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Inequality and Growth: A Time Series Perspective for the Group of Seven

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Contents

List of Abbreviations

ADF	Augmented Dickey-Fuller test
AIC	Akaike information criterion
ARDL	Autoregressive distributed lag model
ASEAN	Association of southeast Asian nations
CAGR	Compound annual growth rate
DW	Durbin-Watson statistic
ECM	Error correction model
ERS DF-GLS	Elliott-Rothenberg-Stock Dickey-Fuller GLS test
FRED	Federal Reserve Bank of St. Louis
G-7	Group of seven countries
GDP	Gross domestic product
GLS	Generalized least squares
HAC	Heteroskedasticity and autocorrelation consistent
HQ	Hannan-Quinn information criterion
i.i.d.	Independent and identically distributed
KPSS	Kwiatkowski-Phillips-Schmidt-Shin test
LM	Lagrange multiplier
OLS	Ordinary least squares
R&D	Research and development
RESET	Regression specification error test
RGDP	Real gross domestic product
RTFP	Real total factor productivity
SIC	Schwarz information criterion
TFP	Total factor productivity
UK	United Kingdom
U.S.	United States of America
VAR	Vector autoregression
WID	The World Wealth and Income Database

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1. Introduction

History proofs the existence of inequality in most egalitarian human social systems like age, gender and income (Cf. Feinman, 1995, p. 256). In this context, a controversial discussed but still unresolved issue is the relationship between inequality and growth. Summarizing the literature, a plethora of empirical studies has accumulated over time in investigating this inequality-growth relationship. However, they are often based on cross-sectional data due to a lack of time series data. Thus, this thesis is using time series data from the world's most industrialized economies, in that case the Group-of-Seven (G-7): Canada, France, Germany, Italy, Japan, the United Kingdom and the United States. Most of the empirical studies indicate that inequality reduces an economy's rate of growth, but there are also empirical findings of inequality promoting different measurements of growth. Consequently, reasons for the change in inequality are potentially various. According to Kuznets' (1955) hypothesis of the inverted U-shaped curve of growth-hampering inequality at the initial phase and growth-promoting inequality in advanced stages, one can assume that as technological and economic performances are rising, inequality should decrease. Since there is surprisingly relative little research existent about the effect of technological progress on inequality[1], the underlying elaboration aims to close that gap slightly. Transferring this interim conclusion into a research question, the thesis will demonstrate the empirical effects of economic growth in terms of total factor productivity (TFP) on the upper end of the income distribution as a determinant of income inequality. The upper end of the income distribution are in that case the top 10%, top 5% and the top 1% income shares, which is the most powerful measure of income inequality (Cf. Piketty and Saez, 2014, p. 839). The evolvement over the past 50 years is distinguished in short-term and long-term effects, which is ensued by the use of cointegrating and error correction estimation techniques.

Within the scope of this thesis, Section 2 presents a brief summary about the state of research as well as an overview about the evolution of income inequality and TFP in the G-7 countries. Section 3 describes the theoretical model. Section 4 introduces the econometric model and provides an explanation about the estimation methods. The empirical results and exceptions of each country are depicted in Section 5. Finally, conclusions are given in Section 6.

[1] See among others Galor and Tsiddon (1997), Caselli (1999), and Rubinstein and Tsiddon (2004).

2. Is Technological Progress Rising Inequality?

The emergence of inequality and its maintenance over time has been a major research component of several scientist. Kuznets (1955, 1963) was one of the first dealing with the question whether the inequality in income distribution increases or decreases due to economic growth. As he was confronted with a scarcity of data, he firstly defined five specifications about income distribution as a measurement of income inequality in developed countries. (1) The data recording should consider family-expenditure units and (2) it should ensure a completeness of the distribution covering all units. Using income data required (3) the distinction between learning and retired stages and (4) a definition of income as national income. (5) Lastly, he suggested clustering the units by secular levels of income (Cf. Kuznets, 1955, p. 1f.). For answering the question whether changes in the production process affects the distribution of income, Kuznets (1963) assumed within his cross-section as well as time series analysis that, caused by the industrial revolution, the increasing income inequality hampers economic growth. Albeit, income inequality decreases afterwards in a consequence of the saturation of the labour force and benefits thereby economic growth (inverted U-shape curve).

Going to the present day, the pioneering findings of Kuznets (1955, 1963) and Deininger and Squire (1996)[2] paved the way for deepening studies about inequality and growth.[3] Some scientists proved a positive relationship between inequality and growth. Meaning, that inequality is fostering growth mechanism by stimulating high-return projects or R&D activities (see among others Rosenzweig and Binswanger, 1993; and Foellmi and Zweimüller, 2006). On the other hand, by promoting fiscal policies or by interfering human capital, growth is expected to be interfered by inequality (see among others Perotti, 1993; Alesina and Rodrik, 1994; Persson and Tabellini, 1994; and Bénabou, 1996). Aghion *et al*. (1999) provided new theoretical perspectives for analysing the effects of inequality on growth. Questioning and challenging the Kuznets' hypothesis (1963) of the inverted U-shaped impact of growth on income inequality, Aghion *et al*. (1999) clarified the need for new theories for explaining the inequality-growth relationship because trade liberalization, technological change, as well as the emergence of new organizational forms affect the evolution of economic growth (Cf. Aghion *et al*., 1999, pp. 1616f.). Analysing the impact of economic growth on inequality, both wage and

[2] Deininger and Squire (1996) provided a primal database on inequality in the distribution of income.
[3] A comprehensive summary about this literature can also be found in Bénabou (1996, pp. 13ff.).

wealth inequality, using cross-country regressions leads to limitations, which evoke the need for further empirical evidences like time series analyses and experiments, as the authors mentioned themselves (Cf. Aghion *et al*., 1999, p. 1655).
Additionally, recent empirical studies do not follow a consistent opinion about the inequality-growth relationship whether it is negative, positive, or insignificant. Voitchovsky (2005) pointed out the complexity of this relationship. In this study, the profile of inequality, in particular the different parts of the income distribution, should be considered as a determinant of economic growth. Using 5-year panel data, Voitchovsky (2005) examined different consequences for growth in wealthy democratic countries. The top end of the income distribution has a positive impact on growth, whereas the bottom end is negatively correlated to growth. Additionally, Barro (2000), Banerjee and Duflo (2003), as well as Chen (2003) argue that these diverse results about the inequality-growth relationship can be explained by a non-linearity behaviour in this relationship. Furthermore, these conflicting results of the effects of the inequality-growth relationship differ due to the considered time spans. Halter *et al*. (2014) investigated the effects of inequality on economic performance developing a parsimonious theoretical model. Using panel data averaged over a 5-year period, their empirical findings show that an increasing inequality pushes the performance in the short-run, but decelerates in the long-run (negative lagged effect) expanding their data to a 10-year period.[4]

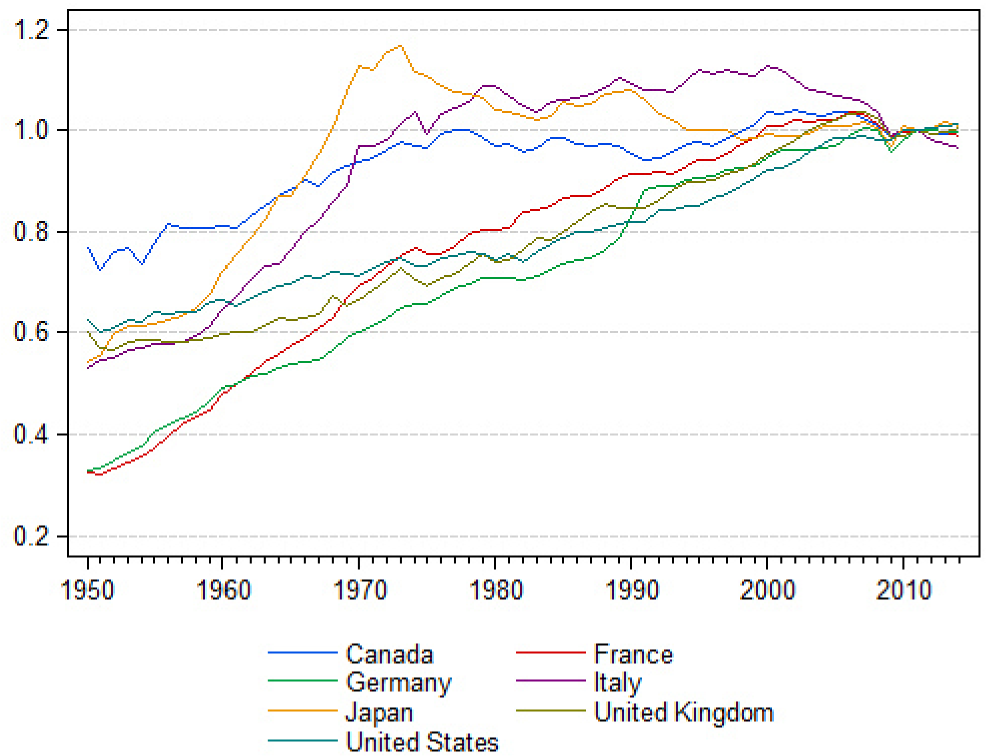
Setting the focus on the total factor productivity, the literature reflects a scarcity of studies about the relationship between income inequality and TFP.[5] However, there are many studies trying to measure the relationship between production factors and economic growth (see among others Klenow and Rodriguez-Clare, 1997; and Bosworth and Collins, 2003), which was initiated by Solow (1957). Easterly and Levine (2001) have maintained that the TFP growth is an important issue within the overall growth. Speaking of TFP – TFP is a variable for the productivity and is calculated as the Solow-residual. It states which part of the production growth cannot be explained by the growth of the commitment of production factors labour and capital (Cf. Carone *et al*., 2006, p. 10). Trying to connect TFP and income inequality gives rise to different assumptions. As an example,

[4] For more discussion about panel data analyses, see among others Partridge (1997, 2005), Barro (2000), Forbes (2000), Frank (2009) and Atems and Jones (2015).
[5] Some efforts in examine the mutual dependencies of income inequality, TFP, human capital and institutions are already available by Fuentes *et al*. (2014) and Sequeira *et al*. (2014).

Foellmi and Zweimüller (2006) have investigated that the increasing inequality is enhancing growth due to promoting R&D activities. However, Bénabou (1996) ascertained that inequality hinders growth by hampering human capital formation. Thus, it is not clearly stated, how TFP is behaving in the inequality-growth relationship. Attempting to find out whether TFP is increasing or decreasing over time and how it affects the inequality is the major incentive of this thesis.

Starting with a graphical investigation of income inequality and TFP, Figure 1 and Figure 2 show the passage of time of all G-7 countries. Specifically, there are shown the country-individual TFP evolutions, subscripted 2011 as 1 (Figure 1), as well as the trends in the top 10%, top 5% and top 1% income shares for each of the G-7 countries between 1950 and 2014 (Figure 2).

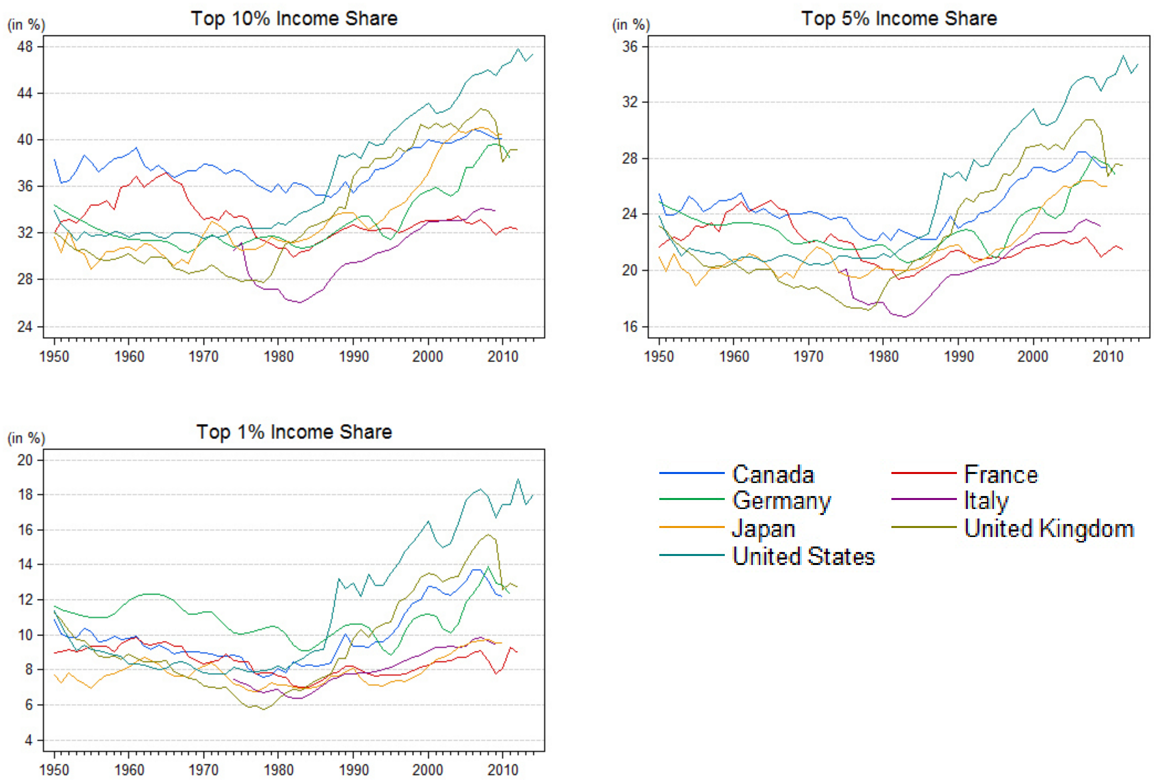
Figure 1: Evolution of TFP at Constant National Prices for G-7 Countries, 1950–2014



Source: Own depiction based on Feenstra *et al*. (2015).
Notes: Index scaling with 2011 = 1.

Commencing with Figure 1, the TFPs of Canada, the UK and the U.S. increase at a steady pace, with an observed slower movement in the case of Canada. The UK's TFP outdistances the U.S. in 1980. Japan and Italy show the most rapid growth in the figure. Japan's TFP starts below Canada, the UK and the U.S. in 1950, but grows very rapidly between 1960 and 1970; however, after 1980 it drops below Canada, France and Italy. Italy has a similar trajectory. It begins below Canada, the UK, the U.S. and Japan, and shows from 1980 until 2010 the highest TFP value. Finally, speaking of Germany's and France's TFP, they both start out on similar levels and experience a steady growth until the 1960s. Beginning 1960, the France's TFP grows stronger than the TFP progress of Germany and can catch up with the UK and the U.S. Recently, Germany was able to catch up with the UK and the U.S., but remains a low TFP performer compared to the above mentioned countries. In 2014, the U.S.' TFP is stronger than Japan's and UK's. Germany's TFP is stronger than France's and Italy's, where Italy has the lowest performance in 2014.

Figure 2: Evolution of Income Shares for G-7 countries, 1950–2014



Source: Own depiction based on Alvaredo *et al.* (2016).

Shifting the focus towards Figure 2 and starting with Canada's income shares, it is evident that all three shares have a similar shape over time. The top 10%, top 5% and top 1%

income shares are showing a marginal increasing compound annual growth rate (CAGR) of 0.08%, 0.12% and 0.19%, respectively. However, in the period of 1980 to 1990, there was a slight loss for all three shares. Considering the income shares of France, the graphs depict a smooth pattern for the top 1% income share, whereas the top 10% and top 5% income shares have a peak around 1960 and a trough in the 1980s. With an almost flat CAGR of 0.02% of the top 10% income share and -0.01% of both the top 5% and top 1% income shares, the income inequality remains steady between 1950 and 2012 in France. The top 10% and top 5% income shares of Germany are showing a slight increasing curve, whereas the top 1% income share fluctuates around the share value of 11.0% between 1950 and 2011. In the case of Italy, the data recording for income shares was not available before 1974, thus there is a fundamental lack of necessary information before the era of 1974. Nevertheless, the data reveals an upward trend of income inequality for all income shares. Having a closer look at Japan, there is a massive increase of the top 10% income share from 1950 to 2010 with a CAGR of 0.41%. The income inequality in terms of the top 5% and top 1% income shares are showing a similar behaviour, however, they slope more slightly. Speaking to the UK, there is also an enormous rise in all three income shares, but there is a trough in the 1980s and a peak becoming apparent around 2000. Finally yet importantly, the U.S. outpace a tremendous increasing development regarding the income inequality within the country. Considering the CAGR and the behaviour of the curves, the U.S. demonstrates the highest constantly growth of all income shares with a CAGR of 0.53%, 0.60% and 0.74%, respectively, between 1950 and 2014.

Comparing the income inequality between these G-7 countries, there seems to be an obvious overall upward trend. However, Canada and especially France remain more or less steady from 1950 to 2010. Additionally, France shows the lowest inequality in comparison to the other G-7 countries with a decile share value of 32.3% in 2010. In contrary to France, the passage of time of the U.S. is remarkable. It shows the highest inequality compared to the other G-7 countries in 2010, where its decile income share is 46.4%, meaning that the top 10% of income earners in the U.S. hold short of the half of the total income. As evident of the graphical investigation, between 1980 and 1990, the inequality has obviously decreased in Canada, France, Germany and Italy; however, Japan, the UK and the U.S. are sharply increased during this period. This phenomenon can be explained by country-specific institutions and historical circumstances as Piketty and Saez (2014) mentioned. One major source for the phenomenon in Europe could be the end of the cold war and the deregulation of the European labour market during that period. For now, this finding shall remain unanswered in this elaboration and will be left for further research. Besides the European countries, Japan, the UK and the U.S. show a different course. The increasing secular trend can be caused by technological changes like the internet or personal computers. As Goldin and Katz (2008) described, there is a race between education and technology. Meaning that technological progress results in an upward demand for skills, whereas education increases the supply of skills. Therefore, this thesis investigates the relationship between economic growth and income inequality with focus on changes in inequality caused by technological progress to examine whether there is a long-run relationship between income inequality and TFP.

3. The Economic Model

The previously detected increasing inequality by the data of income shares can be associated with the increasing course of the total factor productivity. Piketty and Saez (2014) proposed the theory that the global competition for skills, which is for instance based on skill-biased technological change or the growth of information technologies, can lead to rising income inequality. Seizing on the skill-biased technological change as a possible TFP character, which was explained by Violante (2008, p. 1) as "*a shift in the production technology that favours skilled* […] *labor over unskilled labor by increasing its relative productivity* […]", and stating further required assumptions, a simple model can be formulated for explaining a potential relationship between income inequality and TFP. The underlying analysis is using income data without capital gains, which accepts the conclusion of having labour incomes. Assuming additionally, that the labour income represents the major revenue source of household incomes and the consideration of skill-biased technological changes opens the question whether the introduction of innovations and new technologies leads to changes in labour income. Hereby, this thesis assumes that employees have the same skill-levels but differ in their productivities due to new and old technologies. This implicates different incomes for the households leading to inequality. Thus, for answering the previously stated research question whether there is a long-run relationship between income inequality and TFP as a determinant of technological progress and under consideration of the stated assumptions, one can formulate a simple economic model, which is referring to Aghion *et al*. (1999).

According to Solow (1957), the TFP of a country can be expressed within the production function having a Cobb-Douglas form with constant returns to scale:

$$Y_t = K_t^{\alpha}\,(B_t\,L_t)^{1-\alpha}, \qquad 0 < \alpha < 1, \tag{3.1}$$

where Y_t is the aggregate final output or aggregate income, B_t is the TFP, and K_t and L_t are the economy's stock of capital and its labour force, respectively, and where α depicts a given parameter (Cf. Aghion *et al*., 1999, p. 1646). If the level of TFP changes as technological progress occurs, the increasing TFP variable B_t is called the Harrod-neutral or labour-augmenting technological change.[6] Technological progress can be associated with innovations of new technologies and since it is an exogenous variable, it can rise or fall due to unfamiliar reasons as for instance by economic reforms, by government regulations, by changes in work organizations, or by different education and skill-levels of the employees.

Taking logarithms and differentiating Equation (3.1), where the minuscule variables corresponds to the logarithms of the majuscule variables, the production function can be expressed with growth rates (Cf. Sorensen and Whitta-Jacobsen, 2005, p. 130):

$$y_t - y_{t-1} = \alpha\,(k_t - k_{t-1}) + (1-\alpha)[(b_t - b_{t-1}) + (l_t - l_{t-1})]. \qquad (3.2)$$

Denoting the growth rate of Y_t as g_t^y and defining it as $g_t^y = \ln Y_t - \ln Y_{t-1} = y_t - y_{t-1}$, Equation (3.2) can be rewritten as:

$$g_t^y = \alpha g_t^k + (1-\alpha)(g_t^b + g_t^l)\,. \qquad (3.3)$$

This equation permits the calculation of the TFP, knowing all other variables. As a result, the growth of TFP is separated into observable elements, which is also labelled as the Solow residual (Cf. Carone *et al*., 2006, p. 10). However, for the underlying analysis the TFP data are obtained from the Federal Reserve Bank of St. Louis data base (in short FRED), which calculates the real TFP as:

$$RTFP_{jt,t-1} = \frac{RGDP_{jt}}{RGDP_{jt-1}} / Q_T\left(v_{jt}, v_{jt-1}, w_{jt}, w_{jt-1}\right), \qquad (3.4)$$

where the data is based on constant national prices over time.[7]

Reverting to the construction of the simple economic model, which is based on Aghion *et al*. (1999), the thesis assumes further that the model experiences an embodied technological change, meaning that the new technological knowledge is internalised in technologies an organization is applying to. For the examination how inequality can occur even when skill-levels are equal, the model considers two types of technologies: old

[6] According to Harrod (1939), Harrod-neutral technological progress signifies a neutral innovation in the production function, which remains the relative input share unchanged for a given capital-output ratio.
[7] See Feenstra *et al*. (2015) for more discussion.

(vintage) technology and new (innovative) technology. At one point in time, the employees are randomly matched with a technology type. If an employee is allocated to an old technology, she or he can improve her or his skills and productivity via learning-by-doing. Aghion *et al*. (1999) argued that if the employee moves to a new technology, which is more productive, she or he would lose most of her or his acquired skills. Therefore, operating on different types of technology emerges distinct technology-specific skills and hence a heterogeneity among employees and the labour market. In fact, an increasing variety in productivity and especially in salaries is generated due to different employee allocations and technology-specific skills. As assumed previously, using income data without capital gains leads to the conclusion that the major revenue source of household incomes are the labour incomes and salaries. A simple model can shed light on this assumption.

Assuming that these new technologies are embodied in capital goods and last for two periods only, each period a new technology emerges the organization acquires capital to replace its old equipment. The final output of the organization is stated in Equation (3.1), where K_t is the amount of capital, however, L_t will be replaced by X_t, which is the amount of efficiency units of labour used for technology t. B_t still depicts the technology parameter, our TFP. As profit maximization will lead to an optimal amount of capital, which is equivalent to the level of technology B_t, then, for simplicity one can assume that $K_t = B_t$ in the steady state. Therefore, the equilibrium level of final output is:

$$Y_t^N = B_t \, X_t^{1-\alpha}, \qquad 0 < \alpha < 1. \tag{3.5}$$

As new technologies lead to an increase in productivity, the new technology is τ times more productive than the previous one:

$$B_t = \tau \, B_{t-1}, \qquad \tau > 1, \tag{3.6}$$

where τ measures the amount of technological progress. At any point in time, there are only two technologies in operation, which are the old and new one. The new technology is operating according to Equation (3.5), whereas the old technology is operating as:

$$Y_t^O = B_{t-1} \, X_{t-1}^{1-\alpha}, \qquad 0 < \alpha < 1. \tag{3.7}$$

If employees are paid according to their marginal productivity, the salary will depend on two crucial factors. Firstly, the type of technology she or he is currently operating and secondly, the type of technology she or he operated in the previous period. Therefore, the main source of inequality in that case is the fact that not all employees can move to the new technology. Thus, 1 denotes the new technology and 0 denotes the old technology, where X_1 and X_0 are the amount of efficiency units for the new and old technologies, respectively. The rate of learning-by-doing on the same type of technology over two periods is denoted with φ and the fraction of acquired knowledge that an employee can transfer to the new technology is denoted with σ. In addition, the spillover of acquired knowledge to new employees can be depicted by θ. Thus, the resulting efficiency equations can be stated as:

$$X_1 = (1 + \sigma\, \varphi)\, x_{11} + x_{01}\,, \tag{3.8}$$

$$X_0 = (1 + \theta\, \varphi)\, x_{00} + (1 + \varphi)\, x_{10}\,. \tag{3.9}$$

In this case, Aghion *et al*. (1999) depicts x_{ij} as the labour flow from the i^{th} technology of the last period to the j^{th} technology in the current period, which are in steady state.
To examine how relative salaries change, one can assume the following case: Imagine that all employees want to move to the new and productive technology. Then, the factors influencing the ratio of salaries are φ and τ. The ratio of salaries can be expressed as:

$$\frac{s_1}{s_0} = \left(\frac{1-\mu}{\mu}\right)^2 \frac{\tau}{(1+\varphi)^{1-\alpha}} > 1\,, \tag{3.10}$$

where the salaries of employees operating the new technology are determined as $s_1 = (1-\alpha)\,\tau\, B_1\, X_1^{-\alpha}$ and the salaries of those using the old technology are $s_0 = (1-\alpha)(1+\varphi)\, B_1\, X_0^{-\alpha}$. If the relocation constraint μ is binding,[8] that is all employees want to move to the new technology, the salary ratio between these two types of employees were given in Equation (3.10). A higher rate of learning-by-doing, depicted by φ, reduces the salary ratio in that term, that the productivity of the employees operating with the old technology increases relatively more. In addition, a faster technological change depicted by τ will

[8] If the constraint is slack, employees are indifferent between the new and the old technology.

result in a more unequal earning between employees on the old and new technology (Cf. Aghion *et al*., 1999, p. 1648).

