p-value¸¦ °¡Áö´Â ½ÃÁ¡À° 89³â 12¿ù·Î¼ ÀÌ ½ÃÁ¡À» ¼¼ ¹øÂ° ±¸Á¶º¯È½ÃÁ¡À¸·Î ÃßÁ¤ÇÑ´Ù.

´ÙÀ½¿¡´Â 78³â 9¿ù, 81³â 12¿ù, 89³â 12¿ùÀ» Áß½ÉÀ¸·Î ÇÏ¿© 4°³ÀÇ ±¸°£À¸·Î ³ª´©°í, °¢ ±¸°£¿¡¼ 3´Ü°è¿Í °°Àº ¹æ½ÄÀ¸·Î ±¸Á¶º¯ÈÀÌ½Ã¹ýÀ» Àû¿ëÇÑ´Ù. ÀÌ¿Í °°Àº ¹æ½ÄÀ¸·Î 5°³ÀÇ ±¸Á¶º¯È½ÃÁ¡À» Ã£´Â´Ù. ÀÌ½ÄµÈ ±¸Á¶º¯È½ÃÁ¡°ú Åë°è·®ÀÌ <±×¸² 2>¿¡ Á¦½ÃµÇ¾î ÀÖ´Ù.

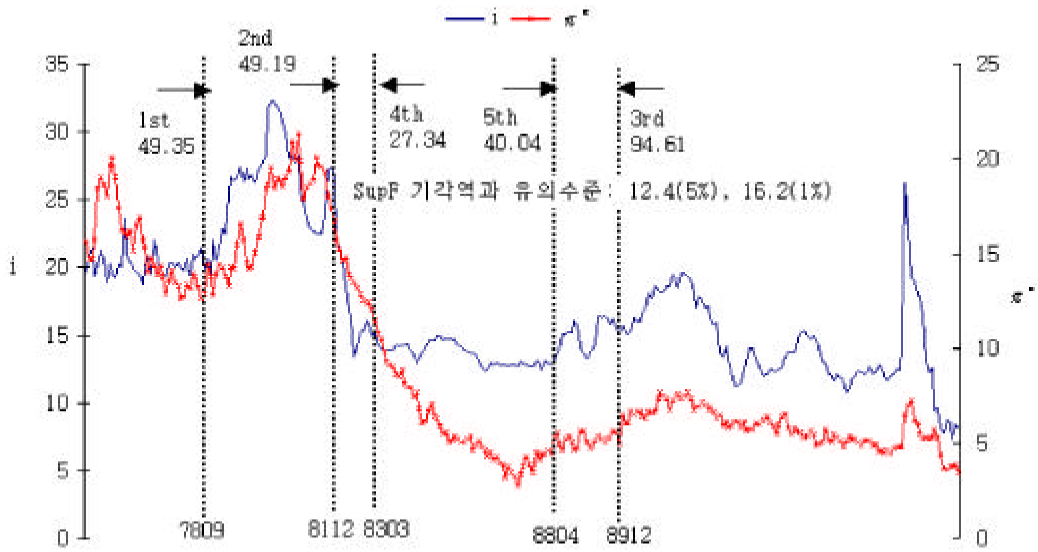
¸í¸ñ±Ý¸®¿Í ±â´ë¹°°¡»ó½Â·ü¿¡ ´ëÇØ °¢ ±¸°£¿¡¼ ÃßÁ¤µÈ ¿©¸¦ ½ÄÀÇ °á°ú´Â <Ç¥ 6>°ú °°´Ù. ±¸°£¿¡ µû¶ó¼´Â ½Ã°è¿ÀÌ ¾ÈÁ¤ÀûÀÎ ±¸°£°ú °Ò¾ÈÁ¤ÇÏÁö¸¸ °øÀû°ÐÀÌ ¼°¸³ÇÏÁö ¾Ê´Â ±¸°£ÀÌ Á¸ÀçÇÑ´Ù. ¾ÈÁ¤Àû

