

## Factores explicativos detrás de la apreciación del tipo de cambio real desde los noventa en El Salvador.

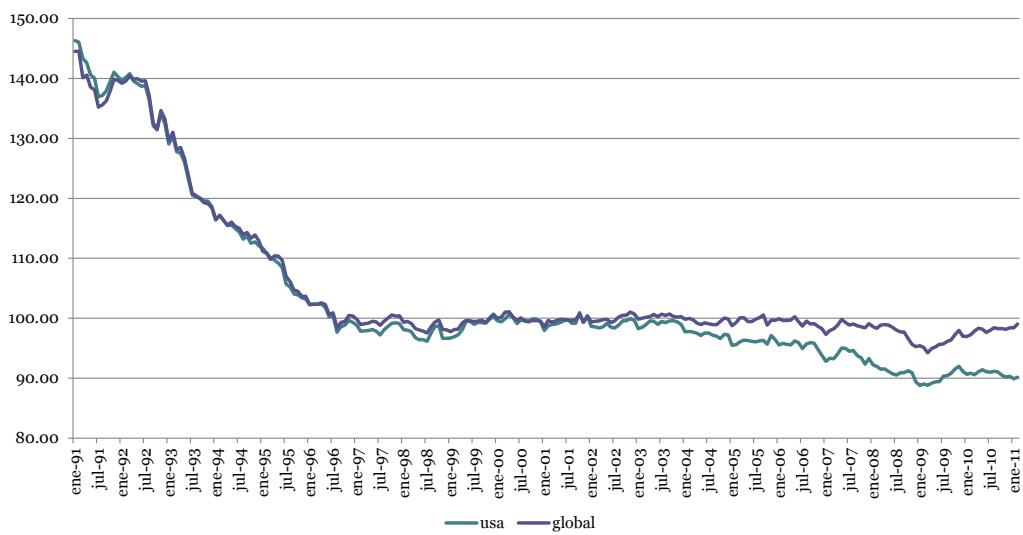
Versión preliminar. Oscar Cabrera Melgar

### Resumen

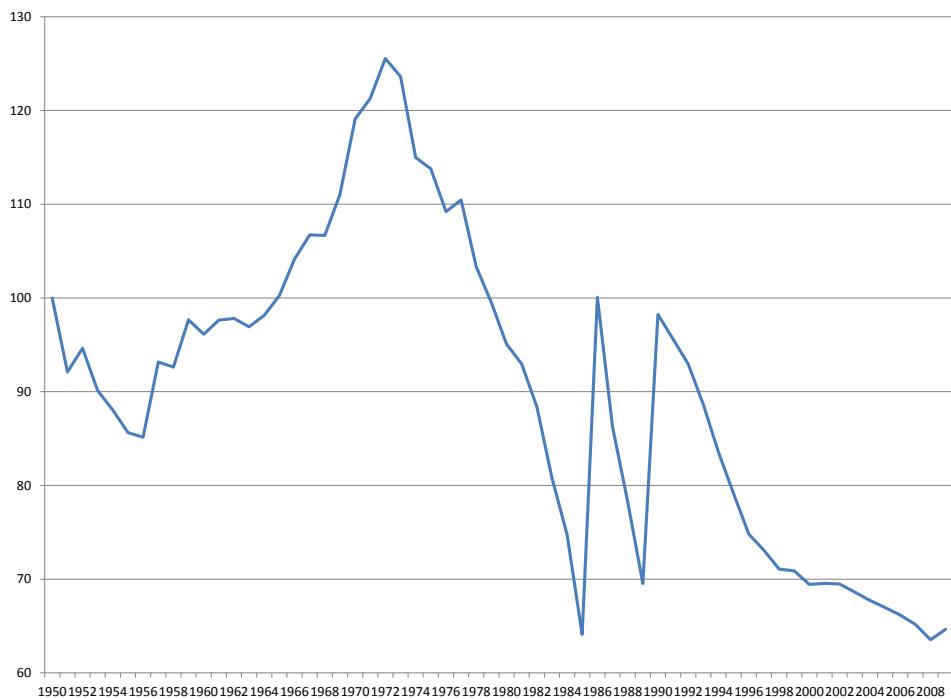
1. Las apreciaciones en el tipo de cambio real salvadoreño sucedido desde la década de los noventa se explican por un incremento de los precios relativos de los bienes no transables respecto a los transables.
2. El incremento acumulado de los precios relativos (BNT/BT) se explican por una ineficiencia productiva en los bienes no transables respecto a los transables, es decir un una menor productividad laboral en los BNT respecto a los BT (Véase Ilustración 1-3).
3. La apreciación del tipo de cambio real sucedido desde la década de los noventa se produce por una caída sustancial de la productividad laboral de los bienes no transables en mayor proporción que el incremento de la productividad de los transables.
4. Y por un menor crecimiento de la productividad laboral de los bienes transables de El Salvador respecto a sus socios comerciales
5. La entrada de remesas familiares simplemente activó el canal de las importaciones de bienes y servicios como porcentaje del PIB. Mayor proporción de la remesas como porcentaje del PIB mayor incremento de las importaciones como porcentaje del PIB
6. Las apreciaciones reales son el resultado de factores endógenos por encima de los enfoques que sugieren que la afluencia de remesas incidieron en el incremento de precios de los bienes no transables (Dutch Disease).
7. A su vez, se encontró que las apreciaciones reales de la economía salvadoreña ha incidido en el menor crecimiento económico per cápita salvadoreño basado en la construcción de un índice de subvaluación o tipo de cambio real ajustado por el efecto Balassa- Samuelson mediante datos de panel para 187 países (basado en Rodrik, 2008), es decir, una simetría entre el descenso de la tasa de crecimiento de la renta per cápita junto a un descenso en el índice de UNDERVAL.

Desde la década de los noventa, La economía salvadoreña ha presentado pérdidas de competitividad (apreciación) del 38% respecto a los USA y del 31% respecto a todos los socios comerciales (Cabrera, 2005) y (Alas de Franco, 2011), según las estimaciones del tipo de cambio real. Sin embargo, si evaluamos el tipo de cambio real desde la década de los cincuenta, la apreciación real alcanza un 35%.