The previous model shows that there might occur inequality in salaries due to technological change even when skill-levels are equal. Since the salaries are a source of revenues, one can conclude that technological change leads to income inequality. Further models could also allow for skill-level differences to cover real world phenomena. In this instance, skilled employees or workers might adapt smoother to technological change in machinery, information technology or automation. One reason for this could be the need of skilled manpower to design and control new technologies, rather than operating them in production directly. This could affect wages of low-skilled workers negatively due to technology induced higher competition in low skilled jobs. Having this in mind, the top earners will benefit from this phenomena by assuming that their skill-level is relatively high. This current research field has already been addressed by some authors like Chang and Huynh (2016), who claimed that 56% of all jobs in the ASEAN-5 are at high risk of displacement due to automation over the next decade.

4. The Econometric Model

This section tries to answer the question whether total factor productivity has a statistical impact on the top 10%, top 5% and top 1% income shares by testing for a long-run equilibrium relationship between them. It first proposes unit root tests for all variables used in the analysis and a short explanation about the emerging trends. Synthesising at the unit root test results and the accordingly integrated order of the variables, there are different methodologies, which need to be used for estimating the long-run relationship between income inequality and growth. The thesis focuses on the residual-based two-step cointegration approach followed by an estimation of the inherent error correction model (ECM) introduced by Engle and Granger (1987). Here, the cointegrating regression describes the long-run dynamics, whereas the ECM estimates the short-run dynamics.

Since the data presents additionally two special cases of variables, which are either integrated of order zero, $I(0)$, or integrated of order two, $I(2)$, the theory offers two more methodologies to estimate a cointegrating relationship. In situations where one variable may be integrated of order zero, $I(0)$ and the other might be integrated of order one, $I(1)$, the autoregressive distributed lag model (in short ARDL) including the bounds testing approach of Pesaran and Shin (1999) and Pesaran *et al*. (2001) is appropriate. This model enables to investigate long-run relationships using a single equation estimation, which allows for straightforward model interpretations. On the other hand, the likelihood-based vector autoregressive (VAR) approach of Johansen (1991, 1996) is appropriate for the investigation of a mixture of $I(1)$ and $I(2)$ variables. However, this regression analysis follows an autoregressive formulation, which necessitates for explicit assumptions. Another important point worth mentioning is the potential cointegration of the $I(2)$ variable with its own difference, which makes this analysis more complicated.

4.1. Data and Unit Root Tests

The variables used in the analysis of the relationship between inequality and growth includes data of the top 10%, top 5% and top 1% income shares for each G-7 country as well as the TFP.[9] The income data was found in The World Wealth and Income Database (WID), which is income before direct taxes excluding government contributions and capital gains (Cf. Alvaredo *et al*., 2016). The Federal Reserve Bank of St. Louis (FRED)

[9] Detailed information about the data sources are reported in Appendix A.

provides the data for TFP based on constant national prices over time (Cf. Feenstra *et al*., 2015). The variables of these three income shares are denoted as *top10*, *top5* and *top1*; all are natural logarithmized. In the underlying analysis, the natural logarithm variable for TFP is termed as *tfp*.[10] The summary statistics as well as the time series plots of all variables for all G-7 countries used for the estimations can be found in Appendix A.

Since economic time series often change over time and possess trends or breaks, it is initially necessary to examine whether there are trends in the data and additionally to test for stationarity and non-stationarity, respectively. The reasons of time series trending over time are related to unobserved factors. However, neglecting the trend component from the regression can lead to a false interpretation of the time series processes as well as result in a spurious regression (Cf. Wooldridge, 2013, pp. 363ff.). Thus, it is important to recognize whether the data follows a trend. It can be distinguished between two types of trends: deterministic and stochastic. The deterministic trend is a non-random function of time, whereas a stochastic trend is random and varies over time (Cf. Stock and Watson, 2015, p. 598). A time series can be trend stationary, meaning that the series follows a stationary process around a deterministic trend. In practice, there can be either a linear deterministic trend $Y_t = \alpha + \beta t + u_t$, where $u_t \sim i.i.d.(0, \sigma^2)$ and $t = 1, 2, \cdots, T$, or a quadratic deterministic trend $Y_t = \alpha + \beta t + \gamma t^2 + u_t$, where $u_t \sim i.i.d.(0, \sigma^2)$ and $t = 1, 2, \cdots, T$ (Cf. DeJong *et al*., 1992, pp. 423f.). Watson (1994) emphasized the important issues about deterministic components in time series, which have often been ignored. They affect both the efficiency and distribution of estimated cointegrating vectors as well as the power of cointegration tests. On the other hand, a time series Y_t with a stochastic trend, can either follow a random walk $Y_t = Y_{t-1} + u_t$, where u_t is i.i.d. and has zero conditional mean $E(u_t | Y_{t-1}, Y_{t-2}, \cdots) = 0$, or a random walk with drift $Y_t = \beta_0 + Y_{t-1} + u_t$, where $E(u_t | Y_{t-1}, Y_{t-2}, \cdots) = 0$ and β_0 depicts the "drift". This drift is the adjustment for the tendency of the series to increase or decrease. If the time series follows a random walk, it is not stationary. Additionally, Stock and Watson (2015) presented problems, which can be accompanied by the presence of a stochastic trend. The first problem is that the standard distribution theory cannot be used. The usual t-statistic can have a non-normal distribution and is not readily tabulated since the distribution depends on the

[10] Taking the natural logarithm of the variables enables to determine the rate of changes using their first differences.

dependent and explanatory variables. However, there is one exceptional case, where it is possible to tabulate the distribution of the t-statistic – unit root testing. Another risk associated with stochastic trends is the spurious regression. Two series, which are independent, will mistakenly appear to be related.[11] Nevertheless, if two series include a common stochastic trend, they are cointegrated. One aim of this thesis is to show whether there are cointegrating relationships between the variables *tfp*, *top10*, *top5* and *top1* for each G-7 country, which will be proven in the next sections. For detecting stochastic trends and ascertaining if a series is non-stationary, the series will be tested for a unit root. The statistical procedure for this test will be depicted afterwards.

Reverting to the question of cointegration, distinctions between deterministic and stochastic cointegration are shown by Park (1992) and Perron and Campbell (1993). There, stochastic cointegration is present, if there are linear independent combinations of the variables that are stationary. According to Perron and Campbell (1993), these combinations may have non-zero deterministic trends. Whereas deterministic cointegration does not allow the presence of a deterministic trend within the linear independent combinations. Using the residual-based cointegration approach of Engle and Granger (1987), the cointegration definition is equal to a deterministic cointegration, where the cointegrating vectors eliminate both, the stochastic and deterministic non-stationarity. However, according to the Granger representation theorem, there is only an error correction representation if there is also a stochastic cointegrating relationship and vice versa (Cf. Engle and Granger, 1987, pp. 255f.). Further features and effects of trending components in a cointegrating relationship are analysed for instance by Hansen (1992), Engle and Kozicki (1993), Hassler (1999) and Xiao and Phillips (1999). As can be evident from Figure 1 and Figure 2, all G-7 countries show a long-term increase for the TFP and a small long-term increasing fluctuation in the income shares. This suggests that at least the inclusion of a linear trend in the income inequality equation, which will be introduced afterwards in Equation (4.4), should be considered in the regression, eventually. As found out from above, if the underlying variables *tfp*, *top10*, *top5* and *top1* share a common stochastic trend, they have a cointegrating relationship and thus an error correction representation.

[11] See also Phillips (1986) for more discussion.

For starting the analysis, initially all variables should be tested whether they follow a trend. Detecting trends preserves from wrong interpretations and a false use of distribution statistics. For detecting stochastic trends, the series is testing for a unit root. There are several formal statistical procedures to test the hypothesis of a unit root and therefore of the presence of a trend against the alternative that there is no unit root. If the univariate time series Y_t has a unit root, Y_t is said to be non-stationary. In this thesis, the so-called augmented Dickey-Fuller (ADF) test based on Dickey and Fuller (1979) is used for computing unit root tests for all variables within the analysis. This is the most commonly used test in practice and is one of the most reliable. In addition to the ADF test, time series can be tested for a unit root using the Phillips-Perron test[12], the KPSS test[13], the GLS-detrending Dickey-Fuller test (ERS DF-GLS)[14] and the Ng-Perron test[15].

The ADF method tests the null hypothesis $H_0\colon \delta = 0$, meaning that there is a unit root present (non-stationarity) against the one-sided alternative $H_1\colon \delta < 0$, where no unit root is existing (stationarity). The following ADF test regression represents a random walk with drift (Cf. Stock and Watson, 2015, p. 605):

$$\Delta Y_t = \beta_0 + \delta Y_{t-1} + \mu_1 \Delta Y_{t-1} + \mu_2 \Delta Y_{t-2} + \cdots + \mu_p \Delta Y_{t-p} + u_t. \tag{4.1}$$

Since the Dickey-Fuller statistic is augmented by lags of ΔY_t, the unknown lag length p can be estimated using a lag length selection method, such as the Akaike Information Criterion (AIC), the Schwarz Information Criterion (SIC) or the Hannan-Quinn Information Criterion (HQ). Another issue refers to the integration of exogenous variables in the test regression. In that case, the remaining null hypothesis of non-stationarity against the changing alternative hypothesis of stationarity around a deterministic linear time trend t must be tested. The ADF regression becomes then:

$$\Delta Y_t = \beta_0 + \alpha t + \delta Y_{t-1} + \mu_1 \Delta Y_{t-1} + \mu_2 \Delta Y_{t-2} + \cdots + \mu_p \Delta Y_{t-p} + u_t, \tag{4.2}$$

where α is an unknown coefficient (Cf. Stock and Watson, 2015, pp. 604f.). In both cases, Equation (4.1) and Equation (4.2), the null hypothesis is rejected, if the ADF-statistic is

[12] See Phillips and Perron (1988).
[13] See Kwiatkowski *et al.* (1992).
[14] See Elliott *et al.* (1996).
[15] See Ng and Perron (2001).

less than the specified Dickey-Fuller critical values. Dickey and Fuller (1979) demonstrated that the ADF-statistic does not follow the Student's t-distribution and therefore simulated critical values for various sample sizes. In addition to these tabulated critical values, MacKinnon (1991, 1996) provided response surfaces for obtaining useful critical values as well as p-values for arbitrary sample sizes:

$$C_k(p) = \beta_\infty + \beta_1 T_k^{-1} + \beta_2 T_k^{-2} + u_k, \tag{4.3}$$

where $C_k(p)$ is the estimated critical value from the k^{th} experiment and T_k is the sample size. As T tends to infinity, T^{-1} and T^{-2} both tend to zero. The parameter β_∞ is an estimate of the asymptotic critical value for a test at level p. The parameters β_1 and β_2 are the shape of the response surface for finite values of T. The parameters β_∞, β_1 and β_2 are given in MacKinnon (1996, 2010). This proper method permits the calculation of the corrected critical values appropriate to the sample size; otherwise, this would lead to an over-rejection of the null hypothesis.[16] The corrected estimated critical values for both cases, Equation (4.1) as intercept only and Equation (4.2) as intercept and time trend, and for the underlying sample sizes of the analyses for each G-7 country are listed in Appendix B. Since this elaboration tries to work out whether there exists any long-run cointegrating equilibrium between income inequality and TFP, the transformation of the time series in terms of differentiating is not required.[17] In the following sections, the two-step approach of Engle and Granger (1987), which allows for the presence of stochastic trends, are explained in more detail. But initially, there is an explanation about the orders of integration required, which depicts an extension of the random walk model. A time series Y_t is integrated of order d, $I(d)$, meaning that Y_t must be differenced d times to eliminate its stochastic trend and make it stationary, that is $\Delta^d Y_t$ is stationary. Reverting to the question of cointegration, Engle and Granger (1987) defined cointegrating components of the series Y_t, which are said to be cointegrated of order d, b, denoted $Y_t \sim CI(d,b)$, only if (i) all components of Y_t are $I(d)$ and if (ii) there exists a coefficient θ ($\neq 0$) so that $z_t = \theta' Y_t \sim I(d-b)$, where θ is called the cointegrating coefficient. The evidence that the TFP processes and the three income shares of all G-7 countries could be cointegrated of order

[16] See Engle and Granger (1987), Engle and Yoo (1987) and Phillips and Ouliaris (1990) for more discussion.
[17] Transforming time series means using first differences for eliminating random walk trends in a series, which, however, only refers to short-run movements. Another method for detrending a series is the trend estimation. See Nelson and Plosser (1982), Watson (1986), Stock and Watson (1988) and Rudebusch (1992) for discussion.

$CI(d, b)$ are presented in Table 1 to follow. In specific, the univariate analysis of each variable referring to Equation (4.2), where each test equation includes an intercept and a linear time trend provides empirical test results. The lag length is selected using the SIC.

Table 1: ADF Test Results

Country	Statistics	***tfp***	***top10***	***top5***	***top1***
Canada	Level	−1.93	−1.63	−1.48	−1.76
	First difference	−9.56***	−8.21***	−7.51***	−6.33***
France	Level	−0.63	−1.98	−1.65	−1.33
	First difference	−6.99***	−7.35***	−7.01***	−6.31***
Germany	Level	−2.44	−2.61	−2.38	−0.72
	First difference	−6.02***	−5.70***	−5.90***	−1.49
	Second difference				−4.78***
Italy	Level	−0.59	−7.36***	−5.41***	−2.92
	First difference	−4.91***			−2.99
	Second difference				−6.90***
Japan	Level	−2.12	−1.68	−1.55	−1.69
	First difference	−2.45	−7.42***	−6.88***	−5.74***
	Second difference	−9.15***			
UK	Level	−2.90	−2.11	−2.24	−2.06
	First difference	−7.87***	−6.59***	−6.19***	−6.23***
US	Level	−2.76	−3.06	−3.14	−2.99
	First difference	−9.85***	−7.44***	−7.20***	−7.20***

Source: Own depiction based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).
Notes: *, ** and *** denote null hypothesis of a unit root are rejected at the 10%, 5% and 1% critical values, respectively.

As Table 1 depicts, the test statistics for all logarithmized time series show different results for each G-7 country. Canada's time series *tfp*, *top10*, *top5* and *top1* failed to reject the null hypothesis of a unit root on the level test. Using the same statistics, *tfp*, *top10*, *top5* and *top1* are stationary on the first-difference unit root test and thus are all integrated of order one, $I(1)$. In case of France, none of the test statistics of the time series is rejecting the null hypothesis of non-stationarity on the level test. However, on the first-difference test, all variables are also stationary and consequently integrated of order one, $I(1)$, as the series of Canada. While Germany's time series *top1* fails to reject the null hypothesis of a unit root on the level as well as on the first-difference tests, the time series *tfp*, *top10* and *top5* missed to reject the null hypothesis of a unit root only on the level test, but they are stationary on the first-difference test. The variable *top1* is said to be integrated of order two, $I(2)$; *tfp*, *top10* and *top5* are integrated of order one, $I(1)$. Referring to Italy, the displayed time series in Table 1 are exceptional in that only *tfp* is integrated of order one, $I(1)$. The time series *top10* and *top5* both reject the null hypothesis of a unit root on the level test at the 1% critical value, meaning they are integrated of order zero, $I(0)$. Using the same statistics, *top1* is stationary on the second-difference unit root test, which indicates that *top1* is integrated of order two, $I(2)$. With regard to Japan, *tfp* failed to reject the null hypothesis of a unit root on the level and on the first-difference test. Reclaiming the same statistics, *tfp* is stationary on the second-difference unit root test and therefore integrated of order two, $I(2)$. Since *top10*, *top5* and *top1* of Japan all reject the null hypothesis of non-stationarity on the first-difference unit root test at the 1% critical value, they are integrated of order one, $I(1)$. In case of the UK and the U.S., all time series missed to reject the null hypothesis of a unit root on the level test, however, using the same statistics, all variables are stationary on the first-difference unit root test and hence are integrated of order one, $I(1)$.

After detecting the integrating order of all variables, it is now possible to examine the potentially cointegrating relationships among the income shares and TFP.

4.2. Engle-Granger Two-Step Cointegration Approach

It is well known that most of the economic variables are non-stationary and contain a time trend component. As already discussed in Subsection 4.1., a regression with $I(1)$ variables can lead to misleading results as well as to a spurious regression. However, the pioneering work of Engle and Granger (1987), Phillips and Hansen (1990), Sims *et al*. (1990), Johansen (1991), Phillips (1991) and Phillips and Loretan (1991) provided alternative estimation and hypothesis testing procedures for the analysis of $I(1)$ variables. These new approaches allow for cointegration between non-stationary variables, if, in the case of the Engle-Granger approach, a linear combination of them has a stationary distribution. The basis of cointegration is a common stochastic trend of all series used in the regression. According to the results of the unit root tests in Subsection 4.1., this thesis suggests to apply different approaches for estimating long-run cointegrating relationships among income inequality and TFP: the residual-based two-step cointegration approach of Engle and Granger (1987) and the bounds testing approach of Pesaran *et al*. (2001). In this elaboration, the focus lies on the Engle-Granger two-step approach. The investigation of the mixture of $I(0)$ and $I(1)$ variables will be presented in Subsection 5.6.1. The investigation of the mixture of $I(1)$ and $I(2)$ variables is excluded since this investigation follows a very different procedure.[18] The case that the underlying analysis could probably not find any cointegration, meaning the $I(1)$ variables within the regression do not have a common stochastic trend as well as no linear combination of them that is $I(0)$, is called spurious regression. Phillips (1986) explained the behaviour of the estimated cointegrating coefficient $\hat{\theta}$ from the regression of the series Y_t and X_t, which are not cointegrated: $Y_t = \hat{\theta} X_t + \hat{u}_t$. Since Y_t is not cointegrated with X_t, $\hat{u}_t \sim I(1)$ and $\hat{\theta}$ converges to a non-normal distribution. Furthermore, the coefficient of determination, *R-squared*, tend to unity as $T \to \infty$ and misleads the model to fit well although it is misspecified. A possible solution of this problem is the differencing of the series. This ensures that all of the series are being stationary; however, it only displays the short-run dynamics and besides could also have omitted constraints.

Starting with the residual-based two-step cointegration approach of Engle and Granger (1987), the first step of this approach contains an estimation of the parameters of the cointegrating relationship. In the second step, these parameters are then used in the appropriate error correction mechanism, which will be explicated in Subsection 4.3. In relation to the present investigation of a feasible relationship between income inequality and growth, the use of a fully modified OLS (FMOLS) regression analysis is suitable. Because of the limited linear restrictions, Hansen (1992) recommended not using and interpreting the non-linear restriction test results, which includes trend regressors as it is the case for the regressions of the G-7 countries. Banerjee *et al*. (1993) further recommended using the FMOLS for cointegrating issues proposed by Phillips and Hansen (1990), because of misleading regression results for small sample sizes, as it is for instance the case for Italy.
Drawing the attention to Engle and Granger (1987), they defined a cointegrating equation with cointegrating vectors, which represent the stationary linear combination of the $I(1)$ series. In economic theory, this linear combination depicts the long-run equilibrium

[18] For more discussion of the likelihood-based vector autoregressive (VAR) approach see Engle and Yoo (1991) and Johansen (1991, 1995).

relationship. According to this long-run relationship, the $I(1)$ series cannot drift too far apart from this equilibrium, since economic forces will restore the equilibrium and push the equilibrium error back to zero. In the regression analysis, the effect on the logarithmized depended variable y_t will be ascertained, which appears due to the change of a logarithmized independent variable x_t. Since the cointegrating coefficient θ is unknown, it is advisable to conduct an estimation. Assuming the existence of a single cointegrating relationship, the general long-run equilibrium equation for this underlying analysis is denoted by:

$$y_t = \beta + \theta x_t + \delta_1 t + \delta_2 t^2 + u_t, \tag{4.4}$$

where y_t depicts the natural logarithms of the top 10%, top 5% and top 1% income shares, respectively, x_t represents the natural logarithm of TFP, t and t^2 in this case are quadratic deterministic trend regressors and u_t depicts the random disturbance term, namely the residuals. Running a regression of y_t and x_t can detect the cointegration order $CI(1,1)$, only if the series are both $I(1)$. The corresponding residuals represent the measure of disequilibrium, meaning the above mentioned linear combination of the random variables, which has the from:

$$\hat{u}_t = y_t - \hat{\beta} - \hat{\theta} x_t - \hat{\delta}_1 t - \hat{\delta}_2 t^2, \tag{4.5}$$

and which is stationary. The stationarity of this error term predicates the realization of the second step of the two-step approach. Engle and Granger (1987) hereby suggested the performance of a unit root test on the residuals of the cointegrating equation (4.4) using the ADF test. But, in this case, the extracted residuals are tested according to Equation (4.1), where each test equation includes only an intercept. The lag length is again selected by using the SIC. Since the ADF-statistic does not follow the Student's t-distribution, Appendix B provides the corrected critical values for the unit root test of the no trend case. Additionally, this elaboration gives a quick review of further cointegration tests, in order to show the different powers and results of the test statistics. Besides testing the residuals with the ADF test, the underlying elaboration verifies these results with the additionally system-provided Engle-Granger cointegration test, as well as with the parameter instability test of Hansen (1992). The Engle-Granger method uses the parametric ADF approach, which tests the null hypothesis of no cointegration against the alternative of cointegration. Lag length selection for the Engle-Granger test ensued with the SIC. The test output provides the Engle-Granger tau-statistic (t-statistic) as well as the normalized autocorrelation coefficient (z-statistic). The Hansen Instability test examines the null hypothesis of cointegration against the alternative of no cointegration. According the alternative hypothesis, Hansen (1992) outlined the evidence of parameter instability using the L_c test statistic, which tests time variation from the estimated equation.

With respect to Table 1, the presented tests for the presence of cointegration within the Engle and Granger (1987) two-step approach are examined for the countries Canada, France, Germany (except *top1* since it is $I(2)$), the UK and the U.S., since the variables of these countries are all integrated of order one, $I(1)$. Thereby, there are the three models depicted: Model I – regression of *tfp* and *top10*, Model II – regression of *tfp* and *top5* and Model III – regression of *tfp* and *top1*.

As represented in Table 2, the most interesting aspects of Canada are evident in Model II and Model III. All tests show no cointegrating relationships, however, the residuals' ADF t statistic for these models are marginally significant at the 10% critical value (−3.164). By assuming that there could be a feasible existence of a cointegrating relationship, the analysis of Canada will pursue the estimation of an ECM using the Engle-Granger methodology. Regarding to France, in all three models the Hansen Instability test indicates the presence of cointegration among the variables. Because the t-statistic of the residuals' ADF test of Model I and Model II are showing a non-stationarity, one can say that there are spurious regressions within these models. However, an ECM will be estimated to examine consistent short-run dynamics, since the Hansen Instability test provides cointegrating relationships. By contrast, Germany is an example par excellence. In Model I and Model II, the ADF t-statistic of the residuals, the Engle-Granger test statistics as well as the Hansen Instability L_c-statistic confirm the existence of cointegrating relationships. Since the residuals are stationary at the 1% critical value, the cointegrating regressions in Model I and Model II in Germany are said to be super-consistent. Concerning the UK, only the Hansen Instability test reveals cointegration for all three models. However, in Model I, the ADF t-statistic of the tested residuals is slightly significant at the 10% critical value (−3.160). In case of the U.S., all three models show a marginally significance at the 10% critical value (−3.157) in the ADF test of the residuals. Hereby, a super consistency in the U.S. regressions might be persist.

Table 2: Cointegration Test Results

	Canada	France	Germany	UK	US
Model I: *tfp* and *top10*					
Residual ADF					
t–statistic	−3.60**	−2.45	−6.08***	−2.87	−2.96
Engle–Granger					
tau–statistic	−2.88	−3.07	-6.11^{+++}	−2.46	−2.55
z–statistic	−14.57	−11.01	-100.50^{+++}	−11.54	−6.92
Hansen Instability					
L_c-statistic	1.18°°°	0.23	0.29	0.40	0.66°°
Model II: *tfp* and *top5*					
Residual ADF					
t–statistic	−2.92	−2.64	−5.81***	−2.64	−3.02
Engle–Granger					
tau–statistic	−2.42	−3.15	-5.86^{+++}	−2.28	−2.72
z–statistic	−11.67	−11.86	-86.54^{+++}	−10.30	−6.84
Hansen Instability					
L_c-statistic	1.40°°°	0.21	0.52	0.43	0.69°°°
Model III: *tfp* and *top1*					
Residual ADF					
t–statistic	−2.69	−3.35*		−2.05	−3.02
Engle–Granger					
tau–statistic	−2.64	−3.63		−1.87	−2.71
z–statistic	−19.44	−17.84		−7.72	−6.61
Hansen Instability					
L_c-statistic	1.29°°°	0.17		0.52	0.66°°

Source: Own depiction based on Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).
Notes: *, ** and *** denote null hypothesis of a unit root are rejected at the 10%, 5% and 1% critical values, respectively. $^{+}$, $^{++}$ and $^{+++}$ denote null hypothesis of no cointegration are rejected at the 10%, 5% and 1% significance levels, respectively. °, °° and °°° denote null hypothesis of cointegration are rejected at the 10%, 5% and 1% significance levels, respectively.

The next subchapter introduces the error correction estimations of the feasible and obvious cointegrating relationships according to the Engle-Granger methodology.

4.3. Error Correction Model

After the execution of the two-step cointegration approach and the examination of the cointegration tests, Engle and Granger (1987) proposed furthermore the conduction of an error correction model, in which the estimated linear combination of random variables from Equation (4.5) enters as the error correction term. Rendering the Granger Representation Theorem, there exists only an ECM if the two variables y_t and x_t are cointegrated (Cf. Engle and Granger, 1987, pp. 255f.). In this instance, the cointegration depicts the long-run relationship between the variables, whereas the ECM presents the short-run relationship. The basic error correction equation can have the form:

$$\Delta y_t = \mu + \sum_{i=1}^{n} \phi_i \Delta y_{t-i} + \sum_{i=0}^{n} \varphi_i \Delta x_{t-i} + \alpha \hat{u}_{t-1} + \varepsilon_t \tag{4.6}$$

where n is the number of lags, $\hat{u}_{t-1}$ is the first lagged value of the error term from the cointegrating regression (4.4) and α is the adjustment mechanism of the error term, the so-called speed-of-adjustment coefficient (Cf. Glasure and Lee, 1997, p. 19). This adjustment coefficient depicts the extent to what it corrects the previous period disequilibrium. This speed-of-adjustment coefficient must be negative and significant. If this is true, α confirms the existence of a long-run equilibrium relationship among the variables.