<Ç¥ 6> °¢ ±¸°£ ÃßÁ¤¸ðÇü

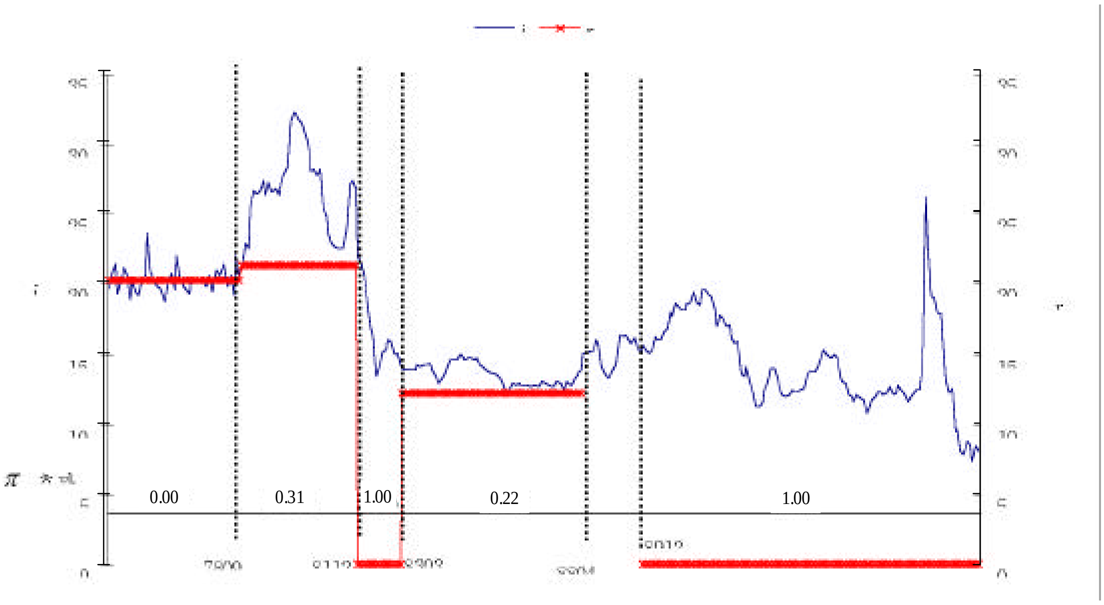
	±¸°£	ÃßÁ¤ ½Ä	MSE	DF
1	75.1¡-78.9	$i_t = 20.31_{*}$ (149.04)	0.84	
2	78.10¡-81.12	$i_t = 21.36 + 0.31\pi_t^e$ $(5.79)\ (1.46)$	8.74	-1.77 (0.07)**
3	82.1¡-83.3	$i_t = 1.26\pi_t^e$ (39.99)	2.65	-1.72 (0.08)
4	83.4¡-88.4	$i_t = 12.27 + 0.22\pi_t^e$ $(47.34)\ (5.20)$	0.40	-1.93 (0.05)
5	88.5¡-89.12	$\triangle i_t = 0$	0.57	
6	90.1¡-99.6	$i_t = 2.43\pi_t^e$ (76.35)	4.09	-3.99 (0.00)
Àü±¸°£		$i_t = 9.24 + 0.84\pi_t^e$ $(27.77)\ (26.22)$	7.73	-3.76 (0.00)

* ()´Â t value, ** ()´Â pvalue

ÀÎ ±¸°£¼´Â ±×´ë·Î ¸ðÇüÀ» ¼³Á¤ÇÏ°í, °Ò¾ÈÁ¤ÀûÀÌ¸é¼ °øÀû°ÐÀÌ Á¸ÀçÇÏÁö ¾Ê´Â °æ¿ì´Â Â÷°ÐÇÏ¿© ¸ðÇüÀ» ¼³Á¤ÇÑ´Ù. Àü±¸°£¿¡¼´Â ½ÇÁú±Ý¸®¼öÁØÀÌ



<±×¸² 2> ±¸Á¶º¯È½ÃÁ¡°¨Áö ¼ø¼¿Í SupFÅë°è·®



<±×¸² 3> ½ÇÁú±Ý¸®¿Í ÀÎÇÃ·¹ÀÌ¼Ç ÃßÁ¤Ä¡

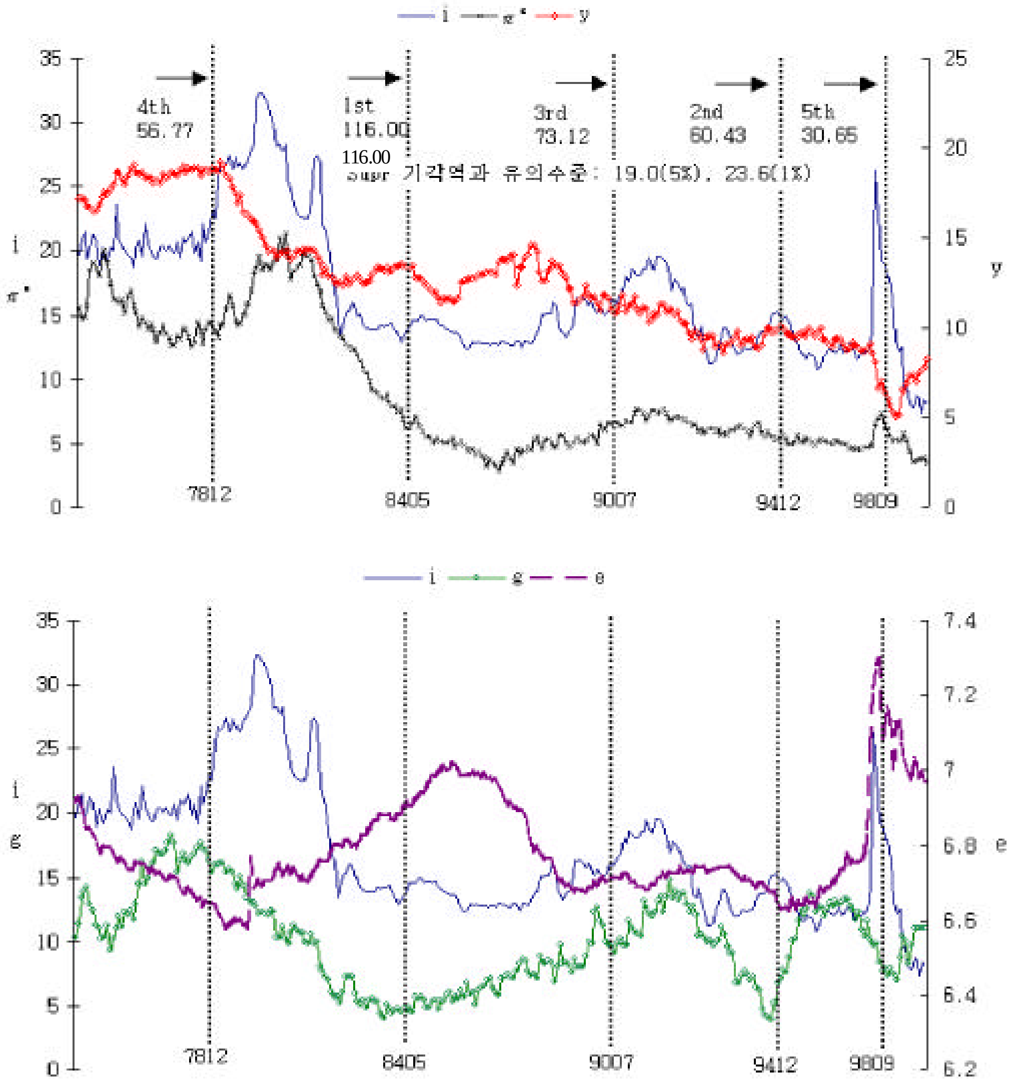
9.24ÀÌ°í ÇÇ¼ÅÈ¿°ú°è¼ö´Â 0.83À¸·Î À¯ÀÇÇÏÁö¸¸ ¼¼ °Î±¸°£¿¡¼´Â °¯µ¿ÀÌ ½ÉÇÏ´Ù.