**Ilustración 1. Tipo de Cambio Real (REER)**

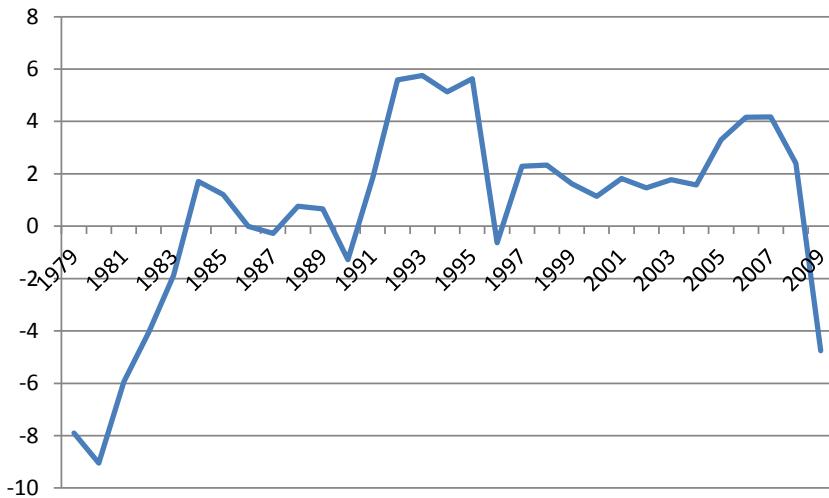


**Ilustración 2. Tipo de Cambio Real (REER). Base 1950=100**



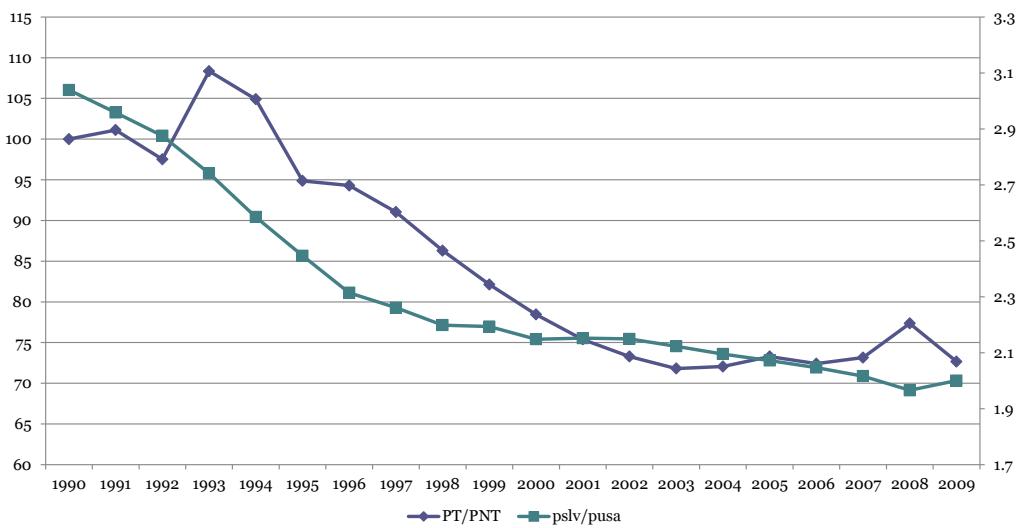
Junto a un crecimiento de la renta per cápita como media de 2.3% entre 1990 y 2009. Vale la pena destacar que los choques externos en una economía dolarizada y abierta produjeron la mayor caída de la renta per cápita desde la guerra civil en la década de los ochenta.

**Ilustración 3. Crecimiento del PIB per cápita**



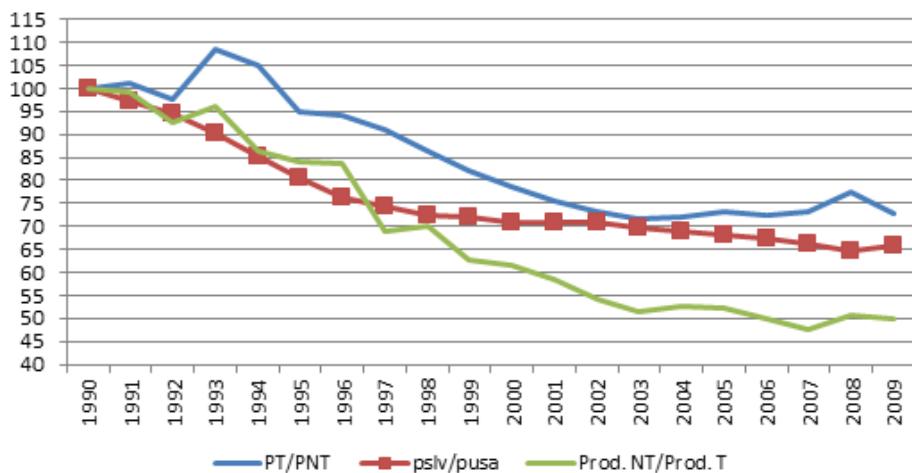
El tipo de cambio real se calcula como un relativo de precios de nuestros socios comerciales homogenizados por el tipo de cambio nominal. A su vez, el tipo de cambio se puede aproximar por los precios de los bienes transables respecto a los no transables (PT/PNT).

**Ilustración 4. Precios relativos (transable/no transable) y REER con USA**



El relativo de precios de los bienes transables entre los no transables se pueden aproximar como la ratio de la productividad laboral de los bienes no transables ( $PRO_{PS}$ ) respecto a la productividad laboral de los bienes transables ( $PRO_{SS}$ ) (Véase Anexo metodológico)

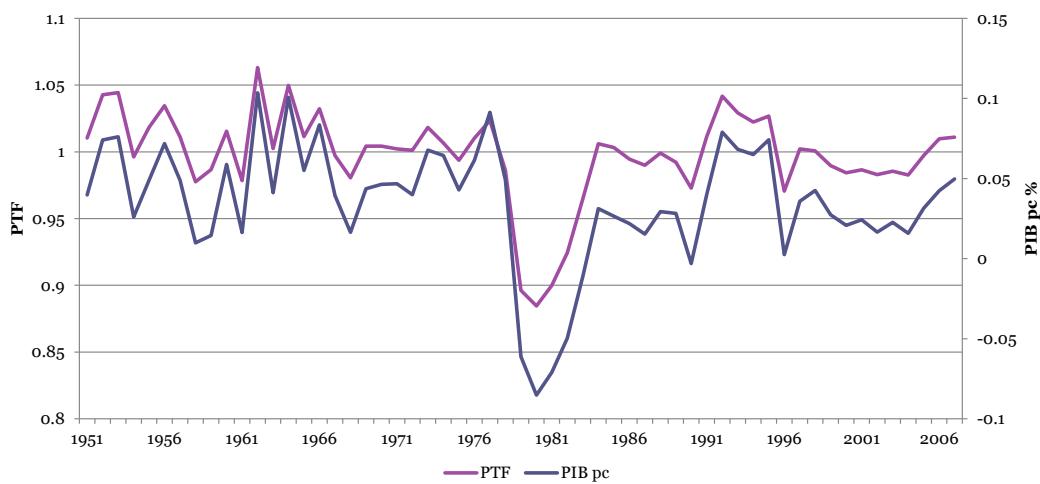
**Ilustración 5. REER USA, Productividad (NT/BT) y Precios relativos (PT/PNT)**



Significa entonces que las apreciaciones del tipo de cambio real desde la década de los noventa se explican porque la productividad de los transables ha crecido más rápido en el resto del mundo que en El Salvador. O porque la productividad de los no transables en la economía salvadoreña se han estancado a pesar del crecimiento de los transables. Como consecuencia la productividad total de los factores ha exhibido una evolución similar a la renta per cápita. La evolución de la década de los ochenta se caracteriza por un una economía de guerra que dificulta comparar con la década de los noventa en adelante