The procedure of finding the appropriate lagged changes of the variables is a country-specific one. The unrestricted error correction estimation includes a number of lags of all differenced variables, which are selected (e.g. up to four differences). In the next step, all significant lagged changes are entering the final restricted ECM. This final model contains the error correction term, which was estimated from the cointegrating regression (4.4) as well as all significant lagged differences of the variables from the unrestricted error correction estimation. These procedure is conducted for each G-7 country with variables integrated of order one, $I(1)$. The results are represented in Section 5.

For testing whether the final ECM is valid and consistent, the model needs to pass some diagnostic test procedures. The residuals of the ECM are testing for serial correlation, for a normally distribution as well as for heteroskedasticity. In other words, serial correlation may not be presented; the residuals should have a normal distribution and should be homoskedastic in the standard errors. Additionally, the residuals can generally be examined for the presence of correlations over time. To start, one can check the Durbin-Watson

(DW) statistic, which is part of the regression output. Durbin and Watson (1950) displayed the evidence that there is no serial correlation with a DW statistic around the value 2. Is the DW statistic located between 2 and 4, the residuals are negatively correlated. Whereas a positive correlation exists if the DW statistic comes within 2. An alternative to the DW statistic is the Breusch-Godfrey Lagrange multiplier (LM) test. This test is adaptable for lagged dependent variables. The Breusch-Godfrey LM test statistic is the so-called *Obs*R-squared*-statistic and examines the null hypothesis of no serial correlation up to lag order p against the alternative of serial correlation.[19] For testing whether the residuals are normally distributed, the Jarque-Bera statistic under the null hypothesis of a normal distribution is a good indicator. Testing for heteroskedasticity is conducted using White's (1980) findings. The test examines the null hypothesis of no heteroskedasticity (= homoskedasticity) against the alternative of heteroskedasticity. If there is an indication of heteroskedasticity, it is advisable to include the HAC standard errors, which was derived from Newey and West (1987). These HAC standard errors are consistent if both, potentially heteroskedasticity and possibly correlation over time of unidentified form, are entering the regression. For ensuring stability of the ECM, Ramsey's (1969) regression specification error test (RESET) is appropriate, which detects general model misspecifications in forms of omitted variables and incorrect functional form. The F-statistic depicts hereby the RESET statistic. A significant F-statistic indicates some functional misspecification (Wooldridge, 2013, pp. 303–305ff.)

After explaining the applied econometric model and its testing procedure, the next section presents the empirical results of each G-7 country.

[19] See Godfrey (1989) for further discussion.

5. Empirical Results

Having discussed the theoretical and statistical model, this section gives empirical evidence about the question whether there is a relationship between inequality and growth. More precisely, this section demonstrates that there is indeed empirical effects of TFP on the upper end of the income distribution of the G-7 countries.

As the availability of the data varies from country to country, the exact number of observations will be established in the corresponding subsections for each G-7 country individually. The variables *top10*, *top5* and *top1* depicts the natural logarithms of the top 10%, top 5% and top 1% income shares, respectively. The natural logarithm of TFP is termed as *tfp*. Since this thesis elucidates that there are different ways in testing for long-run dynamics, the results of the Engle-Granger analysis are separate depicted for each country in alphabetical order. Subsection 5.6. summarizes the approaches of investigating the mixture of $I(0)$ and $I(1)$ variables as well as the mixture of $I(1)$ and $I(2)$ variables.

Starting with the ADF test for all G-7 series, the distinction of the integrating order of the variables is necessary for the further procedure of testing for a cointegrating relationship. Referring to Table 1, Canada, France, Germany[20], the UK and the U.S. are analysed rendering the Engle and Granger (1987) two-step approach, since all variables accomplish the requirement of being integrated of order one, $I(1)$. On the other hand, the variables *top10* and *top5* of Italy[21] are trend stationary, $I(0)$, which renders the implementation of the Engle-Granger approach impossible in that case. Here, the ARDL bounds testing approach of Pesaran and Shin (1999) and Pesaran *et al*. (2001) is appropriate. In addition to the *top1* variables of Germany and Italy, respectively, the analysis of Japan, unfortunately, is not achievable, since the variable *tfp* is integrated of order two, $I(2)$. Therefore, the Engle-Granger approach is again not applicable in the case of the Model III analysis of *tfp* and *top1* for Germany and Italy, as well as of all three models for Japan.

In relation to the present investigation of a feasible relationship between income inequality and growth, the use of a FMOLS regression analysis is suitable, as already explained previously. Here, the effect on the depended variable y_t, which depicts *top10*, *top5* and *top1* in Model I, Model II and Model III, respectively, is ascertained by changes of the independent variable x_t (*tfp*). Therefore, Model I investigates the effect of *tfp* on *top10*,

[20] Investigating of Germany ensued in the absence of the variable *top1*, since it is integrated of order two.
[21] The variable *top1* of Italy is also integrated of order two, $I(2)$.

Model II the effect of *tfp* on *top5* and Modell III the effect of *tfp* on *top1*, respectively. Referring to the general long-run equilibrium equation (4.4), the applied equations for Canada, France, Germany, the UK and the U.S. for Model I, Model II and Model III, respectively, are:

Model I $$top10_t = \beta + \theta\, tfp_t + \delta_1 t + \delta_2 t^2 + u_t \tag{5.1}$$

Model II $$top5_t = \beta + \theta\, tfp_t + \delta_1 t + \delta_2 t^2 + u_t \tag{5.2}$$

Model III $$top1_t = \beta + \theta\, tfp_t + \delta_1 t + \delta_2 t^2 + u_t \tag{5.3}$$

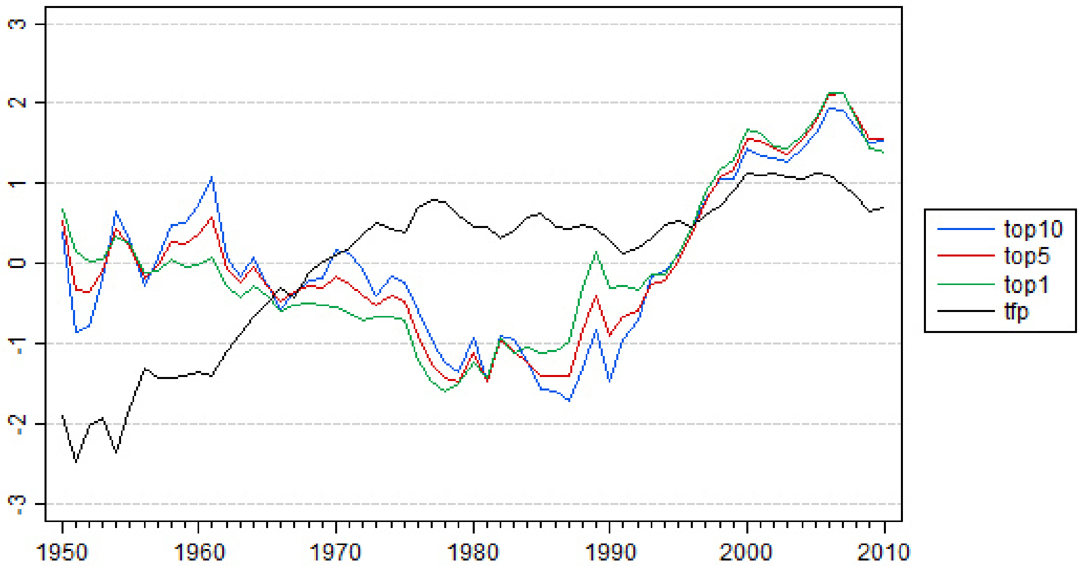
Each model consists of three columns, where column (1) represents the cointegrating FMOLS regression, column (2) the unrestricted error correction estimation and column (3) the restricted ECM, which includes various independent variables. The incidental test results of the cointegrating regression in (1) are already stated in Subchapter 4.2. Ascertaining whether the FMOLS regression in (1) has an error correction system, the unrestricted error correction estimation in (2) was assessed with the extracted residuals from (1) as well as the lagged changes of the *top10*, *top5* and *top1* variables, respectively, and the corresponding quantity of lagged changes of *tfp*. The lag length decision is detected by the easy model building strategy, which estimates the simplest ECM first and then tests for added lags of y_t and x_t (Engle and Granger, 1987, p. 272). Out of this regression, only the significant coefficients are entering the restricted ECM in (3). The test results of the final ECM are listed in Appendix B.

5.1. Canada

The analysis is initiated with Canada having an obtainable valid data basis. For the top 10% income share, data is available from 1941; in case of the top 5% and top 1% income shares, there are data from 1920. However, for the TFP, data is only available from 1950. For a better comparison, the analysis of both, income shares and TFP in Canada, starts from 1950 until 2010 and provides therefore 60 observations. As previously stated, the examination of a feasible cointegrating relationship between inequality and growth is separated into three models: Model I, Model II and Model III.

Beginning with the visual inspection of the data, Figure 3 plots all four logarithmized variables in one graph using a normalized scale. All three income shares show kind of cyclical upward trend, whereas *tfp* displays a positive secular trend. Computing the autocorrelation coefficients, a stochastic trend can be assumed for *tfp*, *top10*, *top5* and *top1*, as the first autocorrelation coefficient is near 1.

Figure 3: Time Series Comparison of Income Shares and TFP of Canada



Source: Own depiction based on Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Using formal statistical procedures, the assumptions made above can be confirmed. Calling to mind the ADF test of a unit root from Subsection 4.1., the variables *tfp*, *top10*, *top5* and *top1* failed to reject the null hypothesis of a unit root on the level test but are stationary on the first-difference test and thus are integrated of order one, $I(1)$. These test results are also evident for the presence of stochastic trends in the data. Furthermore, this property enables to use the Engle-Granger two-step approach for examine possible cointegrating relationships. Trying to answer the question whether Canada shows a long-run relationship between the income shares and TFP, Table 3, Table 4 and Table 5 show the regression results of all models.

Model I (Table 3) represents the FMOLS estimation (1) of the effect of TFP on the top 10% income share in Canada including a quadratic deterministic trend, which shows evidence for a spurious regression. However, testing the residuals from (1) with the ADF test shows that the error term (here depicted as *resid10*) is stationary. The ADF test results are previously presented in Subchapter 4.1. According to Engle and Granger (1987), this stationary error term represents the linear combination, which makes the regression super-consistent. Thus, the variables *top10* and *tfp* are sharing the same stochastic trend. Regression (2) is an OLS estimation of the change in the top 10% income share on six lags of Δ*top10* and Δ*tfp* plus the error correction term with one lag. Since the coefficient of the error term is negative and significant, the generation of the restricted ECM in (3) is now possible. Of all lagged changes, the first, third, fourth and sixth lags of Δ*top10* as well as the fourth, fifth and sixth lags of Δ*tfp* are significant. Thus, the final ECM has the error correction term estimated from (1) and the previous listed lagged changes in *top10* and *tfp*. Referring to Equation (4.6), the coefficient on the lagged error correction term is negative and highly significant. This speed-of-adjustment coefficient states that on average 38.1% of the last period's equilibrium error is corrected in this period. Since the diag-

Table 3: Regression Results Canada, Model I

	(1)	(2)	(3)
Dep. Var.:	*top10*	Δ*top10*	Δ*top10*
tfp	0.345** (2.3)		
resid10(−1)		−0.551***(−3.8)	−0.381***(−3.9)
Δ*top10*(−1)		0.314* (1.8)	0.202 (1.3)
Δ*top10*(−2)		0.281 (1.4)	
Δ*top10*(−3)		0.348** (2.1)	0.269** (2.5)
Δ*top10*(−4)		0.379***(3.4)	0.308***(3.6)
Δ*top10*(−5)		0.141 (1.3)	
Δ*top10*(−6)		0.242** (2.2)	0.221** (2.5)
Δ*tfp*(−1)		0.057 (0.4)	
Δ*tfp*(−2)		0.029 (0.2)	
Δ*tfp*(−3)		0.021 (0.1)	
Δ*tfp*(−4)		0.254** (2.5)	0.219* (1.9)
Δ*tfp*(−5)		0.219* (1.7)	0.132 (1.1)
Δ*tfp*(−6)		0.227* (2.0)	0.161 (1.3)
const	6.797***(10.6)	−0.004 (−1.6)	−0.002 (−0.8)
trend	−0.011***(−4.8)		
$trend^2$	0.000***(6.1)		
R-squared	0.638	0.330	0.263
SER	0.026	0.013	0.013
DW	–	1.98	2.06

Source: Own depiction based on Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).
Notes: SER = standard error of regression. *, ** and *** denote the 10%, 5% and 1% significance levels, respectively. The *t*-statistics are in parentheses, even though they are not valid for regression (1).

nostic tests for serial correlation, normally distribution, heteroskedasticity as well as the RESET test are all generally good, the final ECM demonstrates the existence of a cointegrating relationship between the top 10% income share and TFP in Canada.

Table 4: Regression Results Canada, Model II

	(1)	(2)	(3)
Dep. Var.:	*top5*	Δ*top5*	Δ*top5*
tfp	0.389* (2.0)		
resid5(−1)		−0.398***(−2.8)	−0.203** (−2.4)
Δ*top5*(−1)		0.378* (1.9)	0.250 (1.3)
Δ*top5*(−2)		0.234 (1.1)	
Δ*top5*(−3)		0.173 (1.2)	
Δ*top5*(−4)		0.176 (1.6)	
Δ*top5*(−5)		0.161 (1.4)	
Δ*tfp*(−1)		0.090 (0.5)	
Δ*tfp*(−2)		0.099 (0.6)	
Δ*tfp*(−3)		0.158 (0.9)	
Δ*tfp*(−4)		0.142 (1.0)	
Δ*tfp*(−5)		0.366** (2.2)	0.246** (2.3)
const	6.213***(7.4)	−0.004 (−1.1)	0.001 (0.2)
trend	−0.016***(−5.5)		
$trend^2$	0.000***(7.5)		
R-squared	0.767	0.237	0.142
SER	0.035	0.018	0.018
DW	–	2.15	2.03

Source: Own depiction based on Feenstra *et al.* (2015) and Alvaredo *et al.* (2016).
Notes: SER = standard error of regression. *, ** and *** denote the 10%, 5% and 1% significance levels, respectively. The t-statistics are in parentheses, even though they are not valid for regression (1).

Modell II (Table 4) represents the FMOLS estimation (1) of the effect of TFP on the top 5% income share in Canada. Testing the residuals from (1) with the ADF test shows a marginally significance at the 10% critical value. By assuming a feasible existence of a cointegrating relationship, model (2) is estimated in order to find the final restricted ECM in (3). Regression (2) includes five lagged changes of *top5* and *tfp*. The significant first lag of Δ*top5* as well as the fifth lag of Δ*tfp* are entering the final ECM in (3). The speed-of-adjustment coefficient is negative and significant at the 5% significance level and is equal to −0.203. The diagnostic tests are again valid. Despite the weak ADF test result, the assumption stated previously of the feasible presence of a cointegrating relationship can be verified.

Modell III (Table 5) shows the FMOLS estimation (1) of the impact of TFP on the top 1% income share in Canada. The ADF test of the residuals from (1) are again marginally significant at the 10% critical value as it was the same instance for regression (1) in Model II. Once more, the assumption is made that there exists a cointegrating relationship. Regression (2) detects the significant lagged changes of *top1* and *tfp*, which structures the restricted ECM in (3). The speed-of-adjustment coefficient of the final ECM in (3) is –0.258 and highly significant. All diagnostic tests show good test results. Back to the assumption made at regression (1), it can be verified that there is a long-run equilibrium as well as short-run dynamics of the top 1% income share and TFP in Canada.

Table 5: Regression Results Canada, Model III

	(1)	(2)	(3)
Dep. Var.:	*top1*	Δ*top1*	Δ*top1*
tfp	0.112 (0.3)		
resid1(–1)		–0.510***(–3.3)	–0.258***(–2.9)
Δ*top1*(–1)		0.600***(2.9)	0.429** (2.1)
Δ*top1*(–2)		0.258 (1.4)	
Δ*top1*(–3)		0.168 (1.1)	
Δ*top1*(–4)		0.194* (1.8)	0.085 (1.0)
Δ*top1*(–5)		0.175* (1.8)	0.087 (1.0)
Δ*tfp*(–1)		0.572 (1.6)	
Δ*tfp*(–2)		0.221 (0.7)	
Δ*tfp*(–3)		0.565* (1.7)	0.148 (1.0)
Δ*tfp*(–4)		0.258 (0.9)	
Δ*tfp*(–5)		0.778***(2.8)	0.523***(2.9)
const	6.557***(4.1)	–0.013 (–1.6)	–0.001 (–0.2)
trend	–0.025***(–4.5)		
$trend^2$	0.000***(7.2)		
R-squared	0.835	0.286	0.204
SER	0.066	0.036	0.036
DW	–	2.09	2.10

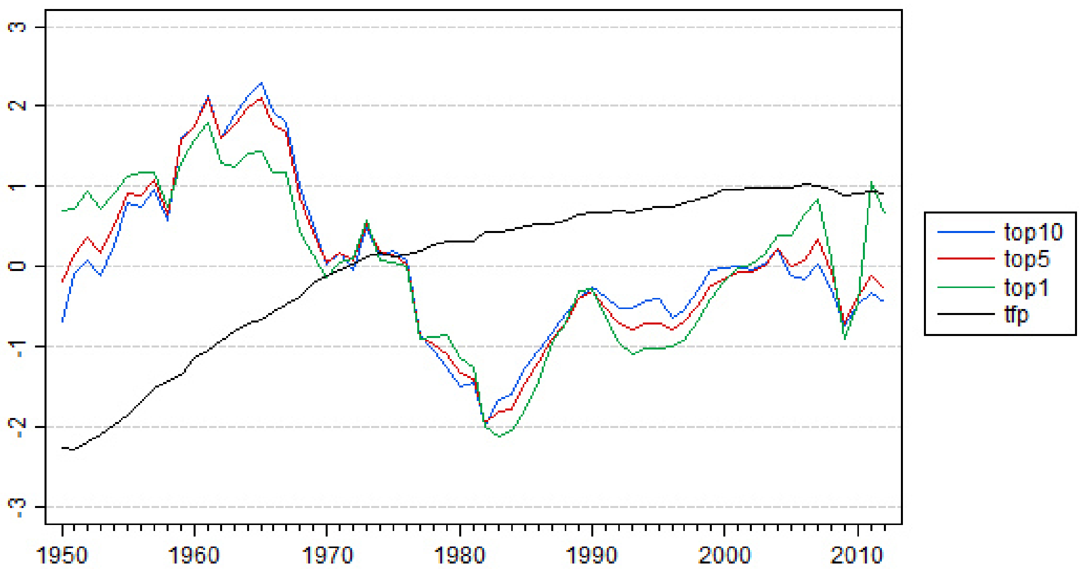
Source: Own depiction based on Feenstra *et al.* (2015) and Alvaredo *et al.* (2016).
Notes: SER = standard error of regression. *, ** and *** denote the 10%, 5% and 1% significance levels, respectively. The *t*-statistics are in parentheses, even though they are not valid for regression (1).

Summarizing the empirical results of Canada, Model I shows that the technological progress has a positive significant long-run effect on the top 10% income share on average by 0.345 percentage points. The top 5% income share in Model II is increasing by 0.389 percentage points in the long run. Only in Model III, the effect of TFP on the top 1% income share is not significant. However, overall it is evident that there is a long-run relationship between income inequality and economic growth. Considering the short-run dynamics, the speed-of-adjustment coefficients of Model I, Model II and Model III are relatively quick with 38.1%, 20.3% and 25.8%, respectively.

5.2. France

To continue with France, the situation of available data is the same as it was for Canada. For the top 10% and top 5% income shares, the data recording starts at 1919. The data of the top 1% income share was recording since 1915; TFP, however, initially since 1950. Again, for a better comparison, the analysis of France starts from 1950 until 2012 and results in a total amount of 62 observations.

Figure 4: Time Series Comparison of Income Shares and TFP of France



Source: Own depiction based on Feenstra *et al.* (2015) and Alvaredo *et al.* (2016).

As evident from Figure 4, the logarithmized variables *top10*, *top5* and *top1* show barely upward or downward trends, however, there are peaks and troughs indicating a cyclical character. The natural logarithm of TFP, *tfp*, shows a positive secular trend. A stochastic trend can be assumed for *tfp*, *top10*, *top5* and *top1*, as the first autocorrelation coefficient of all variables is near 1. Introducing the next steps, the variables *tfp*, *top10*, *top5* and *top1* are tested for a unit root and stochastic trend, respectively, using the ADF test. All four variables are integrated of order one, $I(1)$, meaning that none of them are rejecting the null hypothesis of a unit root on the level test, however, all are stationary on the first-difference test, which allows for the application of the Engle-Granger two-step approach. Using this approach, the variables are investigating for long-run relationships. The succeeding Table 6, Table 7 and Table 8 are showing the results of the regression models used for analysing the long-run as well as the short-run dynamics of inequality and growth in France.

Table 6 depicts the results of Model I. Starting with the FMOLS estimation in column (1), which analyses the effect of TFP on the top 10% income share in France and which includes a significant quadratic deterministic trend, the residuals from regression (1) are tested to be non-stationary. This implies that there is no stationary linear combination of the cointegrating regression and is also an evidence for a spurious regression. However, the Hansen Instability cointegration test provides cointegrating relationship (see Table 2). With this result, one can assume that there could be a possible cointegrating relationship between the top 10% income share and TFP. Therefore, the analysis proceeds further and estimates the unrestricted error correction mechanism in (2). This OLS regression estimates the change in the top 10% income share on eight lags of Δ*top10* and Δ*tfp* as well as the one-lagged error correction term, depicted as *resid10(-1)*. The restricted ECM in (3) is built with the fourth lag of Δ*top10* as well as with the fourth and eighth lags of Δ*tfp*. The speed-of-adjustment coefficient is –0.133 and significant at the 5% level, which means that the disequilibrium in the last period is corrected in this period by around 13.3%. The diagnostic tests are all generally good, although the DW statistic of 1.77 shows a positive correlation. The final ECM confirms the assumption of a cointegrating relationship between the *top10* and *tfp* in France.

Table 6: Regression Results France, Model I

	(1)	(2)	(3)
Dep. Var.:	*top10*	Δ*top10*	Δ*top10*
tfp	0.452* (1.9)		
resid10(−1)		−0.232** (−2.3)	−0.133** (−2.4)
Δ*top10*(−1)		0.117 (0.8)	
Δ*top10*(−2)		0.224 (1.6)	
Δ*top10*(−3)		0.008 (0.1)	
Δ*top10*(−4)		0.349** (2.4)	0.355***(2.9)
Δ*top10*(−5)		0.167 (1.1)	
Δ*top10*(−6)		0.081 (0.8)	
Δ*top10*(−7)		−0.007 (−0.1)	
Δ*top10*(−8)		0.080 (0.9)	
Δ*tfp*(−1)		0.101 (0.9)	
Δ*tfp*(−2)		0.200 (1.4)	
Δ*tfp*(−3)		0.021 (0.2)	
Δ*tfp*(−4)		0.421** (2.4)	0.484***(4.6)
Δ*tfp*(−5)		−0.095 (−0.9)	
Δ*tfp*(−6)		−0.143 (−1.1)	
Δ*tfp*(−7)		−0.020 (−0.1)	
Δ*tfp*(−8)		−0.506***(−3.9)	−0.591***(−4.0)
const	6.626***(8.2)	0.003 (1.0)	0.003 (1.3)
trend	−0.025** (−2.3)		
$trend^2$	0.000** (2.3)		
R-squared	0.458	0.597	0.474
SER	0.038	0.013	0.013
DW	–	1.98	1.77

Source: Own depiction based on Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).
Notes: SER = standard error of regression. *, ** and *** denote the 10%, 5% and 1% significance levels, respectively. The t-statistics are in parentheses, even though they are not valid for regression (1).

Model II in Table 7 represents the FMOLS estimation in (1), which examines the effect of TFP on the top 5% income share in France. Being confronted with the same situation as in Model I, the residuals' ADF test statistic from (1) does not show a stationary behaviour. By assuming feasible cointegrating relationship due to the proof of the Hansen Instability cointegrating test, the unrestricted error correction estimation is conducted in (2). Here, there are again eight lags of Δ*top5* and Δ*tfp* as well as the error correction term, which is lagged one time. Generating the restricted ECM in (3) with the fourth lag of Δ*top5* and the fourth and eighth lags of Δ*tfp* leads to a significant speed-of-adjustment coefficient of

−0.129. The DW statistic of 1.56 indicates a positive correlation. However, the diagnostic tests are again generally good with one exception: the residuals are not normally distributed. According to the assumption of the feasible presence of a cointegrating relationship stated previously, the ECM test results can verify it marginally.

Table 7: Regression Results France, Model II

	(1)	(2)	(3)
Dep. Var.:	*top5*	Δ*top5*	Δ*top5*
tfp	0.629** (2.4)		
resid5(−1)		−0.323** (−2.3)	−0.129* (−1.9)
Δ*top5*(−1)		0.253 (1.7)	
Δ*top5*(−2)		0.167 (1.0)	
Δ*top5*(−3)		0.075 (0.5)	
Δ*top5*(−4)		0.369** (2.4)	0.298** (2.2)
Δ*top5*(−5)		0.124 (0.8)	
Δ*top5*(−6)		0.202 (1.5)	
Δ*top5*(−7)		0.048 (0.4)	
Δ*top5*(−8)		0.115 (1.1)	
Δ*tfp*(−1)		0.153 (1.0)	
Δ*tfp*(−2)		0.164 (0.9)	
Δ*tfp*(−3)		−0.021 (−0.1)	
Δ*tfp*(−4)		0.493** (2.5)	0.518***(3.6)
Δ*tfp*(−5)		−0.130 (−0.9)	
Δ*tfp*(−6)		−0.102 (−0.6)	
Δ*tfp*(−7)		0.058 (0.3)	
Δ*tfp*(−8)		−0.565***(−3.5)	−0.661***(−3.6)
const	5.637***(6.3)	0.003 (0.5)	0.004 (1.1)
trend	−0.035***(−3.0)		
trend^2	0.000***(3.0)		
R-squared	0.567	0.531	0.401
SER	0.042	0.017	0.016
DW	–	1.85	1.56

Source: Own depiction based on Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).
Notes: SER = standard error of regression. *, ** and *** denote the 10%, 5% and 1% significance levels, respectively. The t-statistics are in parentheses, even though they are not valid for regression (1).