ÇÔÁ¤È£¿Í ÃÖ¿î±Ô[5]´Â 75³â 1/4ºÐ±â°ÎÅÍ 90³â 4/4ºÐ±â±îÁöÀÇ ÇÇ¼ÅÈ¿°ú¸¦ 0.39·Î ÃßÁ¤ÇÏ°í ÀÖ ´Âµ¥ 2±¸°£°ú 4±¸°£ÀÇ °á°ú¿Í ÀÏÄ¡ÇÏ°í ÀÖ´Ù. ±è¼¼Áø°ú ÀÌÁõ¶ô[1]À° 75³â 1¿ù°ÎÅÍ 92³â 12¿ù ±îÁöÀÇ ÇÇ¼ÅÈ¿°ú¸¦ 0.76À¸·Î ÃßÁ¤ÇÏ°í ÀÖÁö¸¸, À¯»çÇÑ ±¸°£À» Ã£À» ¼ö°¡ ¾ø´Ù. ÀåÈ«¹ü[3]À° 83³â 2/4ºÐ±â°ÎÅÍ 95³â 4/4ºÐ±â±îÁö ´Ü±âÇÇ¼ÅÈ¿°ú¸¦ 0.84·Î ÃßÁ¤ÇÏ°í ÀÖ´Âµ¥, °» °á°ú¿¡¼´Â µ¿ÀÏÇÑ ±¸°£¿¡ ¼ 5±¸°£À³·³ °Ò¼ÅÁ¤ÀûÀÎ ±¸°£°ú 4±¸°£°ú 6±¸°£À³·³ °øÀû°ÐÀÌ ¼º¸³ÇÏ°í ÀÖ´Â ±¸°£ÀÌ Á¸ÀçÇÏ°í ÀÖ´Ù.

<Ç¥ 7> °¢ ±¸°£ ÃßÁ¤¸ðÇü

±¸°£		ÃßÁ¤½Ä	MSE	DF
1	75.1¡-78.12	$i_t = 20.43$ * (138.38)	1.04	
2	79.1¡-84.5	$i_t = -136.19 + 0.73\pi_t^e + 1.40g_t + 19.88e_t$ (-2.16) (8.34) (6.42) (2.19)	4.60	-2.95 (0.04)**
3	84.6¡-90.7	$i_t = 65.48 + 0.35\pi_t^e - 0.45y_t - 0.16g_t - 6.75e_t$ (7.39) (3.30) (-4.69) (-2.27) (-5.84)	0.43	-3.80 (0.00)
4	90.8¡-94.12	$i_t = 361.72 + 1.44y_t + 0.53g_t - 54.54e_t$ (5.52) (6.42) (7.11) (-5.67)	1.06	-5.12 (0.00)
5	95.1¡-98.9	$i_t = -91.77 + 2.03\pi_t^e + 1.15y_t - 0.29g_t + 12.92e_t$ (-4.55) (3.63) (3.20) (-2.72) (4.62)	2.38	-5.38 (0.00)
6	98.10¡-99.6	$\nabla i_t = 26.41\nabla e_t$ (3.48)	0.75	
Àü ±¸°£		$i_t = 7.62 + 0.77\pi_t^e + 0.22g_t$ (15.72) (22.60) (4.47)	7.26	-3.79 (0.00)

* ()´Â t value, ** ()´Â pvalue



<±×¸² 4> ±¸Á¶º¯È½ÃÁ¡°¨Áö ¼øÂ÷¿¡ ÀÇÇÑ SupF Åë°è·®

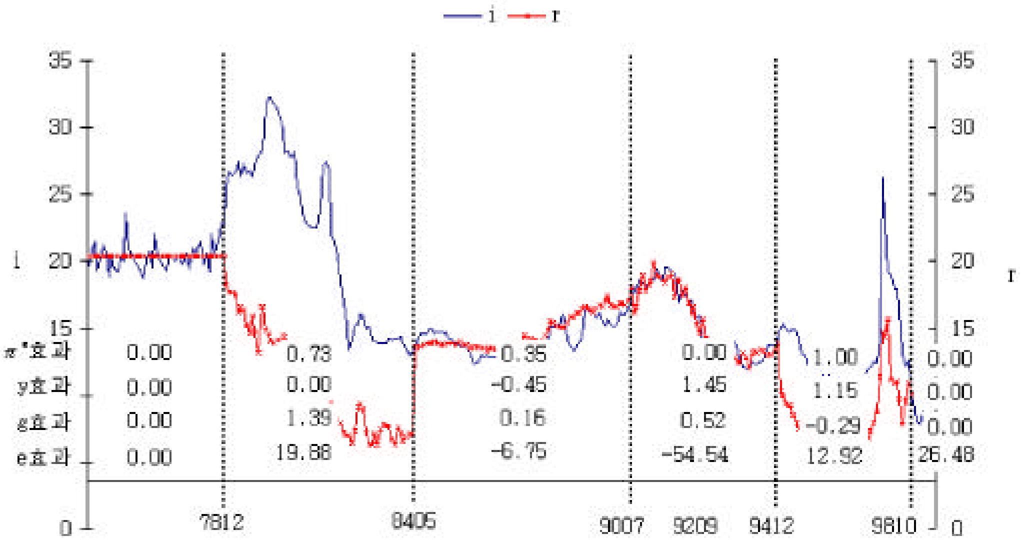
½Ä (3)À» ÃßÁ¤ÇÑ °á°ú´Â <±×¸² 3>¿¡ Á¦½ÃµÇ¾î ÀÖ´Ù.