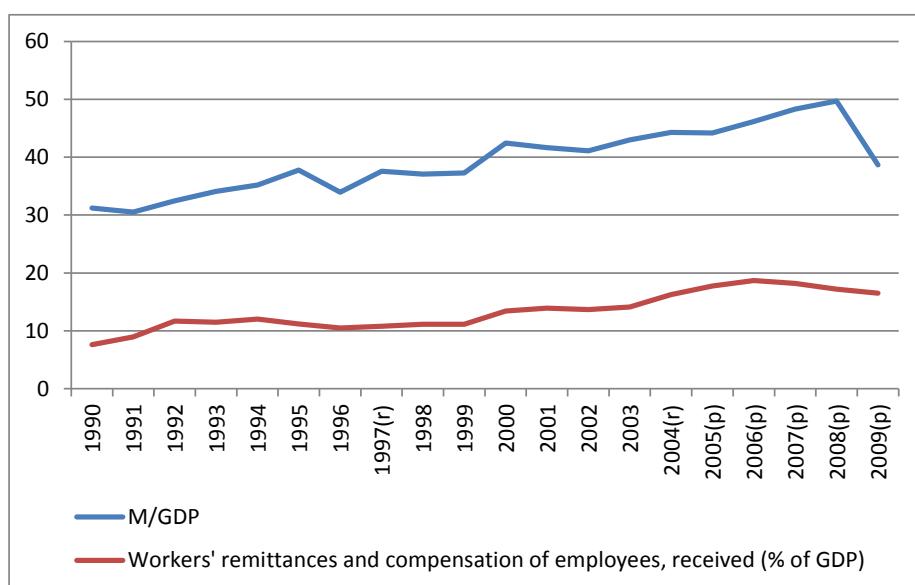
### Ilustración 6. PTF y Renta percápita

EL SALVADOR. Productividad total de los factores (índices Hicks-Moorsteen) y PIB per cápita en PPC de 2005



Usualmente, se atribuye la apreciación del tipo de cambio real por la fuerte afluencia de remesas familiares, sin embargo, la entrada de una fuerte inyección de dinero en la economía produjo un incremento del consumo de los hogares y una mayor demanda por productos de origen importado dado la baja productividad laboral de las empresas salvadoreñas y la escasa diferenciación de sus productos trajo como consecuencia la importación de bienes.

### Ilustración 7. Importaciones %PIB y Remesas % PIB



Estimaciones desarrolladas en el BCR, mediante datos de panel con efectos fijos y aleatorios para una muestra de 187 países para los **4 Quinquenios de 1990 a 2009**, estiman el índice de subvaluación de tipo de cambio real respecto a sus niveles de PIB per cápita y respecto a los Estados Unidos de América. La siguiente tabla describe la fórmula empleada y las variables incorporadas:

La estimación.

El índice de subvaluación resulta de ajustar el tipo de cambio real por el efecto Harrod-Balassa-Samuelson, mediante la fórmula:

$$Inunderval = \ln(100/p) - Inrer^*$$

$$\text{Con } Inrer^* = a + b * \ln rgdpch + f + e$$

Donde:

**p:** Nivel de precios del PIB

**rgdpch:** PIB per cápita con precios encadenados

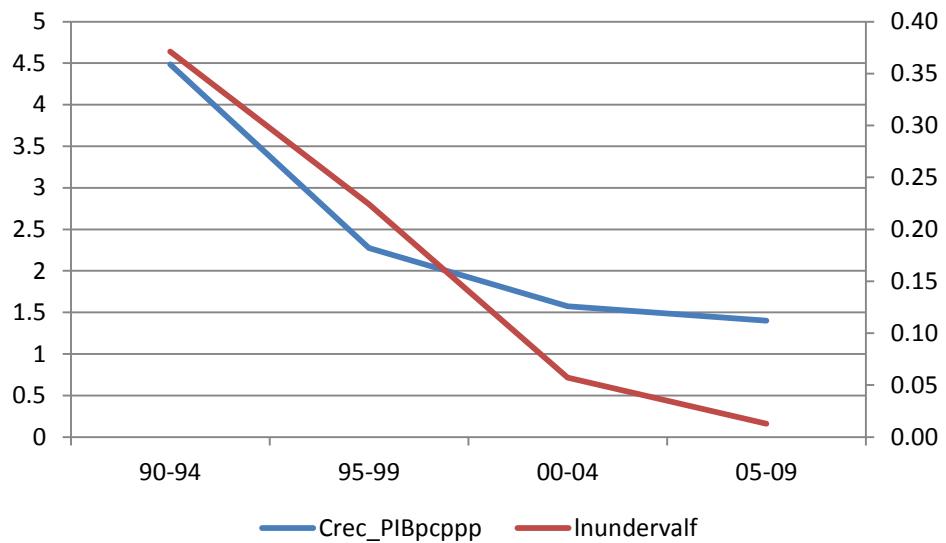
**f:** efecto fijo del tiempo

### ¿Cómo se interpreta el índice del In (UNDERVAL)?

- Un In (UNDERVAL) de 0 significa que el tipo de cambio de mercado produce los mismos niveles de precios que en los EE.UU. (el país de referencia).
- Un In (UNDERVAL) menor que 0 significa una sobrevaloración de la moneda
- Un In (UNDERVAL) mayor de 0 significa una subvaluación de la moneda
- El formato de índice tiene la ventaja de que es comparable entre países, así como con el tiempo.

La Ilustración 8, nos muestra que existe una simetría entre el descenso de la tasa de crecimiento de la renta per cápita junto a un descenso en el índice de UNDERVAL que sostiene en los quinquenios analizados la ganancias de subvaluación se han ido perdiendo hasta alcanzar un límite donde se puede iniciar una “sobrevaloración de la moneda”.

**Ilustración 8. Ln underval efectos variables y crecimiento del PIB per cápita en ppp.**



Las apreciaciones cambiarias (dado que el  $\ln$  UNDERVAL ha ido cayendo hasta situarse en el límite de sobrevaloración según Rodrik (2008) presentan una evolución similar al decrecimiento del PIB per cápita en los cuatro quinquenios estimados.

## Anexo 1

Hemos supuesto que el precio fijado por las empresas (P) está determinado por la ratio salario nominal (W) y la productividad marginal del trabajo (PRO). Bajo el supuesto que las empresas compiten en condiciones de competencia imperfecta, el precio fijado será un margen sobre dichos costos ( $\kappa$ ). Si mantenemos dos sectores: productor de Bienes transables (SB) y No transables (SS):

### Ecuación 1

$$P_{SB} = \frac{W_{PS}}{PRO_{PS}} \kappa_{PS}$$

### Ecuación 2

$$P_{SS} = \frac{W_{SS}}{PRO_{SS}} \kappa_{SS}$$

Si inicialmente, suponemos que los salarios entre ambos sectores tienden a ser idénticos, los precios relativos se podrán expresar como:

### Ecuación 3

$$\frac{P_{SS}}{P_{SB}} = \left( \frac{PRO_{SB}}{PRO_{SS}} \right) * \frac{\kappa_{SS}}{\kappa_{SB}}$$

Por tanto, los precios relativos depende de la evolución relativa de la productividad marginal relativa al factor trabajo y de los márgenes relativos, es decir, del grado de competencia existente entre ambos sectores.