Table 8 represents Model III, in which the impact of TFP on the top 1% income share in France is estimated with FMOLS in (1). In this case, the ADF test statistic of the residuals from (1) are significant at the 10% critical value. This indicates a stationary linear combination, which proves the existence of a super-consistent cointegrating relationship between *top1* and *tfp*. The error correction estimate in (2) detects the significant lagged changes of *top1* and *tfp*, which enter the restricted ECM in (3). Since all diagnostic tests are verifying good test results, the last period disequilibrium will be corrected very quickly by around 43.8% in this period, accomplishing the requirement of being negative and significant. Additionally, the DW statistic is around 2, which implies that there is no correlation. Thus, in Model III, there is a long-run equilibrium as well as short-run dynamics between the top 1% income share and TFP in France.

Table 8: Regression Results France, Model III

	(1)	(2)	(3)
Dep. Var.:	*top1*	Δ*top1*	Δ*top1*
tfp	0.886***(3.1)		
resid1(−1)		−0.685***(−2.8)	−0.438** (−2.6)
Δ*top1*(−1)		0.642***(2.8)	0.440***(2.9)
Δ*top1*(−2)		0.066 (0.3)	
Δ*top1*(−3)		0.267 (1.3)	
Δ*top1*(−4)		0.434** (2.1)	0.349 (1.5)
Δ*top1*(−5)		0.180 (0.8)	
Δ*top1*(−6)		0.270 (1.3)	
Δ*top1*(−7)		0.083 (0.4)	
Δ*top1*(−8)		0.254 (1.4)	
Δ*tfp*(−1)		0.281 (0.9)	
Δ*tfp*(−2)		−0.178 (−0.5)	
Δ*tfp*(−3)		−0.088 (−0.3)	
Δ*tfp*(−4)		0.653** (2.5)	0.281 (1.5)
Δ*tfp*(−5)		−0.030 (−0.1)	
Δ*tfp*(−6)		0.150 (0.5)	
Δ*tfp*(−7)		0.273 (0.8)	
Δ*tfp*(−8)		−0.573 (−1.7)	
const	3.875***(3.9)	−0.004 (−0.3)	−0.004 (−0.7)
trend	−0.053***(−4.1)		
$trend^2$	0.001***(4.4)		
R-squared	0.704	0.464	0.258
SER	0.050	0.032	0.032
DW	–	1.81	1.94

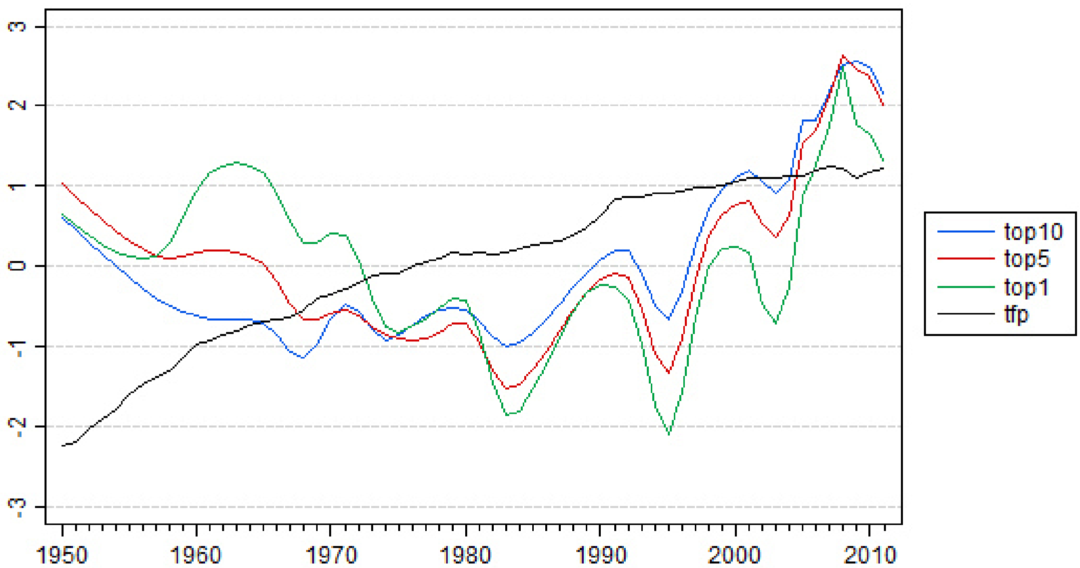
Source: Own depiction based on Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).
Notes: SER = standard error of regression. *, ** and *** denote the 10%, 5% and 1% significance levels, respectively. The *t*-statistics are in parentheses, even though they are not valid for regression (1).

In conclusion, the statistical impact of technological progress on income inequality in France shows a generally positive one. If TFP is increasing by one unit above its long-run trend, the top 5% and top 1% income shares rise by about 0.629 and 0.886 percentage points, respectively. The top 10% income share will increase on average by 0.452 percentage points. Besides, only the diagnostic test results of the ECM in Model III, where the effect of TFP on the top 1% income share is investigating, are showing perfect outcomes. This indicates that there must be other omitted variables explaining the steady behaviour of income inequality in France.

5.3. Germany

Continuing the analysis with Germany, the situation of the available data is full with irregularities. For all income shares, the data recording starts at 1891, however, as time passed there have been some gaps. These gaps are closed with statistical interpolation techniques.[22] The TFP data is again available from 1950. However, for a better comparison, the analysis for Germany is restricted to the period of 1950 until 2011 with the result of 61 observations.

Figure 5: Time Series Comparison of Income Shares and TFP of Germany



Source: Own depiction based on Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

[22] See Appendix A for more details of the applied interpolation technique.

Figure 5 allows the depiction of the logarithmized variables *top10*, *top5*, *top1,* as well as *tfp* being summarized within one chart due to the normalized scaling. The income share variables are showing a positive secular trend with random variation as well as *tfp* does. A stochastic trend can be assumed for *tfp*, *top10*, *top5* and *top1*, as the first autocorrelation coefficient of the variables is near 1. Consulting the ADF test results from Subsection 4.1., Table 9 shows the integrating order of each variable in Germany. Since *tfp*, *top10* and *top5* are stationary at first-difference, they are integrated of order one, $I(1)$. However, *top1* failed to reject the null hypothesis of a unit root on the level and first-difference test. Being stationary on the second-difference means that *top1* is integrated of order two, $I(2)$.

Table 9: Integrating Order of Variables in Germany

	tfp	*top10*	*top5*	*top1*
Integrating order	$I(1)$	$I(1)$	$I(1)$	$I(2)$

Source: Own depiction based on Alvaredo *et al*. (2016) and Feenstra *et al*. (2015).

Answering and proving the question whether TFP has an impact on the upper end of the income distribution in Germany, Table 10 and Table 11 are showing the results of the Model I and Model II, respectively. Model III is not computed, since *top1* is $I(2)$ and hence needs another approach for estimating the long-run relationship between the top 1% income share and TFP, which will be explained briefly in Subsection 5.6.2.

Commencing with the first model in Table 10, the cointegrating regression in column (1) indicates a significant quadratic deterministic trend, which explains the movements of *tfp*. Omitting this time trend could result in a spurious regression. This can be seen by the coefficient of determination, *R-squared*, which is very high (0.925) and therefore implies a very good fit for the model. The additionally very high t-ratio of the constant coefficient indicates that the regression in (1) is spurious. However, the residuals from (1) are stationary at the 1% critical value (see Table 2). According to Engle and Granger (1987), this result suggests that the regression in (1) is not spurious. In specific, *top10* and *tfp* in Germany are cointegrated with certainty as well as are being super-consistent. Consulting the other cointegrating test results, they all confirm the test results of the residuals' ADF test. Constructing the ECM in (3) requires first the regression of the unrestricted error correction estimation in (2). This OLS model estimates the change in the top 10% income

Table 10: Regression Results Germany, Model I

	(1)	(2)	(3)
Dep. Var.:	*top10*	Δ*top10*	Δ*top10*
tfp	−0.016 (−0.1)		
resid10(−1)		−0.426***(−3.1)	−0.424***(−6.7)
Δ*top10*(−1)		0.491* (1.8)	0.714***(3.6)
Δ*top10*(−2)		0.097 (0.4)	
Δ*top10*(−3)		0.030 (0.3)	
Δ*top10*(−4)		−0.041 (−0.4)	
Δ*top10*(−5)		0.372***(3.9)	0.281** (2.3)
Δ*top10*(−6)		−0.635***(−3.2)	−0.491***(−3.5)
Δ*top10*(−7)		0.479** (2.1)	0.414** (2.1)
Δ*tfp*(−1)		0.203** (2.4)	0.114** (2.2)
Δ*tfp*(−2)		−0.069 (−0.8)	
Δ*tfp*(−3)		−0.083 (−0.9)	
Δ*tfp*(−4)		−0.148 (−1.3)	
Δ*tfp*(−5)		−0.103 (−1.1)	
Δ*tfp*(−6)		−0.002 (−0.0)	
Δ*tfp*(−7)		0.092 (0.8)	
const	8.185***(20.4)	0.004 (0.8)	−0.001 (−0.4)
trend	−0.008** (−2.1)		
trend^2	0.000** (6.1)		
R-squared	0.925	0.698	0.633
SER	0.021	0.010	0.010
DW	–	1.95	2.17

Source: Own depiction based on Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).
Notes: SER = standard error of regression. *, ** and *** denote the 10%, 5% and 1% significance levels, respectively. The t-statistics are in parentheses, even though they are not valid for regression (1).

share on seven lags of Δ*top10* and Δ*tfp* plus the one-lagged error correction term from (1). Thus, the restricted ECM in (3) consists of the first, fifth, sixth and seventh lags of Δ*top10* as well as of the first lag of Δ*tfp*. The coefficient of the one-lagged error term is negative and statistical highly significant, This valid speed-of-adjustment coefficient as well as the generally good diagnostic test results[23] lead to the conclusion that the relationship

[23] Ramsey RESET test shows that the ECM in (3) is stable, however, the residuals are not showing a normal distribution. Furthermore, the residuals are heteroskedastic, although the OLS regression is computing with HAC. But the non-robust F-statistic and the robust Wald test of the regression output in (3) are both highly statistically significant at the 1% level, which indicates that the non-intercept coefficients are all statistically significant.

between the top 10% income share and TFP in Germany is a long-run relationship as well as have short-run dynamics. Meaning that the technological progress is decreasing the top 10% income share in Germany on average by 0.016 percentage points. However, the coefficient of *tfp* is not significant and its movement is explained by the quadratic deterministic trend. The short-run dynamics can be explained by the speed-of-adjustment coefficient, which indicates that the last period's disequilibrium is corrected in this period by about 42.4%.

Table 11: Regression Results Germany, Model II

	(1)	(2)	(3)
Dep. Var.:	*top5*	Δ*top5*	Δ*top5*
tfp	0.314* (1.8)		
resid5(−1)		−0.330***(−3.3)	−0.337***(−6.3)
Δ*top5*(−1)		0.617***(3.1)	0.701***(6.9)
Δ*top5*(−2)		−0.022 (−0.1)	
Δ*top5*(−3)		0.162 (0.8)	
Δ*top5*(−4)		−0.224 (−1.3)	
Δ*tfp*(−1)		0.022 (0.2)	
Δ*tfp*(−2)		−0.001 (−0.0)	
Δ*tfp*(−3)		−0.198* (−1.8)	−0.224** (−2.1)
Δ*tfp*(−4)		−0.127 (−1.1)	
const	6.733***(10.6)	0.007** (2.4)	0.005* (1.9)
trend	−0.023***(−4.0)		
$trend^2$	0.000***(6.7)		
R-squared	0.857	0.657	0.627
SER	0.029	0.013	0.013
DW	–	2.01	2.13

Source: Own depiction based on Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).
Notes: SER = standard error of regression. *, ** and *** denote the 10%, 5% and 1% significance levels, respectively. The *t*-statistics are in parentheses, even though they are not valid for regression (1).

Turning the attention towards Model II in Table 11, column (1) represents the regression of *tfp* and *top5* with the inclusion of a significant quadratic deterministic trend. This implies that an innovation and technological progress, respectively, increases the top 5% income share on average by 0.314 percentage points, however, the significant quadratic deterministic trend explains additionally movements of *tfp*. Since the residuals of (1) are stationary, the cointegrating regression is super-consistent and hence not spurious. The following investigation of the ECM in (3) is initiated with the unrestricted error correction estimate composed of four lags of Δ*top5* and Δ*tfp* plus the one-lagged error correction term from regression (1), *resid5(-1)*. Since only the significant coefficients of (2) are entering the OLS regression in (3), the restricted ECM is constructed with the one-lagged error correction term, the first lag of Δ*top5* and the third lag of Δ*tfp*. This model shows a good fit, since the R-squared value is 0.627, the standard error is 0.013 and the DW statistic is around 2. Besides, the diagnostic tests for serial correlation, normally distribution, heteroskedasticity as well as the RESET test are all showing generally good results. The short-run dynamics are depicted in the error correction coefficient, which states that the last periods' equilibrium error is corrected in this period by around 33.7%.

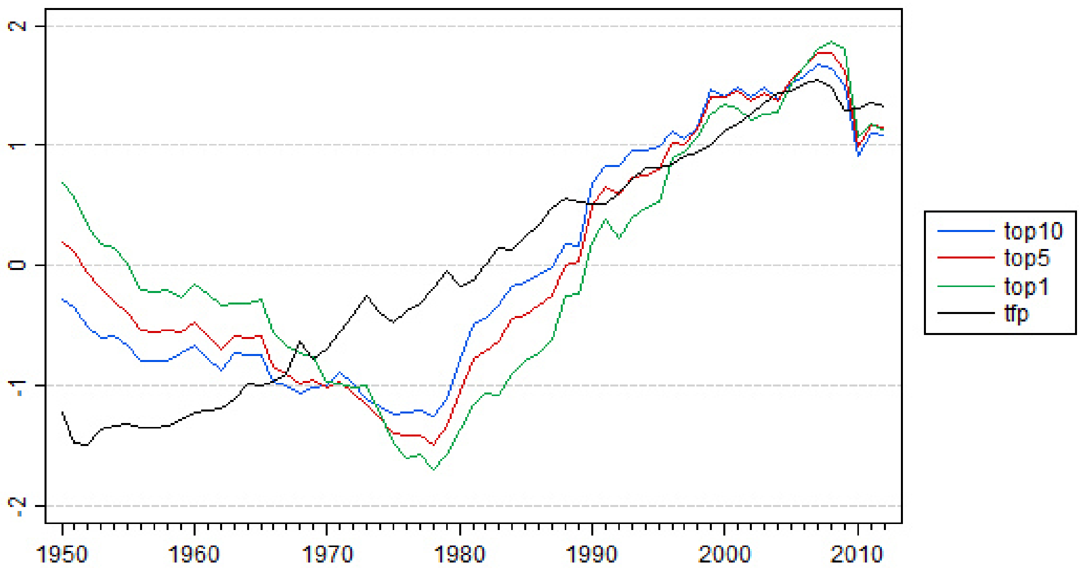
Finally, the increasing income inequality in Germany can be explained in some extent statistically by the technological progress. There are contrasting findings. Model I reveals a negative impact between technological progress and income inequality. Meaning that the increasing TFP will diminish the top 10% income share by about –0.016 percentage points. However, the movements of the insignificant coefficient *tfp* can be explained by the significant deterministic trend. On the other hand, Model II confirms the data behaviour of the increasing inequality in Germany. When TFP grows by 1 unit above its long-run trend, the top 5% income share will rise on average by 0.314 percentage points. The test results of the ECMs are deficient due to normal distributed residuals and the incidence of heteroskedasticity. Additionally, the analysis of the relationship between TFP and the top 1% income share, which is $I(2)$, is lacking. This mentioned biases lead to the result that there must be other omitted variables explaining the increasing income inequality in Germany.

5.4. United Kingdom

Directing the attention to the UK, the data recording of the income shares are starting in 1918, however, there are huge gaps until the more or less regular recording from 1962 onwards. TFP data is still available from 1950. For better comparison, the analysis is limited to the period of 1950 to 2012, which results in 62 observations.

Plotting the logarithmized variables *top10*, *top5*, *top1* as well as *tfp* in one chart using a normalized scaling, allows for a first visual inspection of the data. Figure 6 shows that all four series have a positive secular trend with random variation. Formal statistic procedures suggest first the computing of a unit root test. As described in Subsection 4.1., the time series *top10*, *top5*, *top1,* as well as *tfp* are tested with the ADF test, which arrives at the conclusion that the series are integrated of order one, $I(1)$. These test results are also evident for the presence of stochastic trends in the data. Furthermore, this property enables to use the Engle-Granger two-step approach for examine whether there are cointegrating relationships. The following Table 12, Table 13 and Table 14 are presenting the regression results of Model I, Model II and Model III, respectively. All three models are showing a positive effect of TFP on the income shares. For instance, an innovation or technological progress in Model I increases the top 10% income share on average by 1.831 percentage points.

Figure 6: Time Series Comparison of Income Shares and TFP of the UK



Source: Own depiction based on Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Starting with the statistical results of Model I in Table 12, the movements of *tfp* can additionally be explained by a significant quadratic deterministic trend. According to Engle and Granger (1987), the residuals of the regression in (1) must be tested for a unit root. Is this linear combination stationary, the regression is said to be super-consistent. Consulting the cointegration test results from Table 2 creates a disillusioning scenery. The ADF test value is –2.87, which is not rejecting the 10% critical value of –3.16. However, one can assume that the residuals could be marginally rejecting the 10% critical value. This assumption will be underpinned with the Hansen Instability test result, which indicates a cointegrating relationship. As already implemented previously for Canada, France and Germany, the unrestricted error correction estimate in (2) will be computed in order to find the restricted ECM in (3). In the case of UK, the estimation in (2) was assessed with the extracted residual from (1) as well as eight lagged changes of *top10* and the corresponding quantity of lagged changes of *tfp*. The restricted ECM in (3) consists of the first-lagged error correction term from (1), the first, sixth and eighth lags of Δ*top10* as

Table 12: Regression Results UK, Model I

	(1)	(2)	(3)
Dep. Var.:	*top10*	Δ*top10*	Δ*top10*
tfp	1.831***(3.3)		
resid10(−1)		−0.148** (−2.2)	−0.113** (−2.0)
Δ*top10*(−1)		0.234** (2.3)	0.222* (1.7)
Δ*top10*(−2)		0.176 (1.2)	
Δ*top10*(−3)		0.093 (0.6)	
Δ*top10*(−4)		0.002 (0.0)	
Δ*top10*(−5)		−0.070 (−0.6)	
Δ*top10*(−6)		0.275* (1.8)	0.256* (2.0)
Δ*top10*(−7)		−0.031 (−0.2)	
Δ*top10*(−8)		0.225* (1.7)	0.224** (2.1)
Δ*tfp*(−1)		0.170 (0.5)	
Δ*tfp*(−2)		−0.106 (−0.6)	
Δ*tfp*(−3)		0.016 (0.1)	
Δ*tfp*(−4)		−0.214* (−1.8)	−0.137 (−1.2)
Δ*tfp*(−5)		−0.149 (−0.5)	
Δ*tfp*(−6)		−0.418* (−1.9)	−0.314 (−1.4)
Δ*tfp*(−7)		−0.176 (−0.7)	
Δ*tfp*(−8)		−0.029 (−0.2)	
const	0.730 (0.3)	0.011 (1.1)	0.007 (1.4)
trend	−0.025***(−3.5)		
trend^2	0.000***(3.9)		
R-squared	0.880	0.246	0.177
SER	0.052	0.024	0.022
DW	–	2.08	2.09

Source: Own depiction based on Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).
Notes: SER = standard error of regression. *, ** and *** denote the 10%, 5% and 1% significance levels, respectively. The *t*-statistics are in parentheses, even though they are not valid for regression (1).

well as fourth and sixth lags of Δ*tfp*. The negative and significant error correction coefficient (−0.113) as well as the generally good diagnostic test results imply that Model I has a cointegrating relationship between *top10* and *tfp*, as well as an ECM, which explains the short-run dynamics of this relationship.

Table 13: Regression Results UK, Model II

	(1)	(2)	(3)
Dep. Var.:	*top5*	Δ*top5*	Δ*top5*
tfp	2.263***(3.1)		
resid5(−1)		−0.117** (−2.1)	−0.128** (−2.1)
Δ*top5*(−1)		0.258** (2.1)	0.239** (2.3)
Δ*top5*(−2)		0.207** (2.2)	0.265***(3.5)
Δ*top5*(−3)		0.113 (0.7)	
Δ*top5*(−4)		−0.099 (−0.6)	
Δ*top5*(−5)		−0.038 (−0.3)	
Δ*top5*(−6)		0.317 (1.6)	
Δ*tfp*(−1)		0.453 (1.1)	
Δ*tfp*(−2)		−0.161 (−0.7)	
Δ*tfp*(−3)		0.104 (0.6)	
Δ*tfp*(−4)		−0.214 (−1.6)	
Δ*tfp*(−5)		0.095 (0.4)	
Δ*tfp*(−6)		−0.423* (−1.9)	−0.271* (−1.8)
const	−1.307 (−0.4)	0.004 (0.5)	0.006 (1.6)
trend	−0.039***(−4.2)		
$trend^2$	0.000***(5.3)		
R-squared	0.866	0.318	0.168
SER	0.068	0.027	0.027
DW	–	2.10	2.00

Source: Own depiction based on Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).
Notes: SER = standard error of regression. *, ** and *** denote the 10%, 5% and 1% significance levels, respectively. The *t*-statistics are in parentheses, even though they are not valid for regression (1).

Changing the perspective towards Model II (Table 13) and Model III (Table 14), the disillusioning scenery continues. Testing both models for cointegrating relationships, demonstrates only positive test results with the Hansen Instability test. However, the construction of ECMs for Model II and Model III leads to the evidence of long-run and short-run dynamics within these models. The speed-of-adjustment coefficient in Model II corrects the last period disequilibrium in this period on average by 12.8%, whereas the speed-of-adjustment coefficient in Model III corrects the equilibrium error by 17.9%. The diagnostic test results of Model II and Model III are again generally good.

Table 14: Regression Results UK, Modell III

	(1)	(2)	(3)
Dep. Var.:	*top1*	Δ*top1*	Δ*top1*
tfp	2.981** (2.3)		
resid1(−1)		−0.151***(−3.8)	−0.179***(−3.4)
Δ*top1*(−1)		0.178* (1.8)	0.192** (2.5)
Δ*top1*(−2)		0.269** (2.4)	0.245***(2.8)
Δ*top1*(−3)		0.277** (2.1)	0.287** (2.1)
Δ*top1*(−4)		−0.105 (−0.6)	
Δ*top1*(−5)		−0.036 (−0.3)	
Δ*top1*(−6)		0.299 (1.7)	
Δ*top1*(−7)		−0.022 (−0.2)	
Δ*tfp*(−1)		1.117 (1.6)	
Δ*tfp*(−2)		0.012 (0.0)	
Δ*tfp*(−3)		0.173 (0.4)	
Δ*tfp*(−4)		−0.342 (−1.2)	
Δ*tfp*(−5)		0.201 (0.6)	
Δ*tfp*(−6)		−0.821* (−1.8)	−0.501 (−1.6)
Δ*tfp*(−7)		−0.696* (−1.8)	−0.498* (−1.8)
const	−4.835 (−0.9)	0.007 (0.5)	0.013** (2.2)
trend	−0.069***(−4.2)		
$trend^2$	0.001***(6.4)		
R-squared	0.842	0.442	0.251
SER	0.116	0.045	0.047
DW	–	2.03	1.88

Source: Own depiction based on Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).
Notes: SER = standard error of regression. *, ** and *** denote the 10%, 5% and 1% significance levels, respectively. The *t*-statistics are in parentheses, even though they are not valid for regression (1).

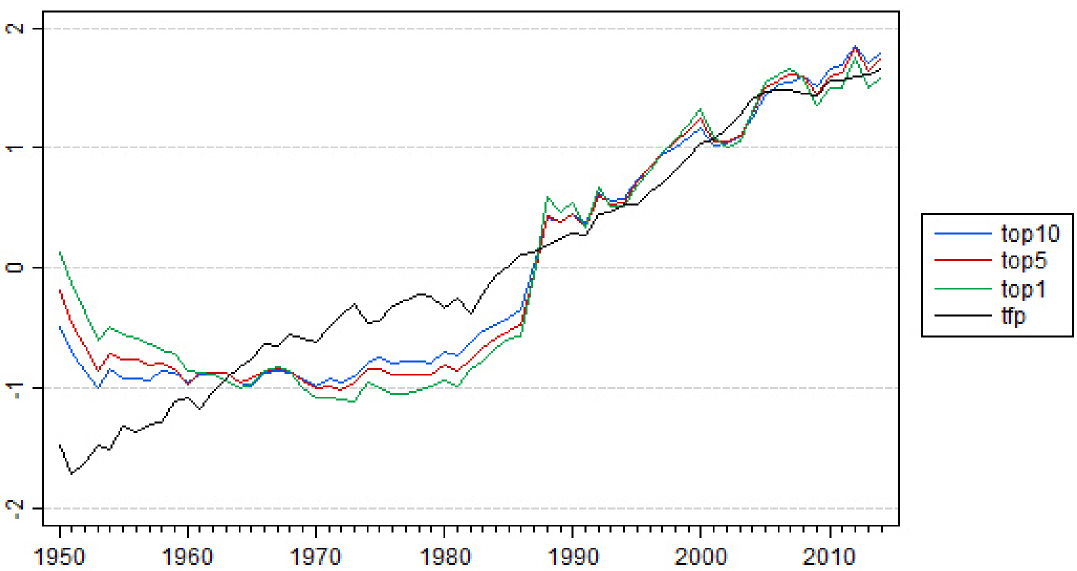
The empirical results of the UK show evidence for a statistically significant long-run relationship between income inequality and economic growth. As already supposed in Section 2 due to the data behaviour of the income ratios and the constructed economic model in Section 3, technological progress leads to a rise of income inequality in the UK. If the TFP increases by one unit, the top 10%, top 5% and top 1% income shares increase in the long-run by about 1.831, 2.263 and 2.981 percentage points, respectively.