99³â 6¿ù ÇöÀç ½ÇÁú±Ý¸®¼öÁØÀº 0%·Î ÃßÁ¤µÇ¾ú °í, »ç¶÷µéÀÌ ¹°°¡»ó½Â·ü¿¡ ¹Î°¨ÇÏ°Ô ¹ÝÀÀÇÏ°í ÀÖ À¸¸ç °¡µ¿ÀÌ ½ÉÇÑ »óÅÂ¿¡ ÀÖ´Â °ÍÀ¸·Î ÆÇ´ÜµÇ¾ú´Ù.

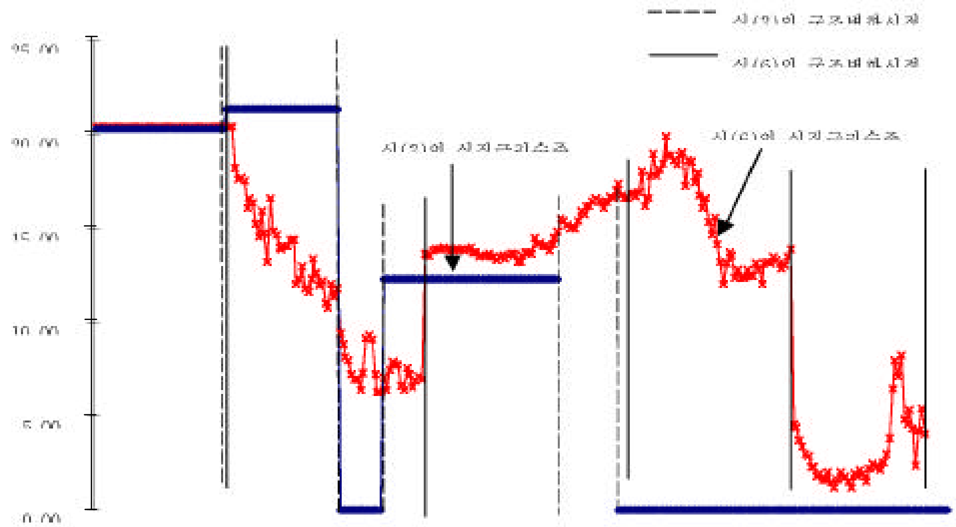
4.2 ÇÕ¸®¼º °ËÁõ

½Ä (3)¿¡¼´Â ½ÇÁú±Ý¸®¸¦ »ó¼öÇ×À¸·Î °¡Á¤ÇÏ¿© ÃßÁ¤ÇÏ¿´´Ù. ½Ä (6)¿¡¼´Â ½ÇÁú±Ý¸®¸¦ ´Ù¸¥ ½ÇÁú °æÁ¦º¯¼öµéÀÇ ÇÔ¼ö·Î ¼³Á¤ÇÏ¿© ÃßÁ¤ÇÑ´Ù. ½Ä (6) Àº ½Ç¹°½ÃÀåÀÇ ±ÕÇüÀ» ³ªÅ¸³»´Â ½ÄÀ¸·Î¼ IS-LM ÀÌ·Ð¿¡ ±Ù°ÅÇÏ¸é, ¸í¸ñ±Ý¸®´Â ÃÑ¼öÁä Áõ°¨È¿°ú·Î ÀÎÇØ ½ÇÁú»ý»ê°ú´Â ÀÝÀÇ °ü°è¸¦, ±¸¸ÅÈ¿°ú·Î ÀÎÇØ ½ÇÁúÅë°ú´Â ¾çÀÇ °ü°è¸¦, ½ÇÁú»ý»ê°ú ¸¶Âù °¡Áö·Î ½ÇÁúÈ¯À²°ú´Â ÀÝÀÇ °ü°è¸¦ °¡Áø´Ù.

´Ù¸¸ ¹øÀÇ ±¸Á¶º¯È°¡ ¹ß»ýÇß´Ù´Â °¡Á¤ÇÏ¿¡ °» ¹®¿¡¼ Á¦±âÇÑ ±¸Á¶º¯ÈÀÌ½Ä¸¸ðÇüÀ¸·Î °¨ÁöÇÑ °á°ú