La ecuación 3, nos prescribe que los precios serán elevados en aquellos sectores que presenten una menor productividad del trabajo y obtengan aprovechen unos márgenes superiores.

## Anexo 2

Se balanceó el panel con los promedios simples por quinquenios de Inrer y Inrgdpch. El dato de Zimbabue para el año 2009 fue eliminado del cálculo. Se generaron dos especificaciones, una con efecto aleatorio y otra respetando el efecto fijo del tiempo, al revisar el test de Hauman

encontramos que la especificación aleatoria es la más adecuada. Esto puede deberse a que el horizonte temporal utilizado es menor al utilizado por Rodrik (2008), por lo que los efectos fijos no parecen ser adecuados ante la menor correlación de los errores con la variable explicativa. (Cambios políticos, metas de cuenta corriente, etc). Estadísticamente la pendiente de la regresión se puede considerar del orden de -0.22 tanto en la especificación aleatoria como en la fija (Test de Wald).

|                                |        | Dependent Variable: LRER?                         |  |  |  |  | H0 : B = -0.22. La estimación de Rodrik con la revisión del ppp |  |  |  |  |  |  |  |  |  |  |
|--------------------------------|--------|---|--|--|--|--|---|--|--|--|--|--|--|--|--|--|--|
|                                |        | Method: Pooled Least Squares                      |  |  |  |  | Wald Test:  |  |  |  |  |  |  |  |  |  |  |
|                                |        | Date: 05/11/11 Time: 08:56                        |  |  |  |  | Pool: POOL_RER  |  |  |  |  |  |  |  |  |  |  |
|                                |        | Sample: 2006 2009                                 |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |
|                                |        | Included observations: 4                          |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |
|                                |        | Cross-sections included: 187                      |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |
|                                |        | Total pool (balanced) observations: 748           |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |
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|                                |        | Variable Coefficient Std. Error t-Statistic Prob. |  |  |  |  | Test Statistic Value df Probability                             |  |  |  |  |  |  |  |  |  |  |
|                                |        | C 2.558091 0.228149 11.21236 0.00                 |  |  |  |  | F-statistic 0.000324 (1, 743) 0.9857                            |  |  |  |  |  |  |  |  |  |  |
|                                |        | LRGDPCH? -0.220477 0.026516 -8.31474 0.00         |  |  |  |  | Chi-square 0.000324 1 0.9856                                    |  |  |  |  |  |  |  |  |  |  |
|                                |        | Fixed Effects (Period)                            |  |  |  |  | Null Hypothesis Summary:  |  |  |  |  |  |  |  |  |  |  |
| SALIDA EFECTO FIJO             | 2006-C | -0.037748   |  |  |  |  | Normalized Restriction (= 0) Value Std. Err.                    |  |  |  |  |  |  |  |  |  |  |
|                                | 2007-C | -0.070881   |  |  |  |  | 0.22 + C(2) -0.000477 0.026516                                  |  |  |  |  |  |  |  |  |  |  |
|                                | 2008-C | 0.045983  |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |
|                                | 2009-C | 0.062646  |  |  |  |  | Restrictions are linear in coefficients.                        |  |  |  |  |  |  |  |  |  |  |
| Effects Specification          |        |   |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |
| Period fixed (dummy variables) |        |   |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |
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|                                |        |   |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |

|                              | <p>Dependent Variable: LER?</p> <p>Method: Pooled EGLS (Period random effects)</p> <p>Date: 05/11/11 Time: 09:02</p> <p>Sample: 2006 2009</p> <p>Included observations: 4</p> <p>Cross-sections included: 187</p> <p>Total pool (balanced) observations: 748</p> <p>Swamy and Arora estimator of component variances</p>   | <p>Wald Test:</p> <p>Pool: POOL_HT</p> <table> <thead> <tr> <th></th> <th>Test Statistic</th> <th>Value</th> <th>df</th> <th>Probability</th> </tr> </thead> <tbody> <tr> <td>F-statistic</td> <td>0.009239</td> <td>(1, 746)</td> <td></td> <td>0.9235</td> </tr> <tr> <td>Chi-square</td> <td>0.009239</td> <td></td> <td>1</td> <td>0.9234</td> </tr> </tbody> </table> |              | Test Statistic | Value    | df   | Probability | F-statistic | 0.009239 | (1, 746) |      | 0.9235 | Chi-square | 0.009239 |   | 1      | 0.9234 | <p>Correlated Random Effects - Hausman Test</p> <p>Pool: POOL_HT</p> <p>Test period random effects</p> <table> <thead> <tr> <th></th> <th>Test Summary</th> <th>Chi-Sq. Stat:</th> <th>Chi-Sq. d.f.</th> <th>Prob.</th> </tr> </thead> <tbody> <tr> <td>Period random</td> <td>1.502212</td> <td></td> <td>1</td> <td>0.2203</td> </tr> </tbody> </table> <p>** WARNING: estimated period random effects variance is zero.</p> |   | Test Summary | Chi-Sq. Stat: | Chi-Sq. d.f. | Prob.         | Period random | 1.502212 |                      | 1        | 0.2203 |           |          |                    |          |              |          |                    |          |                |          |                   |          |             |          |                    |          |                   |   |  |  |           |          |                    |          |               |          |                    |          |   |                              |       |           |             |          |  |   |          |       |        |            |       |          |           |           |          |        |   |          |          |          |   |          |           |          |          |   |           |          |                    |          |              |          |                    |          |                |          |                       |          |             |          |                   |          |               |           |                      |          |             |       |                    |          |                   |   |  |  |
|------------------------------|--|--|--------------|----------------|----------|------|-------------|-------------|----------|----------|------|--------|------------|----------|---|--------|--------|--|---|--------------|---------------|--------------|---------------|---------------|----------|----------------------|----------|--------|-----------|----------|--------------------|----------|--------------|----------|--------------------|----------|----------------|----------|-------------------|----------|-------------|----------|--------------------|----------|-------------------|---|--|--|-----------|----------|--------------------|----------|---------------|----------|--------------------|----------|---|------------------------------|-------|-----------|-------------|----------|--|---|----------|-------|--------|------------|-------|----------|-----------|-----------|----------|--------|---|----------|----------|----------|---|----------|-----------|----------|----------|---|-----------|----------|--------------------|----------|--------------|----------|--------------------|----------|----------------|----------|-----------------------|----------|-------------|----------|-------------------|----------|---------------|-----------|----------------------|----------|-------------|-------|--------------------|----------|-------------------|---|--|--|
|                              | Test Statistic   | Value  | df           | Probability    |          |      |             |             |          |          |      |        |            |          |   |        |        |  |   |              |               |              |               |               |          |                      |          |        |           |          |                    |          |              |          |                    |          |                |          |                   |          |             |          |                    |          |                   |   |  |  |           |          |                    |          |               |          |                    |          |   |                              |       |           |             |          |  |   |          |       |        |            |       |          |           |           |          |        |   |          |          |          |   |          |           |          |          |   |           |          |                    |          |              |          |                    |          |                |          |                       |          |             |          |                   |          |               |           |                      |          |             |       |                    |          |                   |   |  |  |
| F-statistic                  | 0.009239   | (1, 746)   |              | 0.9235         |          |      |             |             |          |          |      |        |            |          |   |        |        |  |   |              |               |              |               |               |          |                      |          |        |           |          |                    |          |              |          |                    |          |                |          |                   |          |             |          |                    |          |                   |   |  |  |           |          |                    |          |               |          |                    |          |   |                              |       |           |             |          |  |   |          |       |        |            |       |          |           |           |          |        |   |          |          |          |   |          |           |          |          |   |           |          |                    |          |              |          |                    |          |                |          |                       |          |             |          |                   |          |               |           |                      |          |             |       |                    |          |                   |   |  |  |
| Chi-square                   | 0.009239   |  | 1            | 0.9234         |          |      |             |             |          |          |      |        |            |          |   |        |        |  |   |              |               |              |               |               |          |                      |          |        |           |          |                    |          |              |          |                    |          |                |          |                   |          |             |          |                    |          |                   |   |  |  |           |          |                    |          |               |          |                    |          |   |                              |       |           |             |          |  |   |          |       |        |            |       |          |           |           |          |        |   |          |          |          |   |          |           |          |          |   |           |          |                    |          |              |          |                    |          |                |          |                       |          |             |          |                   |          |               |           |                      |          |             |       |                    |          |                   |   |  |  |
|                              | Test Summary   | Chi-Sq. Stat:  | Chi-Sq. d.f. | Prob.          |          |      |             |             |          |          |      |        |            |          |   |        |        |  |   |              |               |              |               |               |          |                      |          |        |           |          |                    |          |              |          |                    |          |                |          |                   |          |             |          |                    |          |                   |   |  |  |           |          |                    |          |               |          |                    |          |   |                              |       |           |             |          |  |   |          |       |        |            |       |          |           |           |          |        |   |          |          |          |   |          |           |          |          |   |           |          |                    |          |              |          |                    |          |                |          |                       |          |             |          |                   |          |               |           |                      |          |             |       |                    |          |                   |   |  |  |
| Period random                | 1.502212   |  | 1            | 0.2203         |          |      |             |             |          |          |      |        |            |          |   |        |        |  |   |              |               |              |               |               |          |                      |          |        |           |          |                    |          |              |          |                    |          |                |          |                   |          |             |          |                    |          |                   |   |  |  |           |          |                    |          |               |          |                    |          |   |                              |       |           |             |          |  |   |          |       |        |            |       |          |           |           |          |        |   |          |          |          |   |          |           |          |          |   |           |          |                    |          |              |          |                    |          |                |          |                       |          |             |          |                   |          |               |           |                      |          |             |       |                    |          |                   |   |  |  |
|                              | <p>Variable Coefficient Std. Error t-Statistic Prob.</p> <table> <tr> <td>C</td> <td>2.53252</td> <td>0.227193</td> <td>11.14698</td> <td>0.00</td> </tr> <tr> <td>LRGDPCH?</td> <td>-0.217462</td> <td>0.026402</td> <td>-8.23656</td> <td>0.00</td> </tr> </table> <p>Random Effects (Period)</p> <table> <tr> <td>2006-C</td> <td>0</td> </tr> <tr> <td>2007-C</td> <td>0</td> </tr> <tr> <td>2008-C</td> <td>0</td> </tr> <tr> <td>2009-C</td> <td>0</td> </tr> </table> <p>Effects Specification</p> <table> <thead> <tr> <th></th> <th>S.D.</th> <th>Rho</th> </tr> </thead> <tbody> <tr> <td>Period random</td> <td>0</td> <td>0</td> </tr> <tr> <td>Idiosyncratic random</td> <td>1.046556</td> <td>1</td> </tr> </tbody> </table> <p>Weighted Statistics</p> <table> <tr> <td>R-squared</td> <td>0.083449</td> <td>Mean dependent var</td> <td>0.687962</td> </tr> <tr> <td>Adjusted R-s</td> <td>0.082221</td> <td>S.D. dependent var</td> <td>1.091785</td> </tr> <tr> <td>S.E. of regres</td> <td>1.045938</td> <td>Sum squared resid</td> <td>816.1143</td> </tr> <tr> <td>F-statistic</td> <td>67.92113</td> <td>Durbin-Watson stat</td> <td>1.358933</td> </tr> <tr> <td>Prob(F-statistic)</td> <td>0</td> <td></td> <td></td> </tr> </table> <p>Unweighted Statistics</p> <table> <tr> <td>R-squared</td> <td>0.083449</td> <td>Mean dependent var</td> <td>0.687962</td> </tr> <tr> <td>Sum squaredec</td> <td>816.1143</td> <td>Durbin-Watson stat</td> <td>1.358933</td> </tr> </table> | C  | 2.53252      | 0.227193       | 11.14698 | 0.00 | LRGDPCH?    | -0.217462   | 0.026402 | -8.23656 | 0.00 | 2006-C | 0          | 2007-C   | 0 | 2008-C | 0      | 2009-C   | 0 |              | S.D.          | Rho          | Period random | 0             | 0        | Idiosyncratic random | 1.046556 | 1      | R-squared | 0.083449 | Mean dependent var | 0.687962 | Adjusted R-s | 0.082221 | S.D. dependent var | 1.091785 | S.E. of regres | 1.045938 | Sum squared resid | 816.1143 | F-statistic | 67.92113 | Durbin-Watson stat | 1.358933 | Prob(F-statistic) | 0 |  |  | R-squared | 0.083449 | Mean dependent var | 0.687962 | Sum squaredec | 816.1143 | Durbin-Watson stat | 1.358933 | <p>Null Hypothesis Summary:</p> <table> <tr> <td>Normalized Restriction (= 0)</td> <td>Value</td> <td>Std. Err.</td> </tr> <tr> <td>0.22 + C(2)</td> <td>0.002538</td> <td></td> </tr> </table> <p>Restrictions are linear in coefficients.</p> <p>0.026402</p> | Normalized Restriction (= 0) | Value | Std. Err. | 0.22 + C(2) | 0.002538 |  | <p>Period random effects test comparisons:</p> <table> <thead> <tr> <th>Variable</th> <th>Fixed</th> <th>Random</th> <th>Var(Diff.)</th> <th>Prob.</th> </tr> </thead> <tbody> <tr> <td>LRGDPCH?</td> <td>-0.220477</td> <td>-0.217462</td> <td>0.000006</td> <td>0.2203</td> </tr> </tbody> </table> <p>Period random effects test equation:</p> <p>Dependent Variable: LER?</p> <p>Method: Panel Least Squares</p> <p>Date: 05/11/11 Time: 09:06</p> <p>Sample: 2006 2009</p> <p>Included observations: 4</p> <p>Cross-sections included: 187</p> <p>Total pool (balanced) observations: 748</p> <p>Variable Coefficient Std. Error t-Statistic Prob.</p> <table> <tr> <td>C</td> <td>2.558091</td> <td>0.228149</td> <td>11.21236</td> <td>0</td> </tr> <tr> <td>LRGDPCH?</td> <td>-0.220477</td> <td>0.026516</td> <td>-8.31474</td> <td>0</td> </tr> </table> <p>Effects Specification</p> <p>Period fixed (dummy variables)</p> <table> <tr> <td>R-squared</td> <td>0.086056</td> <td>Mean dependent var</td> <td>0.687962</td> </tr> <tr> <td>Adjusted R-s</td> <td>0.081136</td> <td>S.D. dependent var</td> <td>1.091785</td> </tr> <tr> <td>S.E. of regres</td> <td>1.046556</td> <td>Akaike info criterion</td> <td>2.935549</td> </tr> <tr> <td>Sum squared</td> <td>813.7933</td> <td>Schwarz criterion</td> <td>2.966414</td> </tr> <tr> <td>Log likelihoo</td> <td>-1092.896</td> <td>Hannan-Quinn criter.</td> <td>2.947444</td> </tr> <tr> <td>F-statistic</td> <td>17.49</td> <td>Durbin-Watson stat</td> <td>1.358072</td> </tr> <tr> <td>Prob(F-statistic)</td> <td>0</td> <td></td> <td></td> </tr> </table> | Variable | Fixed | Random | Var(Diff.) | Prob. | LRGDPCH? | -0.220477 | -0.217462 | 0.000006 | 0.2203 | C | 2.558091 | 0.228149 | 11.21236 | 0 | LRGDPCH? | -0.220477 | 0.026516 | -8.31474 | 0 | R-squared | 0.086056 | Mean dependent var | 0.687962 | Adjusted R-s | 0.081136 | S.D. dependent var | 1.091785 | S.E. of regres | 1.046556 | Akaike info criterion | 2.935549 | Sum squared | 813.7933 | Schwarz criterion | 2.966414 | Log likelihoo | -1092.896 | Hannan-Quinn criter. | 2.947444 | F-statistic | 17.49 | Durbin-Watson stat | 1.358072 | Prob(F-statistic) | 0 |  |  |