Considering the short-run dynamics, the disequilibrium in the previous period of Model I will be corrected in this period by 11.3%. Model II and Model III are adjusted faster by 12.8% and 17.9%, respectively. Thus, it is proven that technological progress leads to a rise of income inequality in the UK.

5.5. United States

It is well known that the U.S. provides a valid data basis, starting with the top 10% and top 5% income shares in 1917 and the top 1% income share in 1913. Since TFP data is only available from 1950 until 2014, the analysis of both, income shares and TFP in the U.S., is limited to the period between 1950 and 2014. Thus, there are 64 observations. The logarithmized variables *top10*, *top5*, *top1* as well as *tfp* are again plotted in one chart using a normalized scaling (see Figure 7). As it was the case for the previous countries, the series *top10*, *top5*, *top1* and *tfp* of the U.S. show a positive secular trend with random variation.

Figure 7: Time Series Comparison of Income Shares and TFP of the U.S.



Source: Own depiction based on Feenstra *et al.* (2015) and Alvaredo *et al.* (2016).

Changing the perspective towards the formal statistic procedures, a stochastic trend can be assumed for *tfp*, *top10*, *top5* and *top1*, as the first autocorrelation coefficient of the variables is near 1. Testing the series additionally for a unit root and stochastic trend wit the ADF test, respectively, as is already done in Subsection 4.1., the assumption made with the autocorrelation coefficients can be confirmed. Summarizing these ADF test results, it comes to the realization that the variables *top10*, *top5*, *top1* as well as *tfp* of the U.S. are integrated of order one, $I(1)$. This finding allows the use of the Engle-Granger two-step approach. Running the FMOLS regression for all three models shows that there is no need for the inclusion of a deterministic trend. Subsequently, testing the residuals of these regressions with the ADF test leads to a slightly significance at the 10% critical value. Hereby a super consistency might be persist. However, this assumption is very weak since all other cointegrating tests are indicating that there is no cointegrating relationship between *top10* and *tfp*, *top5* and *tfp*, as well as between *top1* and *tfp*.

Table 15: Regression Results U.S., Model I

	(1)	(2)	(3)
Dep. Var.:	*top10*	Δ*top10*	Δ*top10*
tfp	0.915***(9.3)		
resid10(−1)		−0.102* (−1.9)	−0.100* (−1.9)
Δ*top10*(−1)		0.104 (0.7)	
Δ*top10*(−2)		0.172* (2.0)	0.198***(2.8)
Δ*top10*(−3)		−0.220* (−1.9)	−0.170** (−2.1)
Δ*top10*(−4)		0.178 (1.0)	
Δ*top10*(−5)		0.296** (2.5)	0.322** (2.3)
Δ*top10*(−6)		−0.131 (−0.9)	
Δ*top10*(−7)		0.156* (1.9)	0.062 (0.7)
Δ*top10*(−8)		0.286***(2.8)	0.347***(3.7)
Δ*tfp*(−1)		0.044 (0.4)	
Δ*tfp*(−2)		0.238** (2.1)	0.254* (2.0)
Δ*tfp*(−3)		0.080 (0.5)	
Δ*tfp*(−4)		0.139 (0.8)	
Δ*tfp*(−5)		−0.102 (−0.7)	
Δ*tfp*(−6)		−0.098 (−0.5)	
Δ*tfp*(−7)		0.015 (0.1)	
Δ*tfp*(−8)		−0.232 (−1.0)	
const	4.208***(9.8)	0.000 (−0.0)	−0.001 (−0.5)
R-squared	0.884	0.377	0.269
SER	0.051	0.014	0.014
DW	–	1.89	1.69

Source: Own depiction based on Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).
Notes: SER = standard error of regression. *, ** and *** denote the 10%, 5% and 1% significance levels, respectively. The t-statistics are in parentheses, even though they are not valid for regression (1).

Starting with Model I, Table 15 shows the already mentioned FMOLS regression in column (1), as well as the unrestricted error correction estimate in (2). The latter is an OLS estimation of the change in the top 10% income share on eight lags of Δ*top10* and Δ*tfp* plus the one-lagged error correction term of (1), *resid10(-1)*. Generating the restricted ECM in (3), only the significant lagged changes are entering. Thus, of all lagged changes, the second, third, fifth seventh and eighth lags of Δ*top10* as well as the second lag of Δ*tfp* are significant and hence build the ECM in (3). The speed-of-adjustment coefficient is negative, however, significant on the 10% statistical level. One can argue about this significant level, but this elaboration accepts the 10% significance level. Thus, the equilibrium error in the last period is corrected in this period by around 10.0%. The diagnostic test results are generally good; however, the residuals are not normally distributed. Furthermore, the DW statistic of 1.69 suggests a positive correlation within the model.

Adapting the same procedure to Model II and Model III gives surprising results. Since the residuals' ADF test from the FMOLS regression are suggesting a marginally significance at the 10% critical value, an unrestricted error correction estimate is computed according to the previously models. However, even after 20 lagged changes of *top5* and *top1*, respectively, as well as of 20 lagged changes of *tfp*, the error correction term according to Equation (4.5) is still not significant.[24] The conclusion out of this is that there is evidently no cointegration relationship in the U.S. between the top 5% income share and TFP as well as between the top 1% income share and TFP.

If there is no cointegrating relationship, the only possible way to estimate the series is to differencing the data (see Table 16). This ensures that the series are stationary and avoids furthermore spurious regression. However, differencing the data gives only interpretation of the short-run dynamics, but no statement about the long-run effects. The estimation of an ECM is therefore not appropriate. Thus, Table 16 presents the regression of the first-differences of Model II and Model III in the U.S. The inclusion of a quadratic deterministic time trend is appropriate, since the differenced series Δ*top5* and Δ*tfp* as well as Δ*top1* and Δ*tfp* are trend stationary.

[24] The regression outputs of the failed ECM are compiled in Appendix B.

Table 16: Regression Results U.S., Model II and Model III

	Model II	Model III
Dep. Var.:	$\Delta top5$	$\Delta top1$
Δtfp	0.168 (1.1)	0.406* (1.9)
const	−0.027***(−10.4)	−0.056***(−19.8)
trend	0.002***(11.3)	0.004***(19.3)
trend^2	0.000***(−9.3)	0.000***(−16.0)
R-squared	0.201	0.182
SER	0.023	0.048
DW	1.97	2.03

Source: Own depiction based on Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).
Notes: SER = standard error of regression. *, ** and *** denote the 10%, 5% and 1% significance levels, respectively. The t-statistics are in parentheses.

Recalling the tremendous increasing income inequality in the U.S., the analysis of this country was special since most of the technological changes have their fountainhead in the U.S., like for instance the personal computer or communication technology. Additionally, the income shares of the U.S. are showing the highest rise in the G-7 group. However, summarizing the empirical results, the analysis of the U.S. finds evidence that the top 5% and top 1% income shares, respectively, and TFP are not cointegrated. Nevertheless, Model I depicts a cointegrating relationship between income inequality and growth. If the TFP is rising by one unit above its long-run trend, the top 10% income share increases on average by 0.915 percentage points. Thus, there is little evidence for technological progress increasing the income inequality in the U.S.

5.6. Exceptions

As previously stated, there are some exceptions within the data. Table 17 summarizes the test results of the ADF unit root tests of the exceptional series. The top 1% income share of Germany is integrated of order two, $I(2)$. The top 10% and top 5% income shares of Italy are trend stationary, $I(0)$, whereas the top 1% income share is $I(2)$ and TFP is integrated of order one, $I(1)$. In the case of Japan, the income shares are integrated of order one, $I(1)$, however, TFP is $I(2)$. These characteristics introduce the need for different approaches as the one of Engle and Granger (1987): the bounds testing approach of Pesaran *et al*. (2001) for the mixture of $I(0)$ and $I(1)$ variables, and the polynomial cointegration for analysing the mixture of $I(1)$ and $I(2)$ variables.

Table 17: Integrating Order of Exceptional Variables

	tfp	*top10*	*top5*	*top1*
Germany	$I(1)$			$I(2)$
Italy	$I(1)$	$I(0)$	$I(0)$	$I(2)$
Japan	$I(2)$	$I(1)$	$I(1)$	$I(1)$

Source: Own depiction based on Feenstra *et al.* (2015) and Alvaredo *et al.* (2016).

5.6.1. ARDL Bounds Testing Approach: Italy

In the case of Italy, the investigation of feasible cointegrating relationships in Model I (effect of *tfp* on *top10*) and Model II (effect of *tfp* on *top5*) ensue with the use of the bounds testing approach of Pesaran *et al.* (2001). The combination of an ARDL model and an unrestricted (conditional) error correction model permits the investigation for long-run relationships with a mixture of $I(0)$ and $I(1)$ variables (Cf. Pesaran *et al.*, 2001, p. 290). Pesaran and Shin (1999) mentioned further some advantages of computing an ARDL model for investigating long-run relationships. Firstly, a simple interpretation is given due to the use of single equation estimation. Secondly, the model gives the possibility of different lag lengths of the variables, which makes it more flexible.

The general autoregressive distributed lag model, ARDL(p, q), can be stated as:

$$y_t = \alpha_0 + \alpha_1 t + \sum_{i=1}^{p} \delta_i \Delta y_{t-i} + \phi x_t + \sum_{i=0}^{q} \phi_i \Delta x_{t-i} + u_t \,, \tag{5.4}$$

where $(\alpha_0 + \alpha_1 t)$ is the linear deterministic trend and u_t the serial independent disturbance term (Cf. Pesaran and Shin, 1999, p. 371). The variable y_t is explained by its own lagged values as well as by the explanatory variable x_t and its lags. For determining the appropriate lag length of the model in Equation (5.4), Pesaran and Shin (1999) suggested the use of the SIC, since it performed slightly better in their experiments as the AIC did. Concerning the limited time series data of Italy, it is important to select the "perfect" lag length of the model, which should firstly remedy the problem of the residual serial correlation and should secondly not end in over-parametrisation (Cf. Pesaran *et al.*, 2001, p. 308). In particular, the model in (5.4) has to be tested with the Breusch-Godfrey Serial Correlation LM test, in order to ascertain that the residuals are not serial correlated. The dynamic stability is tested with the Ramsey RESET test (see Subsection 4.3. for more discussion about the Breusch-Godfrey test as well as the Ramsey RESET test). The next step contains the implementation of the bounds test, which enables to spot whether long-run relationships are existing. Under the null hypothesis of no long-run relationship between the variables, the bounds test computes an F-test. However, due to the mixture of $I(0)$ and $I(1)$ variables, the distribution of this test statistic does not follow the Student's distribution. Hence, Pesaran et al. (2001) provided bounds of the critical values, where the lower bound is referred to the polar case of purely I(0) variables, and the upper bound is based on purely I(1) variables. If the examined F-statistic of the bounds test is greater than the upper bound, then there is a long-run relationship between the variables. In comparison, there is no cointegration if the F-statistic is located under the lower bound. The last possibility of the examined F-statistic concerns the position between these bounds. If this is the case, the test result is inconclusive (Cf. Pesaran et al., 2001, p. 304).

Applying this approach to Italy, the results for Model I and Model II are depicted in Table 18. Model I is an ARDL$(4, 2)$ model with a linear deterministic trend and Model II an ARDL$(6, 0)$ model with a linear deterministic trend as well. Both models are tested negative for serial correlation. The bounds test F-statistic of Model I and Model II are 5.118 and 16.299, respectively, where both are located above the critical value bounds of Pesaran et al. (2001). This indicates the existence of a cointegrating relationship between the top 10% income share and TFP, as well as between the top 5% income share and TFP in Italy. A change of one unit in TFP will result in a long-run rise of 0.278 percentage points of the top 10% income share, whereas the top 5% income share will increase on average by 0.591 percentage points in the long-run. Additionally, the speed-of-adjustment coefficients are relatively quick with 26.0% and 55.3%, respectively. Further regression results of the ARDL estimation are compiled in Appendix C.

Table 18: ARDL Regression Results Italy, Model I and Model II

	top10	
Dep. Var.:	Model I	Long-Run Coefficients
top10(−1)	0.990***(4.3)	
top10(−2)	−0.303 (−1.0)	
top10(−3)	0.132 (0.9)	
top10(−4)	−0.079 (−1.0)	
tfp	0.435***(3.1)	0.278 (0.8)
tfp(−1)	−0.296 (−1.3)	
tfp(−2)	−0.066 (−0.4)	
const	1.693***(3.0)	6.515***(4.1)
trend	0.003***(3.0)	0.011***(12.2)
R-squared	0.994	
SER	0.008	
DW	2.09	

	top5	
Dep. Var.:	Model II	Long-Run Coefficients
top5(−1)	0.850***(5.8)	
top5(−2)	−0.232 (−1.2)	
top5(−3)	0.028 (0.1)	
top5(−4)	−0.355** (−2.2)	
top5(−5)	0.384***(4.4)	
top5(−6)	−0.228***(−3.8)	
tfp	0.327***(4.4)	0.591***(5.9)
const	2.545***(6.1)	4.599***(9.8)
trend	0.007***(6.8)	0.012***(36.8)
R-squared	0.997	
SER	0.007	
DW	2.16	

Source: Own depiction based on Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).
Notes: SER = standard error of regression, DW = Durbin Watson statistic. *, ** and *** denote the 10%, 5% and 1% significance levels, respectively. The *t*-statistics are in parentheses.

5.6.2. $I(2)$ Cointegration Approach: Germany, Italy and Japan

The emergence of $I(2)$ variables within this elaboration framework arises in the case of Germany, Italy and Japan. In Germany and Italy, the logarithmized top 1% income share variable, *top1*, is integrated of order two, $I(2)$. On the other hand, Japan's logarithmized variable for TFP, *tfp*, is $I(2)$, which does not allow to investigate long-run relationships of Japan in Model I, Model II, or Model III according to the Engle-Granger approach, since *tfp* enters in each model as explanatory variable. The appropriate methodology in this case is the likelihood-based vector autoregressive (VAR) approach, which was first introduced by Johansen (1991, 1996). Since this is a very different methodology as the Engle-Granger approach, a number of scientists provided some proposed actions of modelling cointegrating relationships between $I(1)$ and $I(2)$ variables according to the literature of the Johansen's VAR procedure: see among others Johansen (1992, 1995, 1997, 2006), Paruolo (1996, 2000), Haldrup (1998), Rahbek *et al*. (1999), Boswijk (2000) and Kurita (2008).

6. Conclusions

The thesis has analysed the inequality-growth relationship for the G-7 countries during the period of 1950 to 2014 using the Engle and Granger (1987) two-step cointegration approach. The measures for inequality are depicted by the upper end of the income distribution, in particular the top 10%, top 5% and top 1% income shares, where the total income is solely labour income; while the TFP is declared as a determinant of economic growth. Using time series data and the Engle-Granger approach, this elaboration offers a relative new attempt in measuring the effect of TFP on income inequality. Based on the suggestion of Piketty and Saez (2014) that global competition in forms of globalization or skill-biased technological change are leading to higher income inequality, and the additionally consideration of growth mechanisms, give rise to a theoretical framework, which explains the effect of skill-biased technological progress as a characteristic of TFP on the income inequality. As apparent from the discussed data behaviour in Section 2, the upward trend of the technological progress calls for advanced skills of employees. A higher acquired level of qualifications in combination with the practise on and with new technologies enables to rise one's own productivity as well as the one of the organization and hence the productivity of the country. Since this underlying analysis assumes that the employees have the same skill-levels, the new acquired skills emerge only if the employee can adapt to the new technologies. Whereas the employee, who is not able to adapt to new technologies is losing twice. Illiterate operating with new technologies results *a priori* in the loss of the old knowledge and *a posteriori* in the nosedive of one's own productivity. Assuming further that the labour income is the main source of a household's income and the employee is paid accordingly to her or his productivity, the heterogeneity on the labour market leads to salary and income inequalities.

The corresponding statistical model is built according to the Engle-Granger two-step cointegration approach, where firstly a cointegrating relationship is investigating the long-run equilibrium and secondly the convenient error correction model is examining the short-run dynamics. From this analysis, the long-run inequality-growth relationship is found to be acceptably positive. A rise in the TFP of Canada, the United Kingdom, the United States and partly in France and Germany leads to an increasing income inequality in these countries. The investigation of the long-run relationship in Italy is only possible with an ARDL model and the inherent bounds testing approach of Pesaran *et al*. (2001), since the variables demonstrate a mixture of $I(0)$ and $I(1)$ characteristics. Applying the

Engle-Granger approach to Japan, there is no feasible investigation possible of the relationship between income inequality and economic growth, since the variable of TFP is integrated of order two, $I(2)$, and hence is not accomplishing the necessary requirement of being integrated of order one, $I(1)$.
Reviewing the results of each state, they are ensuing in an alphabetical sequence. Starting with Canada, the data shows, that technological progress increases income inequality in the long run. The empirical analysis of France demonstrates a positive relationship between technological progress and income inequality. However, as Figure 2 in Section 2 shows, income inequality in the presented three income ratios are remaining steady between 1950 and 2012. Nevertheless, there are clearly visible peaks and troughs over time. This will imply that there are omitted variables influencing income inequality in France varyingly strong, maybe due to economic reforms, political interventions or by changes in work organizations. The general effect of TFP on income inequality in Germany is ambiguous. The top 10% income share is decreasing whereas the top 5% income share is increasing by changes of TFP. Additionally, the investigation of relationship between the top 1% income share and TFP is absent in consequence of the *top1* variable being $I(2)$. These findings can be associated with the findings of France: there have to exist omitted variables explaining the ambiguous behaviour of the income shares in Germany. Changing the perspective towards Italy and the United Kingdom, the empirical analysis proves that technological progress has a positive effect on income inequality in both countries. However, the relationship between the top 1% income share and TFP in Italy could not be examined due to the integrating order of *top1*, which is in that case $I(2)$. Concluding the empirical results with the United States, the investigation of the relationship between income inequality and growth is almost inconclusive. There is only evidence for a cointegrating relationship between the top 10% income share and TFP. Since the top 5% and top 1% income shares, respectively, and TFP are not cointegrated, it is advisable to include a third variable like education or skill-level in the cointegrating regression. However, this third variable should be integrated of order one, $I(1)$.

Recapitulating the findings of this underlying elaboration, the statistical investigation demonstrates that the income inequalities within each G-7 country (except Japan) are increasing due to technological progress. However, this analysis necessitates further empirical evidence. Referring to the results of France, Germany and the U.S., one can reflect over the inclusion of more variables, which are integrated of order one, $I(1)$. Examples are already mentioned previously. Further empirical deliberations lead to the conclusion to use generally the Johansen's (1991, 1996) likelihood-based VAR approach and the vector error correction model (VECM) for investigating the long-run relationships and short-run dynamics, respectively, between income inequality and economic growth. Given further the fact that the increasing impact of TFP on income inequality is only investigated for the upper end of the income distribution, this analysis can supplementary be extended to the lower end of the income distribution. As Voitchovsky (2005) already detected in her panel analysis of Gini coefficients for 21 developed countries, there are different consequences for each income distribution ratio. Aside from that, the investigation and comparison of developed and developing countries can be initiated. Some studies already revealed this issue by using cross-section data for democracies and non-democracies or by investigating a panel of high-income and low-income countries.[25] Nevertheless, the skill-biased technological change is an important progress for each state and cannot be prevented. Indeed, the concomitant income inequality calls for intervention from the organizations but also from the countries. The globalization enhanced the labour market and therefore the competition between organizations hiring fully trained employees. In some degree, this can be a good strategy to increase the productivity. However, considering the matter of expenses and the long-run development, fully trained employees tend to fluctuate between the best offering organizations. This can be prevented due to long lasting commitments to the organization. Implementing this bonding can happen with affording opportunities like promoting and training the existing employees. This opportunity for advancement motivates the employee to stick with the organization, to enhance her or his skill level, to get a higher salary and to escape from her or his inequality.

Comparing furthermore the empirical findings with Kuznets' (1963) hypothesis of the inverted U-shaped curve of income inequality, the investigated industrialized economies are now situated at the advanced stages of Kuznets' assuming passage of time and should accordingly show decreasing income inequality due to the saturation of the labour force.

[25] For more discussion of cross-section analyses, see among others Alesina and Rodrik (1994), Persson and Tabellini (1994), Clarke (1995), Perotti (1996), and Deininger and Squire (1998). For more panel data discussion, see among others Barro (2000), Forbes (2000), Castellò (2010), and Halter et al. (2014).

Yet, the data of the G-7 countries are demonstrating the very reverse: income inequality is increasing. One can suggest that as Kuznets was developing his theory of the inverted U-shaped curve of income inequality in 1963, he did not account for the dimension of technological progress we face today. However, new models have to be designed to incorporate the different levels of innovations and technological changes to investigate on the phenomena of the inequality-growth relationship.

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A. Data Sources and Variable Descriptions

A.1. Data Sources

The data for income is based on the World Wealth and Income Database (WID), where 90 researchers are maintaining almost 70 countries worldwide. The five co-directors F. Alvaredo, A. B. Atkinson, T. Piketty, E. Saez and G. Zucman coordinate and supervise the development efforts of this database. The estimates of the selected G-7 country incomes are not including capital gains. Besides, the database is not entire since there are some missing values due to a lack of data recording in some periods. These values are estimated by interpolation using the Catmull-rom spline method. The resulting series should be viewed as approximate and imperfect. Interpolation was used in Germany, Italy and in the United Kingdom analyses.

The Federal Reserve Bank of St. Louis (FRED) provides the data for the total factor productivity based on constant national prices over time. Feenstra *et al*. (2015) calculated the total factor productivity at constant national prices using growth rates of real GDP from national accounts data in addition to the growth rates of capital stocks over time and the labour force with base year 2011.

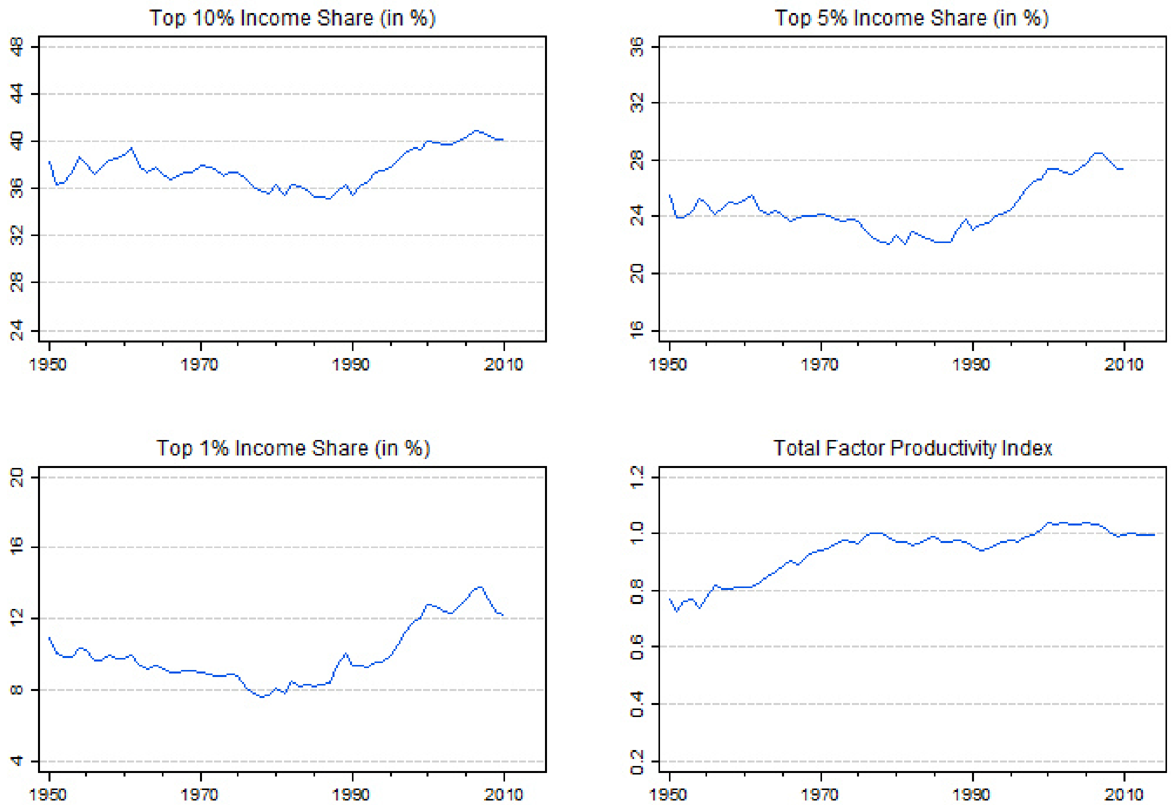
A.2. Variable Descriptions and Time Series Plots

Table A.1: Descriptive Statistics

Country	Variable	Obs.	Mean	Std. Dev.	Min.	Max.
Canada	TFP	65	0.94	0.09	0.73	1.04
	Top 10% share	61	37.68	1.57	35.05	40.80
	Top 5% share	61	24.58	1.76	22.10	28.46
	Top 1% share	61	9.92	1.64	7.60	13.72
France	TFP	65	0.77	0.23	0.32	1.04
	Top 10% share	63	33.13	1.69	29.93	37.15
	Top 5% share	63	21.91	1.38	19.37	24.94
	Top 1% share	63	8.47	0.74	6.99	9.88
Germany	TFP	65	0.72	0.21	0.33	1.00
	Top 10% share	62	33.03	2.50	30.30	39.64
	Top 5% share	62	23.11	1.81	20.53	28.13
	Top 1% share	62	10.93	1.08	8.84	13.89
Italy	TFP	65	0.94	0.20	0.53	1.13
	Top 10% share	36	30.15	2.65	26.04	34.12
	Top 5% share	36	20.16	2.25	16.68	23.60
	Top 1% share	36	7.99	1.10	6.34	9.86
Japan	TFP	65	0.95	0.17	0.54	1.17
	Top 10% share	61	33.18	3.61	28.89	41.03
	Top 5% share	61	21.49	2.12	18.87	26.39
	Top 1% share	61	7.84	0.81	6.77	9.71
UK	TFP	65	0.79	0.16	0.57	1.04
	Top 10% share	63	33.72	5.05	27.78	42.61
	Top 5% share	63	22.74	4.19	17.11	30.77
	Top 1% share	63	9.64	2.77	5.72	15.72
U.S.	TFP	65	0.79	0.12	0.60	1.01
	Top 10% share	65	36.96	5.70	31.38	47.81
	Top 5% share	65	25.41	5.22	20.37	35.35
	Top 1% share	65	11.60	3.82	7.74	18.88