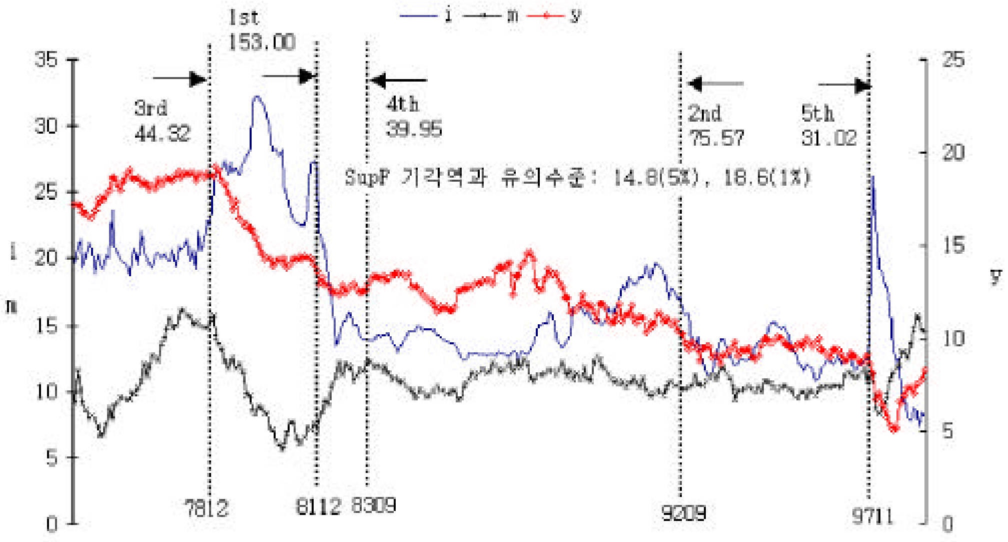
<±×¸² 5> ½ÇÁú±Ý ®¼öÁØ°ú CC¼Å¡Í ½Ç¹°È¿°ú



<±×¸² 6> ¸ðÇü¿¡ µû¸¥ ½ÇÁú±Ý¸®¼öÁØ °ñ±³

´Â ´ÙÀ½°ú °°´Ù. Àü ±¸°£¿¡¼ Ã¹ ¹øÂ° ±¸Á¶º¯È½Ã Á¡Àº 84³â 5¿ù(SupF£º116.00)ÀÌ°í µÎ ¹øÂ°¿Í ¼¼ ¹øÂ° ±¸Á¶º¯È½ÃÁ¡Àº °¢°¢ 94³â 12¿ù(SupF£º60. 43), 90³â 7¿ù(SupF£º73.12)ÀÌ¾ú´Ù. ±¸Á¶º¯È½ÃÁ¡ À» ÃßÁ¤ÇÑ °á°ú¸¦ ±×¸² 5·Î ´Ù¸¥ ½ÇÁú°¸®¼öµé°úÀÇ °ü°è´Â ´ÙÀ½ <±×¸² 4>°ú °°°í °¢ ±¸°£¿¡¼ ÃßÁ¤µÈ 6°³ ½ÄÀÇ °á°ú´Â <Ç¥ 7>¿¡ Á¤¸®µÇ¾î ÀÖ´Ù.

1±¸°£°ú 6±¸°£À» Á¦¿ÜÇÏ°í °øÀûºÐ °ü°è°¡ ¼°¸³ ÇÏ°í ÀÖ°í, ¸ð¼öµéÀÇ º¯È°¡ ±Þ°ÝÇÏ°Ô º¯µ¿ÇÏ°í ÀÖ À½À» ¾Ë ¼ö°¡ ÀÖ´Ù. ½ÇÁú»ý»ê°úÀÇ °ü°è´Â 3, 4, 5±¸ °£¿¡¼ À¯ÀÇÇÏ°Ô ³ªÅ¸³ª°í ÀÖ´Âµ¥, 3±¸°£Àº À½ÀÇ È¿°ú¸¦ ³ªÅ¸³»Áö¸¸, 4, 5±¸°£Àº ¾çÀÇ °ü°è¸¦ °¡Áö °í ÀÖ´Ù. ÀÌ´Â ±ÝÀ¶º¯È¸¦ ¸¸´Ù ½Ç¹°°æ¹®ÀÌ °Ô¼ÈÁ¤ÇÔ ¿¡ µû¶ó ±ÝÀ¶º¯Ð¿¡¼ÀÇ ½ÇÁú»ý»ê°ú ¸í¸ñ±Ý¸®¿ÍÀÇ



<±×¸² 7> ±¸Á¶º¯È½ÃÁ¡°¨Áö ¼ø¼¿Í SupF Åë°è·®

°ü°è°¡ ³ªÅ¸³ °ÍÀÌ¶ó°í ÇØ¼®ÇÒ ¼ö ÀÖ´Ù.

½ÇÁúÁ¤º¸ÎÁöÃâ°úÀÇ °ü°è´Â 2, 3, 4, 5±¸°£¿¡¼ À¯ÀÇÇÏ°Ô ³ªÅ¸³ª°í ÀÖ´Âµ¥, 5±¸°£À» Á¦¿ÜÇÏ°í´Â ÁöÀÇ°ü°è¸¦ ³ªÅ¸³»°í ÀÖ´Ù. ½ÇÁúÈ¯À²°úÀÇ °ü°è´Â 1±¸°£À» Á¦¿ÜÇÏ°í À¯ÀÇÇÏ°Ô ³ªÅ¸³ª°í ÀÖ´Âµ¥, 2, 5±¸°£Àº ¾çÀÇ°ü°è, 3, 4±¸°£Àº À½ÀÇ °ü°è¸¦ ³ªÅ¸³»°í ÀÖ´Ù. 6±¸°£Àº °øÀû°Ð °ü°è°¡ ¼º¸³ÇÏÁö ¾ÊÁö¸¸, ´Ü±âÀûÀ¸·Î ½ÇÁúÈ¯À²°ú ¾çÀÇ °ü°è¸¦ °¡Áö°í ÀÖ´Â °ÍÀ¸·Î ³ªÅ¸³µ´Ù.