| C                            | 2.53252  | 0.227193   | 11.14698     | 0.00           |          |      |             |             |          |          |      |        |            |          |   |        |        |  |   |              |               |              |               |               |          |                      |          |        |           |          |                    |          |              |          |                    |          |                |          |                   |          |             |          |                    |          |                   |   |  |  |           |          |                    |          |               |          |                    |          |   |                              |       |           |             |          |  |   |          |       |        |            |       |          |           |           |          |        |   |          |          |          |   |          |           |          |          |   |           |          |                    |          |              |          |                    |          |                |          |                       |          |             |          |                   |          |               |           |                      |          |             |       |                    |          |                   |   |  |  |
| LRGDPCH?                     | -0.217462  | 0.026402   | -8.23656     | 0.00           |          |      |             |             |          |          |      |        |            |          |   |        |        |  |   |              |               |              |               |               |          |                      |          |        |           |          |                    |          |              |          |                    |          |                |          |                   |          |             |          |                    |          |                   |   |  |  |           |          |                    |          |               |          |                    |          |   |                              |       |           |             |          |  |   |          |       |        |            |       |          |           |           |          |        |   |          |          |          |   |          |           |          |          |   |           |          |                    |          |              |          |                    |          |                |          |                       |          |             |          |                   |          |               |           |                      |          |             |       |                    |          |                   |   |  |  |
| 2006-C                       | 0  |  |              |                |          |      |             |             |          |          |      |        |            |          |   |        |        |  |   |              |               |              |               |               |          |                      |          |        |           |          |                    |          |              |          |                    |          |                |          |                   |          |             |          |                    |          |                   |   |  |  |           |          |                    |          |               |          |                    |          |   |                              |       |           |             |          |  |   |          |       |        |            |       |          |           |           |          |        |   |          |          |          |   |          |           |          |          |   |           |          |                    |          |              |          |                    |          |                |          |                       |          |             |          |                   |          |               |           |                      |          |             |       |                    |          |                   |   |  |  |
| 2007-C                       | 0  |  |              |                |          |      |             |             |          |          |      |        |            |          |   |        |        |  |   |              |               |              |               |               |          |                      |          |        |           |          |                    |          |              |          |                    |          |                |          |                   |          |             |          |                    |          |                   |   |  |  |           |          |                    |          |               |          |                    |          |   |                              |       |           |             |          |  |   |          |       |        |            |       |          |           |           |          |        |   |          |          |          |   |          |           |          |          |   |           |          |                    |          |              |          |                    |          |                |          |                       |          |             |          |                   |          |               |           |                      |          |             |       |                    |          |                   |   |  |  |
| 2008-C                       | 0  |  |              |                |          |      |             |             |          |          |      |        |            |          |   |        |        |  |   |              |               |              |               |               |          |                      |          |        |           |          |                    |          |              |          |                    |          |                |          |                   |          |             |          |                    |          |                   |   |  |  |           |          |                    |          |               |          |                    |          |   |                              |       |           |             |          |  |   |          |       |        |            |       |          |           |           |          |        |   |          |          |          |   |          |           |          |          |   |           |          |                    |          |              |          |                    |          |                |          |                       |          |             |          |                   |          |               |           |                      |          |             |       |                    |          |                   |   |  |  |
| 2009-C                       | 0  |  |              |                |          |      |             |             |          |          |      |        |            |          |   |        |        |  |   |              |               |              |               |               |          |                      |          |        |           |          |                    |          |              |          |                    |          |                |          |                   |          |             |          |                    |          |                   |   |  |  |           |          |                    |          |               |          |                    |          |   |                              |       |           |             |          |  |   |          |       |        |            |       |          |           |           |          |        |   |          |          |          |   |          |           |          |          |   |           |          |                    |          |              |          |                    |          |                |          |                       |          |             |          |                   |          |               |           |                      |          |             |       |                    |          |                   |   |  |  |
|                              | S.D.   | Rho  |              |                |          |      |             |             |          |          |      |        |            |          |   |        |        |  |   |              |               |              |               |               |          |                      |          |        |           |          |                    |          |              |          |                    |          |                |          |                   |          |             |          |                    |          |                   |   |  |  |           |          |                    |          |               |          |                    |          |   |                              |       |           |             |          |  |   |          |       |        |            |       |          |           |           |          |        |   |          |          |          |   |          |           |          |          |   |           |          |                    |          |              |          |                    |          |                |          |                       |          |             |          |                   |          |               |           |                      |          |             |       |                    |          |                   |   |  |  |
| Period random                | 0  | 0  |              |                |          |      |             |             |          |          |      |        |            |          |   |        |        |  |   |              |               |              |               |               |          |                      |          |        |           |          |                    |          |              |          |                    |          |                |          |                   |          |             |          |                    |          |                   |   |  |  |           |          |                    |          |               |          |                    |          |   |                              |       |           |             |          |  |   |          |       |        |            |       |          |           |           |          |        |   |          |          |          |   |          |           |          |          |   |           |          |                    |          |              |          |                    |          |                |          |                       |          |             |          |                   |          |               |           |                      |          |             |       |                    |          |                   |   |  |  |
| Idiosyncratic random         | 1.046556   | 1  |              |                |          |      |             |             |          |          |      |        |            |          |   |        |        |  |   |              |               |              |               |               |          |                      |          |        |           |          |                    |          |              |          |                    |          |                |          |                   |          |             |          |                    |          |                   |   |  |  |           |          |                    |          |               |          |                    |          |   |                              |       |           |             |          |  |   |          |       |        |            |       |          |           |           |          |        |   |          |          |          |   |          |           |          |          |   |           |          |                    |          |              |          |                    |          |                |          |                       |          |             |          |                   |          |               |           |                      |          |             |       |                    |          |                   |   |  |  |