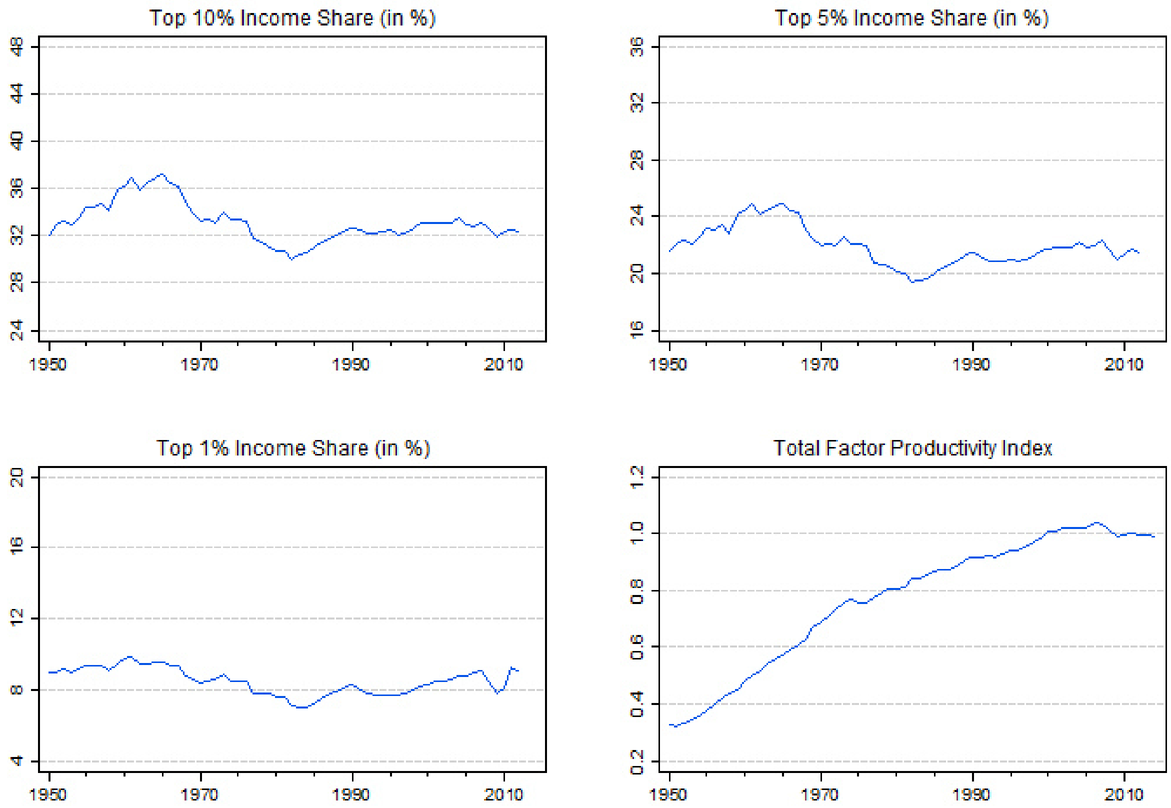
Source: Own depiction based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).
Notes: Obs. = observations, Min. = minimum value, Max. = maximum value

Figure A.1: Time Series Plots of Canada



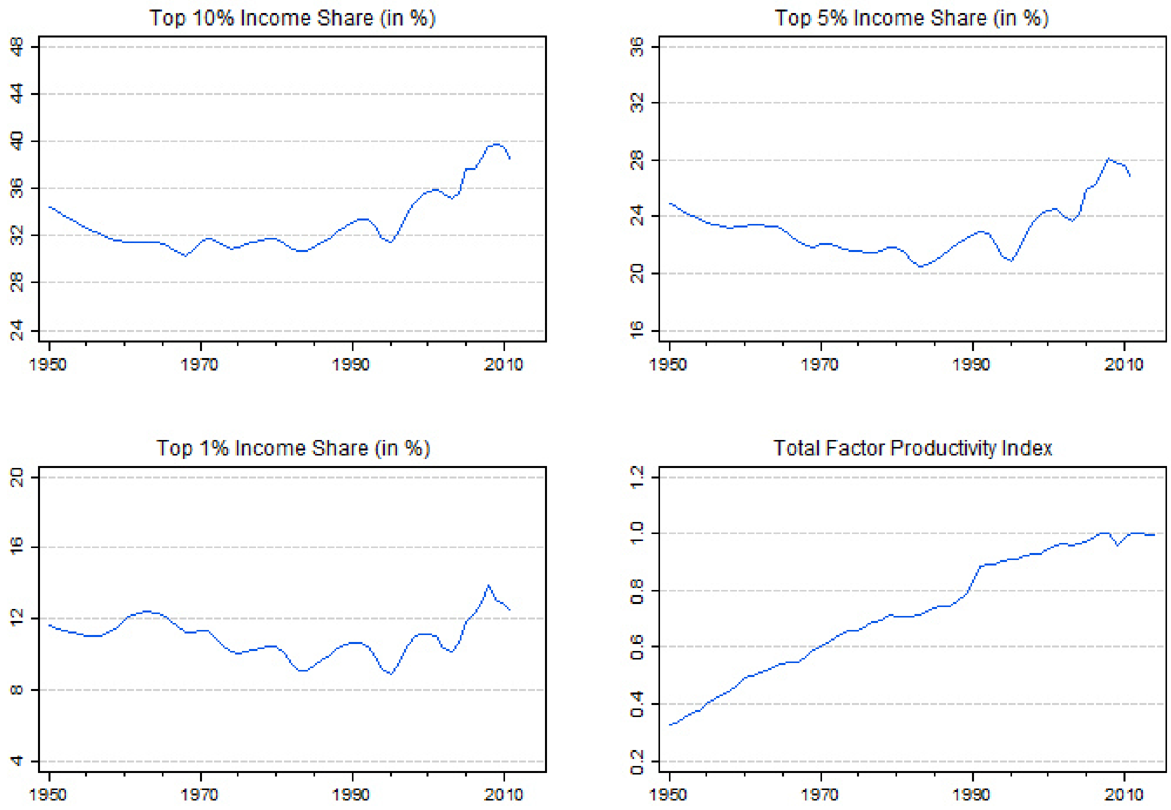
Source: Own depiction based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Figure A.2: Time Series Plots of France



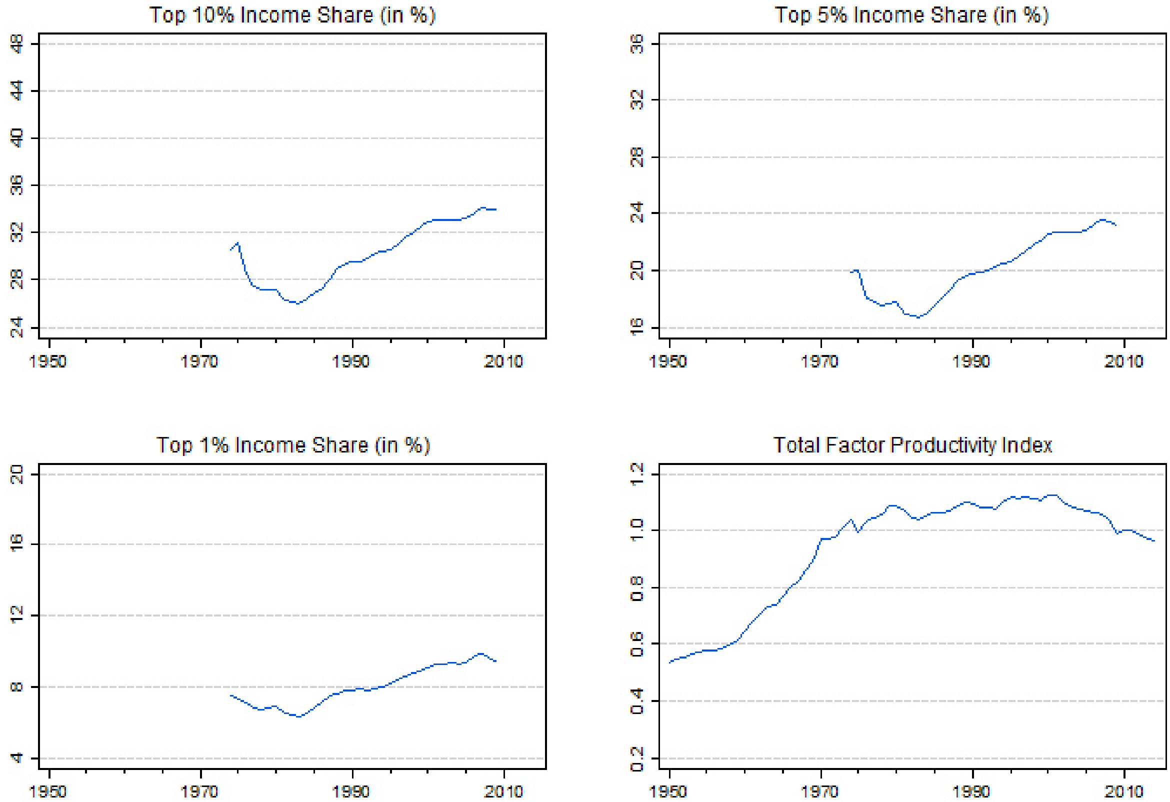
Source: Own depiction based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Figure A.3: Time Series Plots of Germany



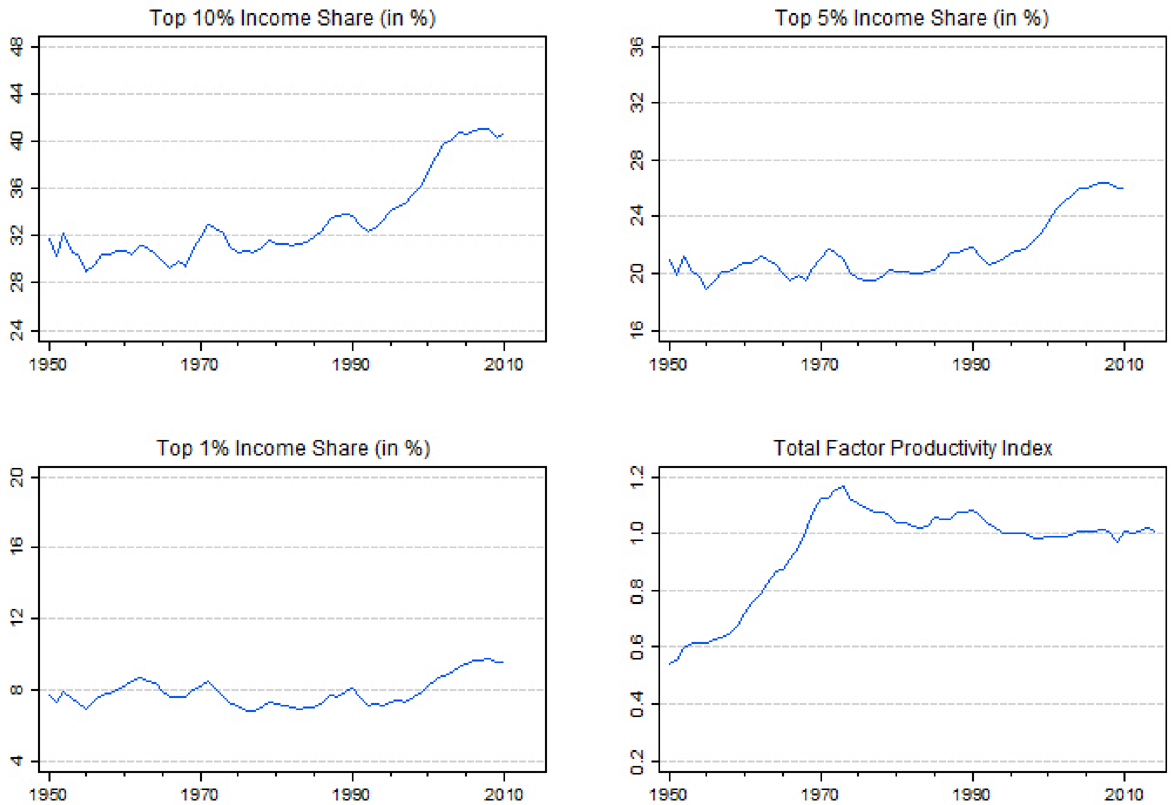
Source: Own depiction based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Figure A.4: Time Series Plots of Italy



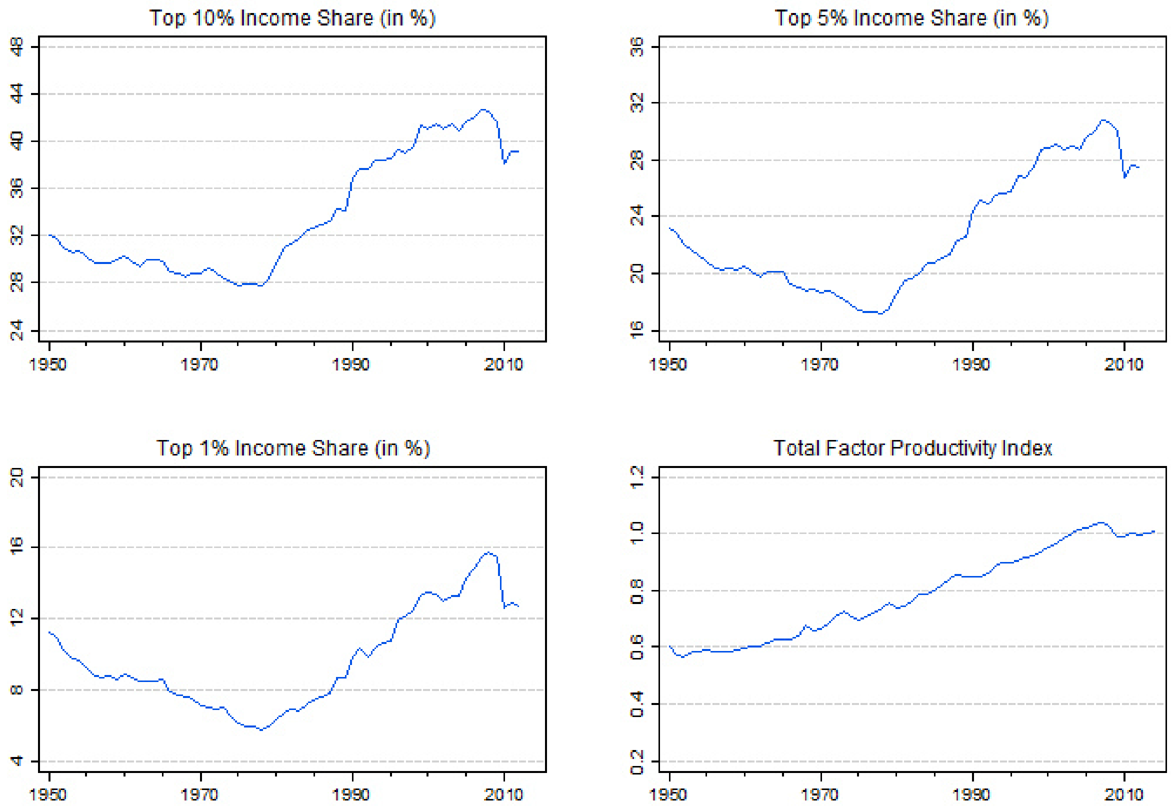
Source: Own depiction based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Figure A.5: Time Series Plots of Japan



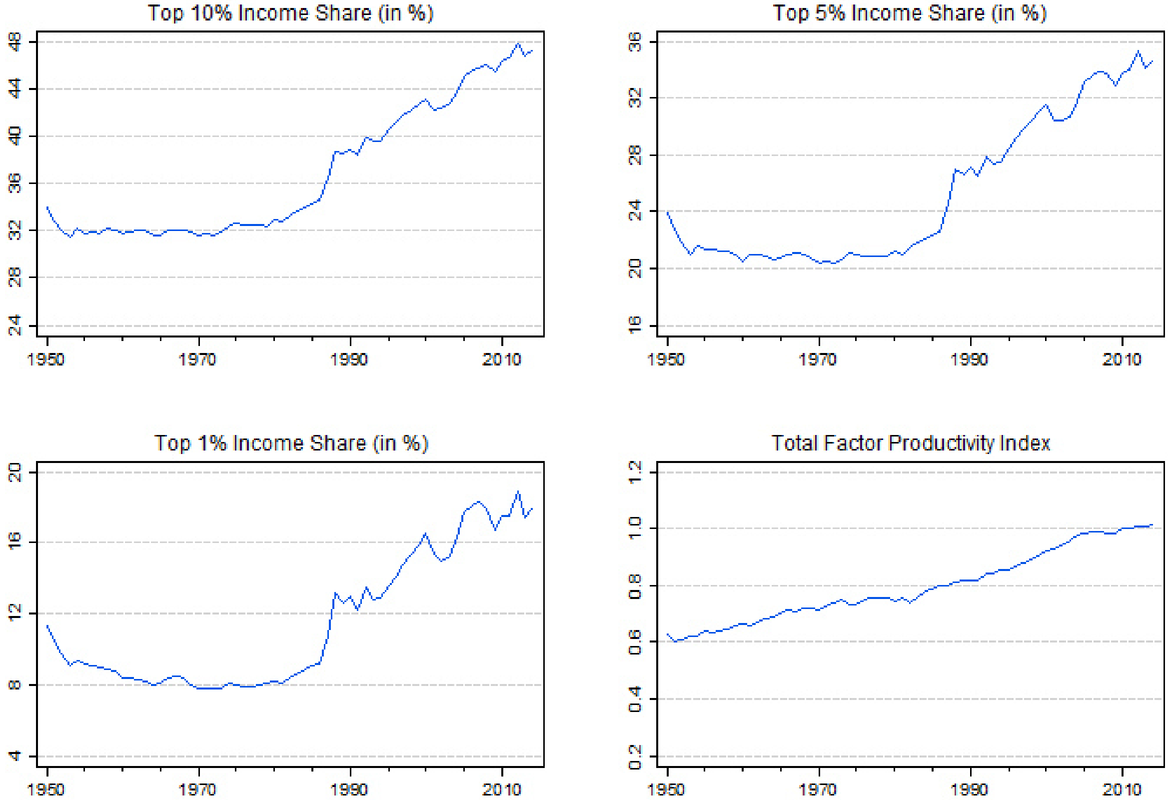
Source: Own depiction based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Figure A.6: Time Series Plots of UK



Source: Own depiction based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Figure A.7: Time Series Plots of U.S.



Source: Own depiction based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

A.3. Unit Root Tests of Logarithmized Variables

Table A.2: Canada Unit Root Test at Level of tfp

Null Hypothesis: TFP has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 1 (Automatic - based on SIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.929493	0.6274
Test critical values:	1% level	-4.110440	
	5% level	-3.482763	
	10% level	-3.169372	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(TFP)
Method: Least Squares
Date: 09/09/16 Time: 16:54
Sample (adjusted): 1952 2014
Included observations: 63 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TFP(-1)	-0.080257	0.041595	-1.929493	0.0585
D(TFP(-1))	-0.031259	0.112995	-0.276638	0.7830
C	0.367392	0.182451	2.013644	0.0486
@TREND("1950")	5.77E-05	0.000220	0.262919	0.7935

R-squared	0.158206	Mean dependent var	0.005051
Adjusted R-squared	0.115403	S.D. dependent var	0.017002
S.E. of regression	0.015991	Akaike info criterion	-5.372201
Sum squared resid	0.015087	Schwarz criterion	-5.236129
Log likelihood	173.2243	Hannan-Quinn criter.	-5.318683
F-statistic	3.696129	Durbin-Watson stat	1.791348
Prob(F-statistic)	0.016593		

Source: EViews output based on data of Feenstra *et al.* (2015) and Alvaredo *et al.* (2016).

Table A.3: Canada Unit Root Test at First-Difference of tfp

Null Hypothesis: D(TFP) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-9.560051	0.0000
Test critical values:	1% level	-4.110440	
	5% level	-3.482763	
	10% level	-3.169372	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(TFP,2)
Method: Least Squares
Date: 09/09/16 Time: 16:54
Sample (adjusted): 1952 2014
Included observations: 63 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(TFP(-1))	-1.078377	0.112800	-9.560051	0.0000
C	0.015453	0.004430	3.487983	0.0009
@TREND("1950")	-0.000306	0.000115	-2.647469	0.0103

R-squared	0.605488	Mean dependent var	0.000990
Adjusted R-squared	0.592337	S.D. dependent var	0.025607
S.E. of regression	0.016350	Akaike info criterion	-5.342757
Sum squared resid	0.016039	Schwarz criterion	-5.240703
Log likelihood	171.2968	Hannan-Quinn criter.	-5.302618
F-statistic	46.04327	Durbin-Watson stat	1.774364
Prob(F-statistic)	0.000000		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table A.4: Canada Unit Root Test at Level of top10

Null Hypothesis: TOP10 has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.625955	0.7709
Test critical values:	1% level	-4.118444	
	5% level	-3.486509	
	10% level	-3.171541	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(TOP10)
Method: Least Squares
Date: 09/09/16 Time: 16:54
Sample (adjusted): 1951 2010
Included observations: 60 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TOP10(-1)	-0.086759	0.053359	-1.625955	0.1095
C	0.708819	0.437986	1.618359	0.1111
@TREND("1950")	0.000204	0.000125	1.625109	0.1097

R-squared	0.064685	Mean dependent var	0.000800
Adjusted R-squared	0.031867	S.D. dependent var	0.016065
S.E. of regression	0.015807	Akaike info criterion	-5.408045
Sum squared resid	0.014242	Schwarz criterion	-5.303328
Log likelihood	165.2414	Hannan-Quinn criter.	-5.367084
F-statistic	1.971016	Durbin-Watson stat	1.751106
Prob(F-statistic)	0.148697		

Source: EViews output based on data of Feenstra *et al.* (2015) and Alvaredo *et al.* (2016).

Table A.5: Canada Unit Root Test at First-Difference of top10

Null Hypothesis: D(TOP10) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-8.210268	0.0000
Test critical values:	1% level	-4.121303	
	5% level	-3.487845	
	10% level	-3.172314	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(TOP10,2)
Method: Least Squares
Date: 09/09/16 Time: 16:55
Sample (adjusted): 1952 2010
Included observations: 59 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(TOP10(-1))	-1.000295	0.121835	-8.210268	0.0000
C	0.000171	0.004043	0.042333	0.9664
@TREND("1950")	4.90E-05	0.000115	0.426699	0.6712

R-squared	0.548635	Mean dependent var	0.000890
Adjusted R-squared	0.532515	S.D. dependent var	0.021740
S.E. of regression	0.014864	Akaike info criterion	-5.530192
Sum squared resid	0.012373	Schwarz criterion	-5.424555
Log likelihood	166.1407	Hannan-Quinn criter.	-5.488955
F-statistic	34.03410	Durbin-Watson stat	1.971164
Prob(F-statistic)	0.000000		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table A.6: Canada Unit Root Test at Level of top5

Null Hypothesis: TOP5 has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.478559	0.8262
Test critical values:	1% level	-4.118444	
	5% level	-3.486509	
	10% level	-3.171541	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(TOP5)
Method: Least Squares
Date: 09/09/16 Time: 16:55
Sample (adjusted): 1951 2010
Included observations: 60 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TOP5(-1)	-0.060602	0.040987	-1.478559	0.1448
C	0.463488	0.317806	1.458402	0.1502
@TREND("1950")	0.000347	0.000163	2.128718	0.0376

R-squared	0.080069	Mean dependent var	0.001194
Adjusted R-squared	0.047791	S.D. dependent var	0.020393
S.E. of regression	0.019899	Akaike info criterion	-4.947555
Sum squared resid	0.022571	Schwarz criterion	-4.842837
Log likelihood	151.4266	Hannan-Quinn criter.	-4.906594
F-statistic	2.480594	Durbin-Watson stat	1.689889
Prob(F-statistic)	0.092687		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table A.7: Canada Unit Root Test at First-Difference of top5

Null Hypothesis: D(TOP5) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-7.509192	0.0000
Test critical values:	1% level	-4.121303	
	5% level	-3.487845	
	10% level	-3.172314	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(TOP5,2)
Method: Least Squares
Date: 09/09/16 Time: 16:55
Sample (adjusted): 1952 2010
Included observations: 59 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(TOP5(-1))	-0.932934	0.124239	-7.509192	0.0000
C	-0.002012	0.005205	-0.386501	0.7006
@TREND("1950")	0.000134	0.000149	0.903482	0.3701

R-squared	0.504287	Mean dependent var	0.001016
Adjusted R-squared	0.486583	S.D. dependent var	0.026497
S.E. of regression	0.018986	Akaike info criterion	-5.040742
Sum squared resid	0.020186	Schwarz criterion	-4.935104
Log likelihood	151.7019	Hannan-Quinn criter.	-4.999505
F-statistic	28.48434	Durbin-Watson stat	1.953070
Prob(F-statistic)	0.000000		

Source: EViews output based on data of Feenstra *et al.* (2015) and Alvaredo *et al.* (2016).

Table A.8: Canada Unit Root Test at Level of top1

Null Hypothesis: TOP1 has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.756817	0.7131
Test critical values:	1% level	-4.118444	
	5% level	-3.486509	
	10% level	-3.171541	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(TOP1)
Method: Least Squares
Date: 09/09/16 Time: 16:55
Sample (adjusted): 1951 2010
Included observations: 60 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TOP1(-1)	-0.061811	0.035183	-1.756817	0.0843
C	0.402292	0.237659	1.692725	0.0960
@TREND("1950")	0.000824	0.000317	2.601611	0.0118

R-squared	0.110411	Mean dependent var	0.001936
Adjusted R-squared	0.079197	S.D. dependent var	0.038607
S.E. of regression	0.037046	Akaike info criterion	-3.704594
Sum squared resid	0.078228	Schwarz criterion	-3.599877
Log likelihood	114.1378	Hannan-Quinn criter.	-3.663634
F-statistic	3.537261	Durbin-Watson stat	1.541065
Prob(F-statistic)	0.035637		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table A.9: Canada Unit Root Test at First-Difference of top1

Null Hypothesis: D(TOP1) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.334199	0.0000
Test critical values:	1% level	-4.121303	
	5% level	-3.487845	
	10% level	-3.172314	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(TOP1,2)
Method: Least Squares
Date: 09/09/16 Time: 16:55
Sample (adjusted): 1952 2010
Included observations: 59 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(TOP1(-1))	-0.808376	0.127621	-6.334199	0.0000
C	-0.006978	0.010090	-0.691503	0.4921
@TREND("1950")	0.000320	0.000289	1.107419	0.2728

R-squared	0.419378	Mean dependent var	0.001282
Adjusted R-squared	0.398642	S.D. dependent var	0.047084
S.E. of regression	0.036512	Akaike info criterion	-3.732838
Sum squared resid	0.074655	Schwarz criterion	-3.627200
Log likelihood	113.1187	Hannan-Quinn criter.	-3.691601
F-statistic	20.22415	Durbin-Watson stat	1.944106
Prob(F-statistic)	0.000000		

Source: EViews output based on data of Feenstra *et al.* (2015) and Alvaredo *et al.* (2016).