2°ÎÅÍ 5±¸°£Àº °øÀû°Ð °ü°è½Ä¿¡ µû¶ó ½ÇÁú±Ý¸® ¼öÁØÀÌ °áÁ¤µÇÁö¸¸, 6±¸°£Àº °æÀ» °æ¿ì¿¡´Â ½ÇÁú±Ý¸®¼öÁØ ÆÄ¾ÇÀÌ ¾î·Æ´Ù. ½Ä (6)À» ÅëÇØ ÆÄ¾ÇÇÑ ½ÇÁú±Ý¸® ¼öÁØ°ú °¢ °è¼ö°¡ <±×¸² 5>¿¡ Á¦½ÃµÇ¾î ÀÖ´Ù. 98³â 10¿ù ÇöÀç ½ÇÁú±Ý¸®¼öÁØÀº 4.09%(½Ä (3)¿¡¼´Â 0%)·Î ÆÄ¾ÇµÇ¾ú°í ±× ÀÌÈÄ·Î´Â ½ÇÁú±Ý¸® ¼öÁØÀ» ÆÄ¾ÇÇÏ±â ¾î·Æ´Ù. ÇÑÆí È¿°ú¸¸À» °í·ÁÇÑ ½ÇÁú±Ý¸®¼öÁØ°ú ½Ç¹° È¿°ú±îÁö °í·ÁÇÑ ½ÇÁú±Ý¸® ¼öÁØÀ» °ñ±³ÇÏ¸é <±×¸² 6>¿Í °°°í, ¸ðÇüÀ» ¾î¶»°Ô ¼³Á¤ÇÏ´À³Ä¿¡ µû¶ó ±¸Á¶º¯È½ÃÁ¡ÀÌ ´Ù¸£°í ½ÇÁú±Ý¸®¼öÁØÀÌ ´Ù¸£°Ô °áÁ¤µÈ´Ù´Â »ç½Ç ¶§¹®¿¡ ½ÇÁú±Ý¸®¼öÁØÀ» °áÁ¤ÇÒ ¼ö ÀÖ´Â ÀýÂ÷°¡ ÇÊ¿äÇÏ´Ù.

4.3 ¼Òµæ¼ö¿°ú¿Í À¯µ¿¼º¿°ú

½Ä (10)Àº ±ÝÀ¶½ÃÀåÀÇ ±ÕÇüÀ» ³ªÅ¸³»´Â ½ÄÀ¸·Î¼ IS-LMÀÌ·Ð´ë·Î¶ó¸é ¼Òµæ¿°ú´Â ¾çÀÇ È¿°ú, À¯µ¿¼º È¿°ú´Â À½ÀÇ È¿°ú°¡ ³ªÅ¸³ª¾ß ´Ù. ´Ù¸¸ ¹øÀÇ ±¸Á¶º¯È°¡ ¹ß»ýÇß´Ù´Â °¡Á¤ÇÏ¿¡ °»½Å¿¡¼ Á¦±âÇÑ ±¸Á¶º¯ÈÀÌÄ¸¸ðÇüÀ¸·Î °¨ÁöÇÑ °á°ú´Â ´ÙÀ½°ú °°´Ù. Àü±¸°£¿¡¼ Ã¹ ¹øÂ° ±¸Á¶º¯È½ÃÁ¡Àº 81³â 12¿ù(SupF

<Ç¥ 8> °¢ ±¸°£ ÃßÁ¤¸ðÇü

±¸°£		ÃßÁ¤½Ä	MSE	DF
1	75.1¡-78.12	$i_t = 20.43$ * (138.38)	1.04	
2	79.1¡-81.12	$\nabla i_t = 0$	1.52	
3	82.1¡-83.9	$i_t = 35.82 - 1.80 m_t$ (17.20) (-9.63)	1.21	
4	83.10¡-92.9	$i_t = 30.79 - 1.29 y_t$ (21.51) (-11.06)	1.91	-2.01 (0.04)**
5	92.10¡-97.11	$i_t = 0.80 y_t + 1.29 m_t$ (4.90) (3.38)	1.07	-2.17 (0.02)
6	97.12¡-99.6	$i_t = 37.56 - 2.00 m_t$ (9.26) (-6.08)	10.98	
Àü ±¸°£		$i_t = 14.52 + 0.98 y_t - 0.93 m_t$ (10.73) (15.68) (-8.54)	13.02	-3.29 (0.02)

* ()´Â t value, ** ()´Â pvalue

£°153.00)ÀÌ°í µÎ ¹øÂ°¿Í ¼¼ ¹øÂ° ±¸Á¶º¯È½ÃÁ¡Àº °¢°¢ 92³â 9¿ù(SupF£°75.57), 78³â 12¿ù(SupF£° 44.32)ÀÌ¾ú´Ù. ±¸Á¶º¯È½ÃÁ¡À» ÁßÀ¸·Î ¸í¸ñ±Ý¸®¿Í ´Ù¸¥ °¯¼öµé°úÀÇ °ü°è´Â ´ÙÀ½ <±×¸² 7>°ú °°°í °¢ ±¸°£¿¡¼ ÃßÁ¤µÈ 6°³ ½ÄÀÇ °á°ú´Â <Ç¥ 8>¿¡ Á¤¸® µÇ¾î ÀÖ´Ù.