| R-squared                    | 0.083449   | Mean dependent var   | 0.687962     |                |          |      |             |             |          |          |      |        |            |          |   |        |        |  |   |              |               |              |               |               |          |                      |          |        |           |          |                    |          |              |          |                    |          |                |          |                   |          |             |          |                    |          |                   |   |  |  |           |          |                    |          |               |          |                    |          |   |                              |       |           |             |          |  |   |          |       |        |            |       |          |           |           |          |        |   |          |          |          |   |          |           |          |          |   |           |          |                    |          |              |          |                    |          |                |          |                       |          |             |          |                   |          |               |           |                      |          |             |       |                    |          |                   |   |  |  |
| Adjusted R-s                 | 0.082221   | S.D. dependent var   | 1.091785     |                |          |      |             |             |          |          |      |        |            |          |   |        |        |  |   |              |               |              |               |               |          |                      |          |        |           |          |                    |          |              |          |                    |          |                |          |                   |          |             |          |                    |          |                   |   |  |  |           |          |                    |          |               |          |                    |          |   |                              |       |           |             |          |  |   |          |       |        |            |       |          |           |           |          |        |   |          |          |          |   |          |           |          |          |   |           |          |                    |          |              |          |                    |          |                |          |                       |          |             |          |                   |          |               |           |                      |          |             |       |                    |          |                   |   |  |  |
| S.E. of regres               | 1.045938   | Sum squared resid  | 816.1143     |                |          |      |             |             |          |          |      |        |            |          |   |        |        |  |   |              |               |              |               |               |          |                      |          |        |           |          |                    |          |              |          |                    |          |                |          |                   |          |             |          |                    |          |                   |   |  |  |           |          |                    |          |               |          |                    |          |   |                              |       |           |             |          |  |   |          |       |        |            |       |          |           |           |          |        |   |          |          |          |   |          |           |          |          |   |           |          |                    |          |              |          |                    |          |                |          |                       |          |             |          |                   |          |               |           |                      |          |             |       |                    |          |                   |   |  |  |
| F-statistic                  | 67.92113   | Durbin-Watson stat   | 1.358933     |                |          |      |             |             |          |          |      |        |            |          |   |        |        |  |   |              |               |              |               |               |          |                      |          |        |           |          |                    |          |              |          |                    |          |                |          |                   |          |             |          |                    |          |                   |   |  |  |           |          |                    |          |               |          |                    |          |   |                              |       |           |             |          |  |   |          |       |        |            |       |          |           |           |          |        |   |          |          |          |   |          |           |          |          |   |           |          |                    |          |              |          |                    |          |                |          |                       |          |             |          |                   |          |               |           |                      |          |             |       |                    |          |                   |   |  |  |
| Prob(F-statistic)            | 0  |  |              |                |          |      |             |             |          |          |      |        |            |          |   |        |        |  |   |              |               |              |               |               |          |                      |          |        |           |          |                    |          |              |          |                    |          |                |          |                   |          |             |          |                    |          |                   |   |  |  |           |          |                    |          |               |          |                    |          |   |                              |       |           |             |          |  |   |          |       |        |            |       |          |           |           |          |        |   |          |          |          |   |          |           |          |          |   |           |          |                    |          |              |          |                    |          |                |          |                       |          |             |          |                   |          |               |           |                      |          |             |       |                    |          |                   |   |  |  |
| R-squared                    | 0.083449   | Mean dependent var   | 0.687962     |                |          |      |             |             |          |          |      |        |            |          |   |        |        |  |   |              |               |              |               |               |          |                      |          |        |           |          |                    |          |              |          |                    |          |                |          |                   |          |             |          |                    |          |                   |   |  |  |           |          |                    |          |               |          |                    |          |   |                              |       |           |             |          |  |   |          |       |        |            |       |          |           |           |          |        |   |          |          |          |   |          |           |          |          |   |           |          |                    |          |              |          |                    |          |                |          |                       |          |             |          |                   |          |               |           |                      |          |             |       |                    |          |                   |   |  |  |
| Sum squaredec                | 816.1143   | Durbin-Watson stat   | 1.358933     |                |          |      |             |             |          |          |      |        |            |          |   |        |        |  |   |              |               |              |               |               |          |                      |          |        |           |          |                    |          |              |          |                    |          |                |          |                   |          |             |          |                    |          |                   |   |  |  |           |          |                    |          |               |          |                    |          |   |                              |       |           |             |          |  |   |          |       |        |            |       |          |           |           |          |        |   |          |          |          |   |          |           |          |          |   |           |          |                    |          |              |          |                    |          |                |          |                       |          |             |          |                   |          |               |           |                      |          |             |       |                    |          |                   |   |  |  |
| Normalized Restriction (= 0) | Value  | Std. Err.  |              |                |          |      |             |             |          |          |      |        |            |          |   |        |        |  |   |              |               |              |               |               |          |                      |          |        |           |          |                    |          |              |          |                    |          |                |          |                   |          |             |          |                    |          |                   |   |  |  |           |          |                    |          |               |          |                    |          |   |                              |       |           |             |          |  |   |          |       |        |            |       |          |           |           |          |        |   |          |          |          |   |          |           |          |          |   |           |          |                    |          |              |          |                    |          |                |          |                       |          |             |          |                   |          |               |           |                      |          |             |       |                    |          |                   |   |  |  |
| 0.22 + C(2)                  | 0.002538   |  |              |                |          |      |             |             |          |          |      |        |            |          |   |        |        |  |   |              |               |              |               |               |          |                      |          |        |           |          |                    |          |              |          |                    |          |                |          |                   |          |             |          |                    |          |                   |   |  |  |           |          |                    |          |               |          |                    |          |   |                              |       |           |             |          |  |   |          |       |        |            |       |          |           |           |          |        |   |          |          |          |   |          |           |          |          |   |           |          |                    |          |              |          |                    |          |                |          |                       |          |             |          |                   |          |               |           |                      |          |             |       |                    |          |                   |   |  |  |
| Variable                     | Fixed  | Random   | Var(Diff.)   | Prob.          |          |      |             |             |          |          |      |        |            |          |   |        |        |  |   |              |               |              |               |               |          |                      |          |        |           |          |                    |          |              |          |                    |          |                |          |                   |          |             |          |                    |          |                   |   |  |  |           |          |                    |          |               |          |                    |          |   |                              |       |           |             |          |  |   |          |       |        |            |       |          |           |           |          |        |   |          |          |          |   |          |           |          |          |   |           |          |                    |          |              |          |                    |          |                |          |                       |          |             |          |                   |          |               |           |                      |          |             |       |                    |          |                   |   |  |  |