Table A.10: France Unit Root Test at Level of tfp

Null Hypothesis: TFP has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-0.632551	0.9735
Test critical values:	1% level	-4.107947	
	5% level	-3.481595	
	10% level	-3.168695	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(TFP)
Method: Least Squares
Date: 09/09/16 Time: 17:04
Sample (adjusted): 1951 2014
Included observations: 64 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TFP(-1)	-0.008676	0.013716	-0.632551	0.5294
C	0.073999	0.051074	1.448860	0.1525
@TREND("1950")	-0.000599	0.000260	-2.304469	0.0246

R-squared	0.493522	Mean dependent var	0.017370
Adjusted R-squared	0.476916	S.D. dependent var	0.019970
S.E. of regression	0.014443	Akaike info criterion	-5.591466
Sum squared resid	0.012725	Schwarz criterion	-5.490269
Log likelihood	181.9269	Hannan-Quinn criter.	-5.551600
F-statistic	29.71978	Durbin-Watson stat	1.362957
Prob(F-statistic)	0.000000		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table A.11: France Unit Root Test at First-Difference of tfp

Null Hypothesis: D(TFP) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.994490	0.0000
Test critical values:	1% level	-4.110440	
	5% level	-3.482763	
	10% level	-3.169372	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(TFP,2)
Method: Least Squares
Date: 09/09/16 Time: 17:04
Sample (adjusted): 1952 2014
Included observations: 63 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(TFP(-1))	-0.779595	0.111458	-6.994490	0.0000
C	0.035737	0.005763	6.200937	0.0000
@TREND("1950")	-0.000663	0.000121	-5.490961	0.0000

R-squared	0.453389	Mean dependent var	1.21E-06
Adjusted R-squared	0.435168	S.D. dependent var	0.016780
S.E. of regression	0.012611	Akaike info criterion	-5.862050
Sum squared resid	0.009542	Schwarz criterion	-5.759996
Log likelihood	187.6546	Hannan-Quinn criter.	-5.821911
F-statistic	24.88362	Durbin-Watson stat	1.995448
Prob(F-statistic)	0.000000		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table A.12: France Unit Root Test at Level of top10

Null Hypothesis: TOP10 has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.983998	0.5983
Test critical values:	1% level	-4.113017	
	5% level	-3.483970	
	10% level	-3.170071	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(TOP10)
Method: Least Squares
Date: 09/09/16 Time: 17:05
Sample (adjusted): 1951 2012
Included observations: 62 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TOP10(-1)	-0.094556	0.047660	-1.983998	0.0519
C	0.773355	0.388282	1.991737	0.0510
@TREND("1950")	-0.000216	0.000134	-1.615489	0.1115

R-squared	0.071310	Mean dependent var	0.000186
Adjusted R-squared	0.039829	S.D. dependent var	0.016975
S.E. of regression	0.016633	Akaike info criterion	-5.307624
Sum squared resid	0.016324	Schwarz criterion	-5.204698
Log likelihood	167.5363	Hannan-Quinn criter.	-5.267213
F-statistic	2.265191	Durbin-Watson stat	1.785951
Prob(F-statistic)	0.112767		

Source: EViews output based on data of Feenstra *et al.* (2015) and Alvaredo *et al.* (2016).

Table A.13: France Unit Root Test at First-Difference of top10

Null Hypothesis: D(TOP10) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-7.353766	0.0000
Test critical values:	1% level	-4.115684	
	5% level	-3.485218	
	10% level	-3.170793	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(TOP10,2)
Method: Least Squares
Date: 09/09/16 Time: 17:05
Sample (adjusted): 1952 2012
Included observations: 61 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(TOP10(-1))	-0.943038	0.128239	-7.353766	0.0000
C	0.001046	0.004510	0.231824	0.8175
@TREND("1950")	-4.24E-05	0.000124	-0.343539	0.7324

R-squared	0.482961	Mean dependent var	-0.000576
Adjusted R-squared	0.465133	S.D. dependent var	0.023132
S.E. of regression	0.016917	Akaike info criterion	-5.273009
Sum squared resid	0.016600	Schwarz criterion	-5.169196
Log likelihood	163.8268	Hannan-Quinn criter.	-5.232324
F-statistic	27.08866	Durbin-Watson stat	2.041850
Prob(F-statistic)	0.000000		

Source: EViews output based on data of Feenstra *et al.* (2015) and Alvaredo *et al.* (2016).

Table A.14: France Unit Root Test at Level of top5

Null Hypothesis: TOP5 has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.650237	0.7612
Test critical values:	1% level	-4.113017	
	5% level	-3.483970	
	10% level	-3.170071	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(TOP5)
Method: Least Squares
Date: 09/09/16 Time: 17:06
Sample (adjusted): 1951 2012
Included observations: 62 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TOP5(-1)	-0.078197	0.047385	-1.650237	0.1042
C	0.607133	0.367111	1.653813	0.1035
@TREND("1950")	-0.000186	0.000165	-1.128085	0.2639

R-squared	0.045814	Mean dependent var	-0.000105
Adjusted R-squared	0.013469	S.D. dependent var	0.020102
S.E. of regression	0.019966	Akaike info criterion	-4.942426
Sum squared resid	0.023519	Schwarz criterion	-4.839501
Log likelihood	156.2152	Hannan-Quinn criter.	-4.902015
F-statistic	1.416398	Durbin-Watson stat	1.744508
Prob(F-statistic)	0.250713		

Source: EViews output based on data of Feenstra *et al.* (2015) and Alvaredo *et al.* (2016).

Table A.15: France Unit Root Test at First-Difference of top5

Null Hypothesis: D(TOP5) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-7.005251	0.0000
Test critical values:	1% level	-4.115684	
	5% level	-3.485218	
	10% level	-3.170793	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(TOP5,2)
Method: Least Squares
Date: 09/09/16 Time: 17:06
Sample (adjusted): 1952 2012
Included observations: 61 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(TOP5(-1))	-0.910514	0.129976	-7.005251	0.0000
C	-2.27E-05	0.005408	-0.004203	0.9967
@TREND("1950")	-1.31E-05	0.000148	-0.088522	0.9298

R-squared	0.458380	Mean dependent var	-0.000497
Adjusted R-squared	0.439704	S.D. dependent var	0.027193
S.E. of regression	0.020355	Akaike info criterion	-4.903080
Sum squared resid	0.024030	Schwarz criterion	-4.799267
Log likelihood	152.5439	Hannan-Quinn criter.	-4.862395
F-statistic	24.54311	Durbin-Watson stat	2.033234
Prob(F-statistic)	0.000000		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table A.16: France Unit Root Test at Level of top1

Null Hypothesis: TOP1 has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.331567	0.8707
Test critical values:	1% level	-4.113017	
	5% level	-3.483970	
	10% level	-3.170071	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(TOP1)
Method: Least Squares
Date: 09/09/16 Time: 17:06
Sample (adjusted): 1951 2012
Included observations: 62 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TOP1(-1)	-0.076316	0.057313	-1.331567	0.1881
C	0.513950	0.390622	1.315724	0.1934
@TREND("1950")	4.06E-06	0.000282	0.014386	0.9886

R-squared	0.038649	Mean dependent var	-7.20E-05
Adjusted R-squared	0.006061	S.D. dependent var	0.034684
S.E. of regression	0.034579	Akaike info criterion	-3.843957
Sum squared resid	0.070547	Schwarz criterion	-3.741031
Log likelihood	122.1627	Hannan-Quinn criter.	-3.803546
F-statistic	1.185979	Durbin-Watson stat	1.637360
Prob(F-statistic)	0.312622		

Source: EViews output based on data of Feenstra *et al.* (2015) and Alvaredo *et al.* (2016).

Table A.17: France Unit Root Test at First-Difference of top1

Null Hypothesis: D(TOP1) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 1 (Automatic - based on SIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.310931	0.0000
Test critical values:	1% level	-4.118444	
	5% level	-3.486509	
	10% level	-3.171541	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(TOP1,2)
Method: Least Squares
Date: 09/09/16 Time: 17:06
Sample (adjusted): 1953 2012
Included observations: 60 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(TOP1(-1))	-1.111127	0.176064	-6.310931	0.0000
D(TOP1(-1),2)	0.307903	0.152370	2.020755	0.0481
C	-0.007645	0.009488	-0.805832	0.4237
@TREND("1950")	0.000204	0.000258	0.788576	0.4337

R-squared	0.468861	Mean dependent var	-0.000898
Adjusted R-squared	0.440407	S.D. dependent var	0.045882
S.E. of regression	0.034323	Akaike info criterion	-3.841676
Sum squared resid	0.065971	Schwarz criterion	-3.702053
Log likelihood	119.2503	Hannan-Quinn criter.	-3.787062
F-statistic	16.47794	Durbin-Watson stat	1.961487
Prob(F-statistic)	0.000000		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table A.18: Germany Unit Root Test at Level of tfp

Null Hypothesis: TFP has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 1 (Automatic - based on SIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.441498	0.3554
Test critical values:	1% level	-4.110440	
	5% level	-3.482763	
	10% level	-3.169372	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(TFP)
Method: Least Squares
Date: 09/09/16 Time: 18:11
Sample (adjusted): 1952 2014
Included observations: 63 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TFP(-1)	-0.061629	0.025242	-2.441498	0.0176
D(TFP(-1))	0.258082	0.117731	2.192139	0.0323
C	0.254568	0.093318	2.727972	0.0084
@TREND("1950")	0.000585	0.000435	1.344929	0.1838

R-squared	0.422725	Mean dependent var	0.017428
Adjusted R-squared	0.393372	S.D. dependent var	0.018862
S.E. of regression	0.014691	Akaike info criterion	-5.541771
Sum squared resid	0.012734	Schwarz criterion	-5.405699
Log likelihood	178.5658	Hannan-Quinn criter.	-5.488253
F-statistic	14.40145	Durbin-Watson stat	1.837653
Prob(F-statistic)	0.000000		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table A.19: Germany Unit Root Test at First-Difference of tfp

Null Hypothesis: D(TFP) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.020577	0.0000
Test critical values:	1% level	-4.110440	
	5% level	-3.482763	
	10% level	-3.169372	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(TFP,2)
Method: Least Squares
Date: 09/09/16 Time: 18:11
Sample (adjusted): 1952 2014
Included observations: 63 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(TFP(-1))	-0.737439	0.122486	-6.020577	0.0000
C	0.027156	0.005913	4.592738	0.0000
@TREND("1950")	-0.000435	0.000125	-3.476429	0.0010

R-squared	0.377251	Mean dependent var	-0.000216
Adjusted R-squared	0.356493	S.D. dependent var	0.019056
S.E. of regression	0.015286	Akaike info criterion	-5.477269
Sum squared resid	0.014020	Schwarz criterion	-5.375214
Log likelihood	175.5340	Hannan-Quinn criter.	-5.437130
F-statistic	18.17354	Durbin-Watson stat	1.792278
Prob(F-statistic)	0.000001		

Source: EViews output based on data of Feenstra *et al.* (2015) and Alvaredo *et al.* (2016).

Table A.20: Germany Unit Root Test at Level of top10

Null Hypothesis: TOP10 has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 1 (Automatic - based on SIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.609845	0.2776
Test critical values:	1% level	-4.118444	
	5% level	-3.486509	
	10% level	-3.171541	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(TOP10)
Method: Least Squares
Date: 09/09/16 Time: 18:12
Sample (adjusted): 1952 2011
Included observations: 60 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TOP10(-1)	-0.078618	0.030124	-2.609845	0.0116
D(TOP10(-1))	0.561552	0.117423	4.782276	0.0000
C	0.627574	0.241531	2.598313	0.0120
@TREND("1950")	0.000308	0.000127	2.432231	0.0182

R-squared	0.413735	Mean dependent var	0.002025
Adjusted R-squared	0.382328	S.D. dependent var	0.015614
S.E. of regression	0.012271	Akaike info criterion	-5.898782
Sum squared resid	0.008433	Schwarz criterion	-5.759159
Log likelihood	180.9634	Hannan-Quinn criter.	-5.844167
F-statistic	13.17330	Durbin-Watson stat	1.667092
Prob(F-statistic)	0.000001		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table A.21: Germany Unit Root Test at First-Difference of top10

Null Hypothesis: D(TOP10) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 5 (Automatic - based on SIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.697309	0.0001
Test critical values:	1% level	-4.133838	
	5% level	-3.493692	
	10% level	-3.175693	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(TOP10,2)
Method: Least Squares
Date: 09/09/16 Time: 18:11
Sample (adjusted): 1957 2011
Included observations: 55 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(TOP10(-1))	-2.010526	0.352890	-5.697309	0.0000
D(TOP10(-1),2)	1.339208	0.278485	4.808906	0.0000
D(TOP10(-2),2)	1.036052	0.249086	4.159417	0.0001
D(TOP10(-3),2)	0.757306	0.208277	3.636044	0.0007
D(TOP10(-4),2)	0.472133	0.174419	2.706888	0.0094
D(TOP10(-5),2)	0.417765	0.159787	2.614512	0.0120
C	-0.019095	0.005337	-3.578055	0.0008
@TREND("1950")	0.000720	0.000172	4.186864	0.0001

R-squared	0.499472	Mean dependent var	-0.000306
Adjusted R-squared	0.424925	S.D. dependent var	0.014891
S.E. of regression	0.011292	Akaike info criterion	-5.995652
Sum squared resid	0.005993	Schwarz criterion	-5.703676
Log likelihood	172.8804	Hannan-Quinn criter.	-5.882743
F-statistic	6.700115	Durbin-Watson stat	1.909077
Prob(F-statistic)	0.000016		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table A.22: Germany Unit Root Test at Level of top5

Null Hypothesis: TOP5 has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 1 (Automatic - based on SIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.378893	0.3865
Test critical values:	1% level	-4.118444	
	5% level	-3.486509	
	10% level	-3.171541	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(TOP5)
Method: Least Squares
Date: 09/09/16 Time: 18:12
Sample (adjusted): 1952 2011
Included observations: 60 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TOP5(-1)	-0.069619	0.029265	-2.378893	0.0208
D(TOP5(-1))	0.631693	0.113247	5.577996	0.0000
C	0.533535	0.225661	2.364325	0.0216
@TREND("1950")	0.000177	0.000128	1.379226	0.1733

R-squared	0.434502	Mean dependent var	0.001409
Adjusted R-squared	0.404208	S.D. dependent var	0.020110
S.E. of regression	0.015522	Akaike info criterion	-5.428742
Sum squared resid	0.013493	Schwarz criterion	-5.289119
Log likelihood	166.8622	Hannan-Quinn criter.	-5.374127
F-statistic	14.34260	Durbin-Watson stat	1.648494
Prob(F-statistic)	0.000000		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table A.23: Germany Unit Root Test at First-Difference of top5

Null Hypothesis: D(TOP5) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 3 (Automatic - based on SIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.896473	0.0000
Test critical values:	1% level	-4.127338	
	5% level	-3.490662	
	10% level	-3.173943	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(TOP5,2)
Method: Least Squares
Date: 09/09/16 Time: 18:12
Sample (adjusted): 1955 2011
Included observations: 57 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(TOP5(-1))	-1.073197	0.182007	-5.896473	0.0000
D(TOP5(-1),2)	0.678754	0.153102	4.433352	0.0000
D(TOP5(-2),2)	0.388404	0.143120	2.713839	0.0090
D(TOP5(-3),2)	0.421564	0.147074	2.866344	0.0060
C	-0.012174	0.004943	-2.463081	0.0172
@TREND("1950")	0.000424	0.000144	2.937008	0.0050

R-squared	0.429529	Mean dependent var	-0.000324
Adjusted R-squared	0.373601	S.D. dependent var	0.018147
S.E. of regression	0.014362	Akaike info criterion	-5.549111
Sum squared resid	0.010520	Schwarz criterion	-5.334053
Log likelihood	164.1497	Hannan-Quinn criter.	-5.465532
F-statistic	7.679967	Durbin-Watson stat	2.033859
Prob(F-statistic)	0.000019		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table A.24: Germany Unit Root Test at Level of top1

Null Hypothesis: TOP1 has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 10 (Automatic - based on SIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		0.724785	0.9996
Test critical values:	1% level	-4.148465	
	5% level	-3.500495	
	10% level	-3.179617	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(TOP1)
Method: Least Squares
Date: 09/09/16 Time: 18:13
Sample (adjusted): 1961 2011
Included observations: 51 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TOP1(-1)	0.050649	0.069881	0.724785	0.4730
D(TOP1(-1))	0.924682	0.154964	5.967085	0.0000
D(TOP1(-2))	-0.487412	0.190140	-2.563442	0.0144
D(TOP1(-3))	-0.687629	0.298346	-2.304802	0.0267
D(TOP1(-4))	1.114892	0.436414	2.554665	0.0148
D(TOP1(-5))	-0.787545	0.443138	-1.777201	0.0835
D(TOP1(-6))	-1.523755	0.362819	-4.199773	0.0002
D(TOP1(-7))	3.927833	0.687288	5.714977	0.0000
D(TOP1(-8))	-4.648325	0.969419	-4.794960	0.0000
D(TOP1(-9))	3.199853	0.794532	4.027345	0.0003
D(TOP1(-10))	-1.159207	0.407052	-2.847807	0.0071
C	-0.376297	0.495999	-0.758665	0.4527
@TREND("1950")	0.000699	0.000346	2.022449	0.0502

R-squared	0.757007	Mean dependent var	0.000658
Adjusted R-squared	0.680272	S.D. dependent var	0.039910
S.E. of regression	0.022567	Akaike info criterion	-4.529091
Sum squared resid	0.019352	Schwarz criterion	-4.036665
Log likelihood	128.4918	Hannan-Quinn criter.	-4.340921
F-statistic	9.865236	Durbin-Watson stat	1.722439
Prob(F-statistic)	0.000000		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table A.25: Germany Unit Root Test at First-Difference of top1

Null Hypothesis: D(TOP1) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 10 (Automatic - based on SIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.494893	0.8183
Test critical values:	1% level	-4.152511	
	5% level	-3.502373	
	10% level	-3.180699	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(TOP1,2)
Method: Least Squares
Date: 09/09/16 Time: 18:12
Sample (adjusted): 1962 2011
Included observations: 50 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(TOP1(-1))	-0.484009	0.323775	-1.494893	0.1434
D(TOP1(-1),2)	0.568704	0.306046	1.858228	0.0711
D(TOP1(-2),2)	-0.203324	0.320907	-0.633592	0.5302
D(TOP1(-3),2)	-0.487092	0.322933	-1.508339	0.1400
D(TOP1(-4),2)	0.611483	0.345905	1.767779	0.0853
D(TOP1(-5),2)	-0.677330	0.359411	-1.884559	0.0674
D(TOP1(-6),2)	-1.330474	0.303720	-4.380601	0.0001
D(TOP1(-7),2)	2.342145	0.471325	4.969282	0.0000
D(TOP1(-8),2)	-3.171874	0.609015	-5.208203	0.0000
D(TOP1(-9),2)	2.060338	0.522551	3.942843	0.0003
D(TOP1(-10),2)	-1.010858	0.382209	-2.644776	0.0119
C	-0.016137	0.009114	-1.770494	0.0849
@TREND("1950")	0.000497	0.000241	2.057397	0.0467

R-squared	0.767476	Mean dependent var	-0.001172
Adjusted R-squared	0.692063	S.D. dependent var	0.037487
S.E. of regression	0.020802	Akaike info criterion	-4.688607
Sum squared resid	0.016011	Schwarz criterion	-4.191481
Log likelihood	130.2152	Hannan-Quinn criter.	-4.499298
F-statistic	10.17694	Durbin-Watson stat	1.854729
Prob(F-statistic)	0.000000		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table A.26: Germany Unit Root Test at Second-Difference of top1

Null Hypothesis: D(TOP1,2) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 9 (Automatic - based on SIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.783392	0.0017
Test critical values:	1% level	-4.152511	
	5% level	-3.502373	
	10% level	-3.180699	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(TOP1,3)
Method: Least Squares
Date: 09/09/16 Time: 18:13
Sample (adjusted): 1962 2011
Included observations: 50 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(TOP1(-1),2)	-4.893224	1.022961	-4.783392	0.0000
D(TOP1(-1),3)	4.055349	0.965498	4.200264	0.0002
D(TOP1(-2),3)	3.430468	0.873148	3.928852	0.0003
D(TOP1(-3),3)	2.562995	0.840582	3.049072	0.0042
D(TOP1(-4),3)	2.867707	0.716574	4.001970	0.0003
D(TOP1(-5),3)	1.855013	0.556626	3.332601	0.0019
D(TOP1(-6),3)	0.288291	0.562609	0.512418	0.6113
D(TOP1(-7),3)	2.533333	0.452489	5.598659	0.0000
D(TOP1(-8),3)	-0.932396	0.341448	-2.730715	0.0095
D(TOP1(-9),3)	1.202971	0.365757	3.288988	0.0022
C	-0.010258	0.008355	-1.227787	0.2271
@TREND("1950")	0.000329	0.000217	1.514501	0.1382

R-squared	0.873354	Mean dependent var	-0.000297
Adjusted R-squared	0.836693	S.D. dependent var	0.052306
S.E. of regression	0.021138	Akaike info criterion	-4.669963
Sum squared resid	0.016978	Schwarz criterion	-4.211077
Log likelihood	128.7491	Hannan-Quinn criter.	-4.495217
F-statistic	23.82264	Durbin-Watson stat	1.878935
Prob(F-statistic)	0.000000		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table A.27: Italy Unit Root Test at Level of tfp

Null Hypothesis: TFP has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-0.591633	0.9741
Test critical values:	1% level	-4.205004	
	5% level	-3.526609	
	10% level	-3.194611	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(TFP)
Method: Least Squares
Date: 09/09/16 Time: 19:11
Sample (adjusted): 1975 2014
Included observations: 40 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TFP(-1)	-0.040402	0.068289	-0.591633	0.5577
C	0.196557	0.319468	0.615263	0.5421
@TREND("1974")	-0.000480	0.000226	-2.119154	0.0409

R-squared	0.109763	Mean dependent var	-0.001834
Adjusted R-squared	0.061642	S.D. dependent var	0.016854
S.E. of regression	0.016326	Akaike info criterion	-5.320051
Sum squared resid	0.009862	Schwarz criterion	-5.193385
Log likelihood	109.4010	Hannan-Quinn criter.	-5.274252
F-statistic	2.280978	Durbin-Watson stat	1.750347
Prob(F-statistic)	0.116374		

Source: EViews output based on data of Feenstra *et al.* (2015) and Alvaredo *et al.* (2016).

Table A.28: Italy Unit Root Test at First-Difference of tfp

Null Hypothesis: D(TFP) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 1 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.911531	0.0016
Test critical values:	1% level	-4.219126	
	5% level	-3.533083	
	10% level	-3.198312	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(TFP,2)
Method: Least Squares
Date: 09/09/16 Time: 19:11
Sample (adjusted): 1977 2014
Included observations: 38 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(TFP(-1))	-1.022983	0.208282	-4.911531	0.0000
D(TFP(-1),2)	0.178006	0.132701	1.341408	0.1887
C	0.009255	0.005351	1.729661	0.0928
@TREND("1974")	-0.000523	0.000232	-2.250383	0.0310

R-squared	0.478685	Mean dependent var	-0.001214
Adjusted R-squared	0.432687	S.D. dependent var	0.017558
S.E. of regression	0.013224	Akaike info criterion	-5.714197
Sum squared resid	0.005946	Schwarz criterion	-5.541819
Log likelihood	112.5697	Hannan-Quinn criter.	-5.652866
F-statistic	10.40657	Durbin-Watson stat	1.856823
Prob(F-statistic)	0.000053		

Source: EViews output based on data of Feenstra *et al.* (2015) and Alvaredo *et al.* (2016).