1, 2, 3, 6±¸°£À» Á¦¿ÜÇÑ ±¸°£¿¡¼ °øÀû°Ð °ü°è°¡ ¼º³ÇÏ°í ÀÖÁö¸¸, ¾ÕÀÇ ¸ðÇüµé°ú °°ÀÌ ¸ð¼öµéÀÇ °¯È°¡ ±Þ°ÝÇÏ°Ô °¯µ¿ÇÏ°í ÀÖ´Ù. ½ÇÁú»ý»ê°úÀÇ °ü°è´Â ¾ÕÀÇ ½Ä (6)¿¡¼¿Í´Â ´Ù¸£°Ô 4, 5±¸°£¿¡¼ À¯ÀÇÇÏ°Ô ³ªÅ¸³ª°í ÀÖ´Âµ¥, 5±¸°£À° ¾çÀÇ È¿°ú¸¦ ³ªÅ¸³»Áö¸¸, 4±¸°£À° À½ÀÇ °ü°è¸¦ °¡Áö°í ÀÖ´Ù.

ÀÌ´Â IS-LM °æÁ¦ÀÌ·Ð´ë·Î¶ó¸é ½Ç¹°°Î¹®º¸´Ù ±ÝÀ¶°Î¹®ÀÌ °Ö¼ÈÁ¤ÇÒ¿¡ µû¶ó ½Ç¹°°Î¹®¿¡¼ÀÇ ½ÇÁú»ý»ê°ú ¸í¸ñ±Ý¸®¿ÍÀÇ °ü°è°¡ ³ªÅ¸³ °ÍÀÌ¶ó°í ÇØ¼®ÇÒ ¼ö ÀÖ´Ù. Áï, ½ÇÁúÅëÈ·®ÀÌ ½Ä°°¯¼ö·Î¼ÀÇ ¿ªÇÒÀ» ÇÏÁö ¸øÇÑ´Ù°í º¼ ¼ö ÀÖ´Ù. ½ÇÁúÅëÈ·®°úÀÇ °ü°è´Â 2, 4, 5±¸°£¿¡¼ À¯ÀÇÇÏ°Ô ³ªÅ¸³ª°í ÀÖ´Âµ¥, 5±¸°£À» Á¦¿ÜÇÏ°í´Â ¿¹»ó´ë·Î À½ÀÇ °ü°è¸¦ ³ªÅ¸³»°í ÀÖ´Ù.

5. °á　·Ð

°» ³í¹®Àº ±Ý¸®¿Í °ü·Ã °Å½Ã°æÁ¦°¯¼ö¸¦ ÀÌ¿ëÇÏ¿© ±Ý¸®¿¡ ¹ÌÄ¡´Â È¿°ú¸¦ °Ð®ÇÏ¿´´Ù. 6°³ ¹æÁ¤½Ä °¢°¢¿¡¼ À¯ÀÇÇÑ ±¸Á¶º¯È°¡ °¨ÁöµÇ¾ú°í ¼½ÂÈ¯°ú ÇÑ¼º½Å[4]°ú ±èÀÎÁø[2]ÀÇ ±¸Á¶º¯È±¸°£°ú ´ëÃ¼·Î ÀÏÄ¡ÇÏ¿´´Ù. Á¦2Â÷ ¼®À¯ÆÄµ¿½ÃÀÛ½Ã±â 1978³â 12¿ù (ÇÕ¼ÀÈ¿°ú¸¦ °í·ÁÇÑ ¸ðÇüÀÎ ½Ä (6)°ú ½Ç¹°È¿°ú±îÁö °í·ÁÇÑ ¸ðÇüÀÎ ½Ä (10)Àº 1978³â 12¿ù, ¼Òµæ È¿°ú¿Í À¯µ¿¼º È¿°ú¸¦ °í·ÁÇÑ ¸ðÇüÀÎ ½Ä (3)Àº 1978³â 9¿ù·Î ÃßÁ¤), ¾ÈÁ¤ÈÁ¤Ã¥ÀÇ ÃßÁø½ÃÀÛ½Ã±â 1982³â 1¿ù (½Ä (3)°ú ½Ä (10)Àº 1981³â 12¿ù·Î ÃßÁ¤, ´Ù¸¥ ½ÄÀº ÀÎ½ÄÇÏÁö ¸øÇÔ), ÀÚ°»½ÃÀå°³¹æ½Ã±â 1988³â 1¿ù (½Ä (1)¸¸ÀÌ 1988³â 4¿ù·Î ÃßÁ¤, ´Ù¸¥ ½ÄÀº ÀÎ½Ä ¸øÇÔ), ±Ý¸®ÀÚÀ¯È½ÃÀÛ ½Ã±â 1992³â 9¿ù(½Ä (10)¸¸ÀÌ 92³â 9¿ù·Î ÃßÁ¤, ´Ù¸¥ ½ÄÀº ÀÎ½ÄÇÏÁö ¸øÇÔ), ±Ý¸® ÀÚÀ¯È ¿Ï·á½Ã±â 1994³â 12¿ù(½Ä (6)¸¸ÀÌ 1994³â 12¿ù·Î ÃßÁ¤, ´Ù¸¥ ½ÄÀº ÀÎ½Ä ¸øÇÔ) IMF ±¸Á¦½ÅÃ» ½Ã±â 1997³â 12¿ù(½Ä (3)Àº 1997³â 11¿ù·Î ÃßÁ¤, ´Ù¸¥ ½ÄÀº ÀÎ½Ä ¸øÇÔ) ±Ù¹æÀÌ ÁßÁ¿äÇÑ °¯È½ÃÁ¡À¸·Î ÀÎ½ÄµÇ¾ú°í, ÀÌ ½ÃÁ¡À» ÀüÈÄ·Î ¸ð¼öµéÀÇ °¯È°¡ ±Þ°ÝÇÏ°Ô °¯ÇÏ°í ÀÖ¾ú´Ù.