| LRGDPCH?                     | -0.220477  | -0.217462  | 0.000006     | 0.2203         |          |      |             |             |          |          |      |        |            |          |   |        |        |  |   |              |               |              |               |               |          |                      |          |        |           |          |                    |          |              |          |                    |          |                |          |                   |          |             |          |                    |          |                   |   |  |  |           |          |                    |          |               |          |                    |          |   |                              |       |           |             |          |  |   |          |       |        |            |       |          |           |           |          |        |   |          |          |          |   |          |           |          |          |   |           |          |                    |          |              |          |                    |          |                |          |                       |          |             |          |                   |          |               |           |                      |          |             |       |                    |          |                   |   |  |  |
| C                            | 2.558091   | 0.228149   | 11.21236     | 0              |          |      |             |             |          |          |      |        |            |          |   |        |        |  |   |              |               |              |               |               |          |                      |          |        |           |          |                    |          |              |          |                    |          |                |          |                   |          |             |          |                    |          |                   |   |  |  |           |          |                    |          |               |          |                    |          |   |                              |       |           |             |          |  |   |          |       |        |            |       |          |           |           |          |        |   |          |          |          |   |          |           |          |          |   |           |          |                    |          |              |          |                    |          |                |          |                       |          |             |          |                   |          |               |           |                      |          |             |       |                    |          |                   |   |  |  |
| LRGDPCH?                     | -0.220477  | 0.026516   | -8.31474     | 0              |          |      |             |             |          |          |      |        |            |          |   |        |        |  |   |              |               |              |               |               |          |                      |          |        |           |          |                    |          |              |          |                    |          |                |          |                   |          |             |          |                    |          |                   |   |  |  |           |          |                    |          |               |          |                    |          |   |                              |       |           |             |          |  |   |          |       |        |            |       |          |           |           |          |        |   |          |          |          |   |          |           |          |          |   |           |          |                    |          |              |          |                    |          |                |          |                       |          |             |          |                   |          |               |           |                      |          |             |       |                    |          |                   |   |  |  |
| R-squared                    | 0.086056   | Mean dependent var   | 0.687962     |                |          |      |             |             |          |          |      |        |            |          |   |        |        |  |   |              |               |              |               |               |          |                      |          |        |           |          |                    |          |              |          |                    |          |                |          |                   |          |             |          |                    |          |                   |   |  |  |           |          |                    |          |               |          |                    |          |   |                              |       |           |             |          |  |   |          |       |        |            |       |          |           |           |          |        |   |          |          |          |   |          |           |          |          |   |           |          |                    |          |              |          |                    |          |                |          |                       |          |             |          |                   |          |               |           |                      |          |             |       |                    |          |                   |   |  |  |
| Adjusted R-s                 | 0.081136   | S.D. dependent var   | 1.091785     |                |          |      |             |             |          |          |      |        |            |          |   |        |        |  |   |              |               |              |               |               |          |                      |          |        |           |          |                    |          |              |          |                    |          |                |          |                   |          |             |          |                    |          |                   |   |  |  |           |          |                    |          |               |          |                    |          |   |                              |       |           |             |          |  |   |          |       |        |            |       |          |           |           |          |        |   |          |          |          |   |          |           |          |          |   |           |          |                    |          |              |          |                    |          |                |          |                       |          |             |          |                   |          |               |           |                      |          |             |       |                    |          |                   |   |  |  |
| S.E. of regres               | 1.046556   | Akaike info criterion  | 2.935549     |                |          |      |             |             |          |          |      |        |            |          |   |        |        |  |   |              |               |              |               |               |          |                      |          |        |           |          |                    |          |              |          |                    |          |                |          |                   |          |             |          |                    |          |                   |   |  |  |           |          |                    |          |               |          |                    |          |   |                              |       |           |             |          |  |   |          |       |        |            |       |          |           |           |          |        |   |          |          |          |   |          |           |          |          |   |           |          |                    |          |              |          |                    |          |                |          |                       |          |             |          |                   |          |               |           |                      |          |             |       |                    |          |                   |   |  |  |
| Sum squared                  | 813.7933   | Schwarz criterion  | 2.966414     |                |          |      |             |             |          |          |      |        |            |          |   |        |        |  |   |              |               |              |               |               |          |                      |          |        |           |          |                    |          |              |          |                    |          |                |          |                   |          |             |          |                    |          |                   |   |  |  |           |          |                    |          |               |          |                    |          |   |                              |       |           |             |          |  |   |          |       |        |            |       |          |           |           |          |        |   |          |          |          |   |          |           |          |          |   |           |          |                    |          |              |          |                    |          |                |          |                       |          |             |          |                   |          |               |           |                      |          |             |       |                    |          |                   |   |  |  |
| Log likelihoo                | -1092.896  | Hannan-Quinn criter.   | 2.947444     |                |          |      |             |             |          |          |      |        |            |          |   |        |        |  |   |              |               |              |               |               |          |                      |          |        |           |          |                    |          |              |          |                    |          |                |          |                   |          |             |          |                    |          |                   |   |  |  |           |          |                    |          |               |          |                    |          |   |                              |       |           |             |          |  |   |          |       |        |            |       |          |           |           |          |        |   |          |          |          |   |          |           |          |          |   |           |          |                    |          |              |          |                    |          |                |          |                       |          |             |          |                   |          |               |           |                      |          |             |       |                    |          |                   |   |  |  |
| F-statistic                  | 17.49  | Durbin-Watson stat   | 1.358072     |                |          |      |             |             |          |          |      |        |            |          |   |        |        |  |   |              |               |              |               |               |          |                      |          |        |           |          |                    |          |              |          |                    |          |                |          |                   |          |             |          |                    |          |                   |   |  |  |           |          |                    |          |               |          |                    |          |   |                              |       |           |             |          |  |   |          |       |        |            |       |          |           |           |          |        |   |          |          |          |   |          |           |          |          |   |           |          |                    |          |              |          |                    |          |                |          |                       |          |             |          |                   |          |               |           |                      |          |             |       |                    |          |                   |   |  |  |
| Prob(F-statistic)            | 0  |  |              |                |          |      |             |             |          |          |      |        |            |          |   |        |        |  |   |              |               |              |               |               |          |                      |          |        |           |          |                    |          |              |          |                    |          |                |          |                   |          |             |          |                    |          |                   |   |  |  |           |          |                    |          |               |          |                    |          |   |                              |       |           |             |          |  |   |          |       |        |            |       |          |           |           |          |        |   |          |          |          |   |          |           |          |          |   |           |          |                    |          |              |          |                    |          |                |          |                       |          |             |          |                   |          |               |           |                      |          |             |       |                    |          |                   |   |  |  |

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