ÀÌ´Â ¸ð¼öÀÇ °¯È°¡ ½ÇÁú±Ý¸®ÀÇ ±¸Á¶¸¦ °¯È½ÃÄÑ ¿Ô´Ù´Â °ÍÀ» ÀÇ¹ÌÇÑ´Ù. ½Ä (6)À» ÅëÇØ¼´Â 98³â 10¿ù ÇöÀç ½ÇÁú±Ý¸®¼öÁØÀÌ 4.09%·Î ÆÄ¾ÇµÇ¾ú°í ±× ÀÌÈÄ·Î´Â ½ÇÁú±Ý¸® ¼öÁØÀ» ÆÄ¾ÇÇÏ±â ¾î·Á¿î °ÍÀ¸·Î °Ð®µÇ¾ú´Ù. ½ÇÁú±Ý¸®¿Í ´Ù¸¥ °Å½Ã°æÁ¦°¯¼ö¿Í ÀÇ °ü°è´Â ÃÖ±Ù±¸°£¿¡¼ ±â´ë¹°°¡»óÂ·ü°ú´Â (+)·Î, ¸í¸ñ±Ý¸®¸¦ Åë ÇØ °£Á¢ÀûÀ¸·Î ½ÇÁúÅëÈ·®°ú´Â (-), ÇØ¿Ü±Ý¸®¿Í´Â (+), °Îµ¿»ê°¡°Ý°ú´Â (-), ´Ü±â±Ý ¸®¿Í´Â (+)·Î ÆÄ¾ÇµÇ¾ú´Ù.

ÇâÈÄ ¿¬±¸·Î¼ ¸ðÇüÀÇ ¿¬¸³¹æÁ¤½Ä ÆíÀÇ, °è¿»ó °ü, ÀÌ°Ð»ê¼º¹®Á¦¸¦ ÇØ°áÇÏ´Â °Í°ú ±¸Á¶º¯È¿¡ ´ë ÇØ ½Å¼ÓÇÑ ´ëÀÀÀÌ ÀÌ·ç¾î Áú ¼ö ÀÖ´Â ÀÇ»ç°áÁ¤À¼ °è¸¦ ¸¶·ÃÇÏ´Â °ÍÀÌ ÇÊ¿äÇÏ´Ù. ÀÌ·¯ÇÑ ¿¬±¸´Â ´ë±Ô ¸ð ¿¬¸³¹æÁ¤½Ä¿¡¼ ¸ð¼öÀÇ ÃßÁ¤°ª¯È¿¡ ´ëÇÑ °ËÁ¤ ÀÌ ½ÇÁ½Ã°£À¸·Î ÀÌ·ç¾îÁú ¼ö ÀÖµµ·Ï ÇÏ´Â ±¸Á¶º¯È °¨Áö¸ðÇüÀ¸·Î ¿¬°áµÇ¾î ÀÌ¿ëÇÑ Á¤Ã¥°áÁ¤À» À¯µµÇÒ °ÍÀ¸·Î ±â´ëÇÑ´Ù.

Âü °í ¹® Çå

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[ºÎ ·Ï A]

$$pv(x) = 100 - \frac{100}{1 + \exp(a + bx)}$$

x£ºSupF °ª, $pv(x)$£ºp-value of x, p£º¿Ü»ý°¯¼öÀÇ °³¼ö

1) ¾ËÁ¤ÀûÀÎ È¸±Í°è¼ö¿¡¼ÀÇ p-value¸¦ ±¸ÇÏ±â À§ÇÑ ¸ð¼ö-Andrews(1993)

p	1	2	3	4
a	2.0645	2.8887	2.9342	3.6349
b	-0.4256	-0.4141	-0.3584	-0.3598

2) ºÒ¾ÈÁ¤ÀûÀÎ È¸±Í°è¼ö¿¡¼ÀÇ p-value¸¦ ±¸ÇÏ±â À§ÇÑ ¸ð¼ö-Hansen(1992)

p	1	2	3	4
a	2.2539	3.2614	3.9741	4.3814
b	-0.4198	-0.4198	-0.4032	-0.3849

[ºÎ ·Ï B]

´ë ¿ë º¯ ¼ö	ARIMA ¸ðÇü
È¸»çÃ¤¼öÀÍ·ü	$(1-B)i_t = (1+0.19B)\varepsilon_t$ (-3.32)
Àü³âµ¿±â´ëºñ ¹°°¡»ó½Â·ü	$(1-0.68B)(1-B)\pi^e_t = (1-0.34B)(1-0.62B^{12})\varepsilon_t$ (7.42) (2.94) (14.45)
Àü³âµ¿±â´ëºñ »ê¾÷»ý»êÁõ°¡À²	$(1-B)y_t = (1-0.38B)(1-0.85B^{12})\varepsilon_t$ (7.49) (27.63)
Àü³âµ¿±â´ëºñ Á¤ºÎÁöÃâÁõ°¡À²	$(1-B)g_t = (1-0.89B)(1-0.60B^{12})\varepsilon_t$ (36.21) (13.29)
·Î±×½ÇÁúÈ¯À²	$(1-B)e_t = (1+0.26B)\varepsilon_t$ (-5.02)
Àü³âµ¿±â´ëºñ ½ÇÁúÅëÈÁõ°¡À²	$(1-B)m_t = (1+0.14B+0.20B^2)(1-0.67B^{12})\varepsilon_t$ (-2.69) (-3.67) (16.50)