Table A.29: Italy Unit Root Test at Level of top10

Null Hypothesis: TOP10 has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 1 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-7.355027	0.0000
Test critical values:	1% level	-4.252879	
	5% level	-3.548490	
	10% level	-3.207094	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(TOP10)
Method: Least Squares
Date: 09/09/16 Time: 19:11
Sample (adjusted): 1976 2009
Included observations: 34 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TOP10(-1)	-0.360109	0.048961	-7.355027	0.0000
D(TOP10(-1))	0.125394	0.104068	1.204927	0.2377
C	2.818587	0.384701	7.326687	0.0000
@TREND("1974")	0.003547	0.000451	7.866396	0.0000

R-squared	0.715814	Mean dependent var	0.002415
Adjusted R-squared	0.687396	S.D. dependent var	0.021409
S.E. of regression	0.011970	Akaike info criterion	-5.902727
Sum squared resid	0.004298	Schwarz criterion	-5.723155
Log likelihood	104.3464	Hannan-Quinn criter.	-5.841488
F-statistic	25.18826	Durbin-Watson stat	0.934106
Prob(F-statistic)	0.000000		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table A.30: Italy Unit Root Test at Level of top5

Null Hypothesis: TOP5 has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 1 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.410171	0.0005
Test critical values:	1% level	-4.252879	
	5% level	-3.548490	
	10% level	-3.207094	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(TOP5)
Method: Least Squares
Date: 09/09/16 Time: 19:12
Sample (adjusted): 1976 2009
Included observations: 34 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TOP5(-1)	-0.361997	0.066911	-5.410171	0.0000
D(TOP5(-1))	0.134350	0.129384	1.038379	0.3074
C	2.672660	0.495489	5.393984	0.0000
@TREND("1974")	0.004413	0.000778	5.675178	0.0000

R-squared	0.562264	Mean dependent var	0.004268
Adjusted R-squared	0.518491	S.D. dependent var	0.025411
S.E. of regression	0.017633	Akaike info criterion	-5.127984
Sum squared resid	0.009327	Schwarz criterion	-4.948412
Log likelihood	91.17573	Hannan-Quinn criter.	-5.066745
F-statistic	12.84484	Durbin-Watson stat	1.174358
Prob(F-statistic)	0.000014		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table A.31: Italy Unit Root Test at Level of top1

Null Hypothesis: TOP1 has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 1 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.919982	0.1691
Test critical values:	1% level	-4.252879	
	5% level	-3.548490	
	10% level	-3.207094	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(TOP1)
Method: Least Squares
Date: 09/09/16 Time: 19:12
Sample (adjusted): 1976 2009
Included observations: 34 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TOP1(-1)	-0.215600	0.073836	-2.919982	0.0066
D(TOP1(-1))	0.460318	0.146994	3.131532	0.0039
C	1.389363	0.474592	2.927492	0.0065
@TREND("1974")	0.002869	0.001047	2.741450	0.0102

R-squared	0.426758	Mean dependent var	0.007616
Adjusted R-squared	0.369434	S.D. dependent var	0.024544
S.E. of regression	0.019490	Akaike info criterion	-4.927687
Sum squared resid	0.011396	Schwarz criterion	-4.748115
Log likelihood	87.77068	Hannan-Quinn criter.	-4.866448
F-statistic	7.444641	Durbin-Watson stat	1.926758
Prob(F-statistic)	0.000722		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table A.32: Italy Unit Root Test at First-Difference of top1

Null Hypothesis: D(TOP1) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.993405	0.1487
Test critical values:	1% level	-4.252879	
	5% level	-3.548490	
	10% level	-3.207094	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(TOP1,2)
Method: Least Squares
Date: 09/09/16 Time: 19:12
Sample (adjusted): 1976 2009
Included observations: 34 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(TOP1(-1))	-0.486790	0.162621	-2.993405	0.0054
C	0.003724	0.008037	0.463355	0.6463
@TREND("1974")	-4.59E-07	0.000401	-0.001143	0.9991

R-squared	0.243913	Mean dependent var	1.53E-05
Adjusted R-squared	0.195133	S.D. dependent var	0.024219
S.E. of regression	0.021728	Akaike info criterion	-4.736367
Sum squared resid	0.014635	Schwarz criterion	-4.601688
Log likelihood	83.51823	Hannan-Quinn criter.	-4.690437
F-statistic	5.000283	Durbin-Watson stat	1.933649
Prob(F-statistic)	0.013118		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table A.33: Italy Unit Root Test at Second-Difference of top1

Null Hypothesis: D(TOP1,2) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.900773	0.0000
Test critical values:	1% level	-4.262735	
	5% level	-3.552973	
	10% level	-3.209642	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(TOP1,3)
Method: Least Squares
Date: 09/09/16 Time: 19:12
Sample (adjusted): 1977 2009
Included observations: 33 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(TOP1(-1),2)	-1.226725	0.177766	-6.900773	0.0000
C	0.008299	0.009575	0.866799	0.3929
@TREND("1974")	-0.000449	0.000451	-0.995530	0.3274

R-squared	0.613507	Mean dependent var	-0.000586
Adjusted R-squared	0.587740	S.D. dependent var	0.038020
S.E. of regression	0.024411	Akaike info criterion	-4.501023
Sum squared resid	0.017878	Schwarz criterion	-4.364977
Log likelihood	77.26687	Hannan-Quinn criter.	-4.455247
F-statistic	23.81050	Durbin-Watson stat	2.014318
Prob(F-statistic)	0.000001		

Source: EViews output based on data of Feenstra *et al.* (2015) and Alvaredo *et al.* (2016).

Table A.34: Japan Unit Root Test at Level of tfp

Null Hypothesis: TFP has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 1 (Automatic - based on SIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.122957	0.5231
Test critical values:	1% level	-4.110440	
	5% level	-3.482763	
	10% level	-3.169372	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(TFP)
Method: Least Squares
Date: 09/09/16 Time: 19:19
Sample (adjusted): 1952 2014
Included observations: 63 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TFP(-1)	-0.036342	0.017119	-2.122957	0.0380
D(TFP(-1))	0.382698	0.115100	3.324918	0.0015
C	0.176905	0.074706	2.368006	0.0212
@TREND("1950")	-0.000189	0.000191	-0.992580	0.3250

R-squared	0.423497	Mean dependent var	0.009502
Adjusted R-squared	0.394183	S.D. dependent var	0.025635
S.E. of regression	0.019953	Akaike info criterion	-4.929516
Sum squared resid	0.023489	Schwarz criterion	-4.793444
Log likelihood	159.2798	Hannan-Quinn criter.	-4.875998
F-statistic	14.44706	Durbin-Watson stat	2.021595
Prob(F-statistic)	0.000000		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table A.35: Japan Unit Root Test at First-Difference of tfp

Null Hypothesis: D(TFP) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 2 (Automatic - based on SIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.447248	0.3525
Test critical values:	1% level	-4.115684	
	5% level	-3.485218	
	10% level	-3.170793	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(TFP,2)
Method: Least Squares
Date: 09/09/16 Time: 19:19
Sample (adjusted): 1954 2014
Included observations: 61 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(TFP(-1))	-0.359856	0.147045	-2.447248	0.0176
D(TFP(-1),2)	-0.278524	0.149972	-1.857175	0.0685
D(TFP(-2),2)	-0.215663	0.124829	-1.727669	0.0896
C	0.008936	0.007341	1.217290	0.2286
@TREND("1950")	-0.000197	0.000176	-1.119319	0.2678

R-squared	0.320737	Mean dependent var	-0.000548
Adjusted R-squared	0.272218	S.D. dependent var	0.022715
S.E. of regression	0.019379	Akaike info criterion	-4.970882
Sum squared resid	0.021030	Schwarz criterion	-4.797859
Log likelihood	156.6119	Hannan-Quinn criter.	-4.903072
F-statistic	6.610577	Durbin-Watson stat	1.928743
Prob(F-statistic)	0.000198		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table A.36: Japan Unit Root Test at Second-Difference of tfp

Null Hypothesis: D(TFP,2) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 1 (Automatic - based on SIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-9.147221	0.0000
Test critical values:	1% level	-4.115684	
	5% level	-3.485218	
	10% level	-3.170793	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(TFP,3)
Method: Least Squares
Date: 09/09/16 Time: 19:19
Sample (adjusted): 1954 2014
Included observations: 61 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(TFP(-1),2)	-1.850765	0.202331	-9.147221	0.0000
D(TFP(-1),3)	0.344579	0.118018	2.919712	0.0050
C	-0.003157	0.005661	-0.557672	0.5793
@TREND("1950")	5.82E-05	0.000148	0.394485	0.6947

R-squared	0.733486	Mean dependent var	0.000486
Adjusted R-squared	0.719459	S.D. dependent var	0.038154
S.E. of regression	0.020209	Akaike info criterion	-4.902063
Sum squared resid	0.023279	Schwarz criterion	-4.763645
Log likelihood	153.5129	Hannan-Quinn criter.	-4.847816
F-statistic	52.29083	Durbin-Watson stat	1.967622
Prob(F-statistic)	0.000000		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table A.37: Japan Unit Root Test at Level of top10

Null Hypothesis: TOP10 has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 1 (Automatic - based on SIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.682582	0.7466
Test critical values:	1% level	-4.121303	
	5% level	-3.487845	
	10% level	-3.172314	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(TOP10)
Method: Least Squares
Date: 09/09/16 Time: 19:19
Sample (adjusted): 1952 2010
Included observations: 59 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TOP10(-1)	-0.089802	0.053372	-1.682582	0.0981
D(TOP10(-1))	0.072786	0.128595	0.566007	0.5737
C	0.712195	0.424043	1.679536	0.0987
@TREND("1950")	0.000637	0.000311	2.047729	0.0454

R-squared	0.076591	Mean dependent var	0.004935
Adjusted R-squared	0.026223	S.D. dependent var	0.021325
S.E. of regression	0.021043	Akaike info criterion	-4.819102
Sum squared resid	0.024355	Schwarz criterion	-4.678252
Log likelihood	146.1635	Hannan-Quinn criter.	-4.764120
F-statistic	1.520640	Durbin-Watson stat	1.625828
Prob(F-statistic)	0.219367		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table A.38: Japan Unit Root Test at First-Difference of top10

Null Hypothesis: D(TOP10) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-7.420321	0.0000
Test critical values:	1% level	-4.121303	
	5% level	-3.487845	
	10% level	-3.172314	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(TOP10,2)
Method: Least Squares
Date: 09/09/16 Time: 19:19
Sample (adjusted): 1952 2010
Included observations: 59 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(TOP10(-1))	-0.959101	0.129253	-7.420321	0.0000
C	-0.001227	0.005817	-0.210876	0.8337
@TREND("1950")	0.000193	0.000168	1.152651	0.2540

R-squared	0.497006	Mean dependent var	0.000836
Adjusted R-squared	0.479042	S.D. dependent var	0.029627
S.E. of regression	0.021384	Akaike info criterion	-4.802807
Sum squared resid	0.025608	Schwarz criterion	-4.697169
Log likelihood	144.6828	Hannan-Quinn criter.	-4.761570
F-statistic	27.66671	Durbin-Watson stat	1.626605
Prob(F-statistic)	0.000000		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table A.39: Japan Unit Root Test at Level of top5

Null Hypothesis: TOP5 has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 1 (Automatic - based on SIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.546766	0.8017
Test critical values:	1% level	-4.121303	
	5% level	-3.487845	
	10% level	-3.172314	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(TOP5)
Method: Least Squares
Date: 09/09/16 Time: 19:20
Sample (adjusted): 1952 2010
Included observations: 59 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TOP5(-1)	-0.080292	0.051910	-1.546766	0.1277
D(TOP5(-1))	0.154559	0.129014	1.198002	0.2361
C	0.604352	0.391650	1.543091	0.1285
@TREND("1950")	0.000486	0.000271	1.793259	0.0784

R-squared	0.078421	Mean dependent var	0.004519
Adjusted R-squared	0.028154	S.D. dependent var	0.023600
S.E. of regression	0.023265	Akaike info criterion	-4.618319
Sum squared resid	0.029770	Schwarz criterion	-4.477469
Log likelihood	140.2404	Hannan-Quinn criter.	-4.563336
F-statistic	1.560069	Durbin-Watson stat	1.665128
Prob(F-statistic)	0.209458		

Source: EViews output based on data of Feenstra *et al.* (2015) and Alvaredo *et al.* (2016).

Table A.40: Japan Unit Root Test at First-Difference of top5

Null Hypothesis: D(TOP5) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.881985	0.0000
Test critical values:	1% level	-4.121303	
	5% level	-3.487845	
	10% level	-3.172314	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(TOP5,2)
Method: Least Squares
Date: 09/09/16 Time: 19:20
Sample (adjusted): 1952 2010
Included observations: 59 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(TOP5(-1))	-0.882881	0.128289	-6.881985	0.0000
C	-0.001360	0.006418	-0.211914	0.8329
@TREND("1950")	0.000176	0.000185	0.952906	0.3447

R-squared	0.459941	Mean dependent var	0.000880
Adjusted R-squared	0.440653	S.D. dependent var	0.031492
S.E. of regression	0.023553	Akaike info criterion	-4.609637
Sum squared resid	0.031065	Schwarz criterion	-4.503999
Log likelihood	138.9843	Hannan-Quinn criter.	-4.568400
F-statistic	23.84619	Durbin-Watson stat	1.652789
Prob(F-statistic)	0.000000		

Source: EViews output based on data of Feenstra *et al.* (2015) and Alvaredo *et al.* (2016).

Table A.41: Japan Unit Root Test at Level of top1

Null Hypothesis: TOP1 has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 1 (Automatic - based on SIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.685039	0.7456
Test critical values:	1% level	-4.121303	
	5% level	-3.487845	
	10% level	-3.172314	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(TOP1)
Method: Least Squares
Date: 09/09/16 Time: 19:20
Sample (adjusted): 1952 2010
Included observations: 59 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TOP1(-1)	-0.082188	0.048775	-1.685039	0.0976
D(TOP1(-1))	0.328625	0.128172	2.563939	0.0131
C	0.541721	0.321906	1.682855	0.0981
@TREND("1950")	0.000281	0.000268	1.048075	0.2992

R-squared	0.134531	Mean dependent var	0.004529
Adjusted R-squared	0.087324	S.D. dependent var	0.034101
S.E. of regression	0.032578	Akaike info criterion	-3.944948
Sum squared resid	0.058374	Schwarz criterion	-3.804098
Log likelihood	120.3760	Hannan-Quinn criter.	-3.889966
F-statistic	2.849796	Durbin-Watson stat	1.790501
Prob(F-statistic)	0.045652		

Source: EViews output based on data of Feenstra *et al.* (2015) and Alvaredo *et al.* (2016).

Table A.42: Japan Unit Root Test at First-Difference of top1

Null Hypothesis: D(TOP1) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.744953	0.0001
Test critical values:	1% level	-4.121303	
	5% level	-3.487845	
	10% level	-3.172314	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(TOP1,2)
Method: Least Squares
Date: 09/09/16 Time: 19:20
Sample (adjusted): 1952 2010
Included observations: 59 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(TOP1(-1))	-0.724948	0.126189	-5.744953	0.0000
C	-0.000498	0.008995	-0.055354	0.9561
@TREND("1950")	0.000129	0.000257	0.504098	0.6162

R-squared	0.372342	Mean dependent var	0.000840
Adjusted R-squared	0.349926	S.D. dependent var	0.041064
S.E. of regression	0.033109	Akaike info criterion	-3.928510
Sum squared resid	0.061388	Schwarz criterion	-3.822873
Log likelihood	118.8910	Hannan-Quinn criter.	-3.887273
F-statistic	16.61031	Durbin-Watson stat	1.741865
Prob(F-statistic)	0.000002		

Source: EViews output based on data of Feenstra *et al.* (2015) and Alvaredo *et al.* (2016).

Table A.43: UK Unit Root Test at Level of tfp

Null Hypothesis: TFP has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.895313	0.1709
Test critical values:	1% level	-4.107947	
	5% level	-3.481595	
	10% level	-3.168695	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(TFP)
Method: Least Squares
Date: 09/10/16 Time: 15:31
Sample (adjusted): 1951 2014
Included observations: 64 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TFP(-1)	-0.213966	0.073901	-2.895313	0.0052
C	0.859738	0.294450	2.919805	0.0049
@TREND("1949")	0.002294	0.000793	2.893888	0.0053

R-squared	0.121320	Mean dependent var	0.008061
Adjusted R-squared	0.092510	S.D. dependent var	0.017625
S.E. of regression	0.016790	Akaike info criterion	-5.290335
Sum squared resid	0.017196	Schwarz criterion	-5.189137
Log likelihood	172.2907	Hannan-Quinn criter.	-5.250468
F-statistic	4.211141	Durbin-Watson stat	1.449627
Prob(F-statistic)	0.019357		

Source: EViews output based on data of Feenstra *et al.* (2015) and Alvaredo *et al.* (2016).

Table A.44: UK Unit Root Test at First-Difference of tfp

Null Hypothesis: D(TFP) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-7.868459	0.0000
Test critical values:	1% level	-4.110440	
	5% level	-3.482763	
	10% level	-3.169372	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(TFP,2)
Method: Least Squares
Date: 09/10/16 Time: 15:32
Sample (adjusted): 1952 2014
Included observations: 63 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(TFP(-1))	-0.903211	0.114789	-7.868459	0.0000
C	0.010743	0.004366	2.460621	0.0168
@TREND("1949")	-7.33E-05	0.000111	-0.658698	0.5126

R-squared	0.510954	Mean dependent var	0.000937
Adjusted R-squared	0.494652	S.D. dependent var	0.022577
S.E. of regression	0.016050	Akaike info criterion	-5.379822
Sum squared resid	0.015455	Schwarz criterion	-5.277768
Log likelihood	172.4644	Hannan-Quinn criter.	-5.339683
F-statistic	31.34391	Durbin-Watson stat	2.008833
Prob(F-statistic)	0.000000		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table A.45: UK Unit Root Test at Level of top10

Null Hypothesis: TOP10 has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.110140	0.5301
Test critical values:	1% level	-4.110440	
	5% level	-3.482763	
	10% level	-3.169372	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(TOP10)
Method: Least Squares
Date: 09/10/16 Time: 15:32
Sample (adjusted): 1950 2012
Included observations: 63 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TOP10(-1)	-0.069424	0.032900	-2.110140	0.0390
C	0.545355	0.259996	2.097554	0.0402
@TREND("1949")	0.000647	0.000260	2.487910	0.0156

R-squared	0.093659	Mean dependent var	0.003069
Adjusted R-squared	0.063447	S.D. dependent var	0.021939
S.E. of regression	0.021232	Akaike info criterion	-4.820209
Sum squared resid	0.027047	Schwarz criterion	-4.718155
Log likelihood	154.8366	Hannan-Quinn criter.	-4.780071
F-statistic	3.100113	Durbin-Watson stat	1.700876
Prob(F-statistic)	0.052330		

Source: EViews output based on data of Feenstra *et al.* (2015) and Alvaredo *et al.* (2016).

Table A.46: UK Unit Root Test at First-Difference of top10

Null Hypothesis: D(TOP10) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.591299	0.0000
Test critical values:	1% level	-4.113017	
	5% level	-3.483970	
	10% level	-3.170071	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(TOP10,2)
Method: Least Squares
Date: 09/10/16 Time: 15:32
Sample (adjusted): 1951 2012
Included observations: 62 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(TOP10(-1))	-0.849488	0.128880	-6.591299	0.0000
C	-0.002293	0.005794	-0.395742	0.6937
@TREND("1949")	0.000156	0.000158	0.985914	0.3282

R-squared	0.424199	Mean dependent var	0.000112
Adjusted R-squared	0.404680	S.D. dependent var	0.028423
S.E. of regression	0.021931	Akaike info criterion	-4.754686
Sum squared resid	0.028376	Schwarz criterion	-4.651760
Log likelihood	150.3953	Hannan-Quinn criter.	-4.714274
F-statistic	21.73297	Durbin-Watson stat	2.031430
Prob(F-statistic)	0.000000		

Source: EViews output based on data of Feenstra *et al.* (2015) and Alvaredo *et al.* (2016).

Table A.47: UK Unit Root Test at Level of top5

Null Hypothesis: TOP5 has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.238282	0.4605
Test critical values:	1% level	-4.110440	
	5% level	-3.482763	
	10% level	-3.169372	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(TOP5)
Method: Least Squares
Date: 09/10/16 Time: 15:32
Sample (adjusted): 1950 2012
Included observations: 63 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TOP5(-1)	-0.059747	0.026693	-2.238282	0.0289
C	0.437880	0.200066	2.188673	0.0325
@TREND("1949")	0.000793	0.000259	3.060797	0.0033

R-squared	0.135183	Mean dependent var	0.002564
Adjusted R-squared	0.106356	S.D. dependent var	0.027929
S.E. of regression	0.026402	Akaike info criterion	-4.384286
Sum squared resid	0.041825	Schwarz criterion	-4.282232
Log likelihood	141.1050	Hannan-Quinn criter.	-4.344147
F-statistic	4.689414	Durbin-Watson stat	1.611807
Prob(F-statistic)	0.012815		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table A.48: UK Unit Root Test at First-Difference of top5

Null Hypothesis: D(TOP5) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.188445	0.0000
Test critical values:	1% level	-4.113017	
	5% level	-3.483970	
	10% level	-3.170071	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(TOP5,2)
Method: Least Squares
Date: 09/10/16 Time: 15:32
Sample (adjusted): 1951 2012
Included observations: 62 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(TOP5(-1))	-0.790893	0.127802	-6.188445	0.0000
C	-0.007369	0.007266	-1.014111	0.3147
@TREND("1949")	0.000295	0.000199	1.479073	0.1444

R-squared	0.393757	Mean dependent var	0.000114
Adjusted R-squared	0.373206	S.D. dependent var	0.034237
S.E. of regression	0.027106	Akaike info criterion	-4.330954
Sum squared resid	0.043349	Schwarz criterion	-4.228028
Log likelihood	137.2596	Hannan-Quinn criter.	-4.290543
F-statistic	19.16033	Durbin-Watson stat	2.061362
Prob(F-statistic)	0.000000		

Source: EViews output based on data of Feenstra *et al.* (2015) and Alvaredo *et al.* (2016).

Table A.49: UK Unit Root Test at Level of top1

Null Hypothesis: TOP1 has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.063475	0.5556
Test critical values:	1% level	-4.110440	
	5% level	-3.482763	
	10% level	-3.169372	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(TOP1)
Method: Least Squares
Date: 09/10/16 Time: 15:33
Sample (adjusted): 1950 2012
Included observations: 63 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TOP1(-1)	-0.051105	0.024767	-2.063475	0.0434
C	0.312061	0.163301	1.910959	0.0608
@TREND("1949")	0.001207	0.000380	3.179856	0.0023

R-squared	0.147075	Mean dependent var	0.001617
Adjusted R-squared	0.118644	S.D. dependent var	0.049886
S.E. of regression	0.046834	Akaike info criterion	-3.237981
Sum squared resid	0.131604	Schwarz criterion	-3.135927
Log likelihood	104.9964	Hannan-Quinn criter.	-3.197843
F-statistic	5.173078	Durbin-Watson stat	1.622089
Prob(F-statistic)	0.008459		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table A.50: UK Unit Root Test at First-Difference of top1

Null Hypothesis: D(TOP1) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.226345	0.0000
Test critical values:	1% level	-4.113017	
	5% level	-3.483970	
	10% level	-3.170071	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(TOP1,2)
Method: Least Squares
Date: 09/10/16 Time: 15:33
Sample (adjusted): 1951 2012
Included observations: 62 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(TOP1(-1))	-0.800530	0.128571	-6.226345	0.0000
C	-0.018881	0.013062	-1.445529	0.1536
@TREND("1949")	0.000630	0.000358	1.760407	0.0835

R-squared	0.396767	Mean dependent var	5.16E-05
Adjusted R-squared	0.376319	S.D. dependent var	0.060663
S.E. of regression	0.047908	Akaike info criterion	-3.191901
Sum squared resid	0.135414	Schwarz criterion	-3.088976
Log likelihood	101.9489	Hannan-Quinn criter.	-3.151490
F-statistic	19.40319	Durbin-Watson stat	2.041631
Prob(F-statistic)	0.000000		

Source: EViews output based on data of Feenstra *et al.* (2015) and Alvaredo *et al.* (2016).

Table A.51: U.S. Unit Root Test at Level of tfp

Null Hypothesis: TFP has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.758866	0.2177
Test critical values:	1% level	-4.107947	
	5% level	-3.481595	
	10% level	-3.168695	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(TFP)
Method: Least Squares
Date: 09/10/16 Time: 17:52
Sample (adjusted): 1951 2014
Included observations: 64 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TFP(-1)	-0.203092	0.073614	-2.758866	0.0076
C	0.837936	0.301453	2.779658	0.0072
@TREND("1950")	0.001688	0.000603	2.799209	0.0068

R-squared	0.113977	Mean dependent var	0.007601
Adjusted R-squared	0.084927	S.D. dependent var	0.012638
S.E. of regression	0.012090	Akaike info criterion	-5.947156
Sum squared resid	0.008916	Schwarz criterion	-5.845958
Log likelihood	193.3090	Hannan-Quinn criter.	-5.907289
F-statistic	3.923469	Durbin-Watson stat	1.854485
Prob(F-statistic)	0.024950		

Source: EViews output based on data of Feenstra *et al.* (2015) and Alvaredo *et al.* (2016).

Table A.52: U.S. Unit Root Test at First-Difference of tfp

Null Hypothesis: D(TFP) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-9.847550	0.0000
Test critical values:	1% level	-4.110440	
	5% level	-3.482763	
	10% level	-3.169372	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(TFP,2)
Method: Least Squares
Date: 09/10/16 Time: 17:52
Sample (adjusted): 1952 2014
Included observations: 63 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(TFP(-1))	-1.127053	0.114450	-9.847550	0.0000
C	0.009976	0.003075	3.243862	0.0019
@TREND("1950")	-2.13E-05	7.95E-05	-0.268193	0.7895

R-squared	0.619566	Mean dependent var	0.000705
Adjusted R-squared	0.606885	S.D. dependent var	0.018278
S.E. of regression	0.011460	Akaike info criterion	-6.053402
Sum squared resid	0.007880	Schwarz criterion	-5.951347
Log likelihood	193.6821	Hannan-Quinn criter.	-6.013263
F-statistic	48.85731	Durbin-Watson stat	2.005353
Prob(F-statistic)	0.000000		

Source: EViews output based on data of Feenstra *et al.* (2015) and Alvaredo *et al.* (2016).

Table A.53: U.S. Unit Root Test at Level of top10

Null Hypothesis: TOP10 has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.057560	0.1254
Test critical values:	1% level	-4.107947	
	5% level	-3.481595	
	10% level	-3.168695	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(TOP10)
Method: Least Squares
Date: 09/10/16 Time: 17:52
Sample (adjusted): 1951 2014
Included observations: 64 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TOP10(-1)	-0.097326	0.031831	-3.057560	0.0033
C	0.771156	0.253552	3.041417	0.0035
@TREND("1950")	0.000976	0.000246	3.966857	0.0002

R-squared	0.227481	Mean dependent var	0.005232
Adjusted R-squared	0.202152	S.D. dependent var	0.016037
S.E. of regression	0.014325	Akaike info criterion	-5.607936
Sum squared resid	0.012517	Schwarz criterion	-5.506738
Log likelihood	182.4539	Hannan-Quinn criter.	-5.568069
F-statistic	8.981224	Durbin-Watson stat	1.883289
Prob(F-statistic)	0.000381		

Source: EViews output based on data of Feenstra *et al.* (2015) and Alvaredo *et al.* (2016).

Table A.54: U.S. Unit Root Test at First-Difference of top10

Null Hypothesis: D(TOP10) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-7.440499	0.0000
Test critical values:	1% level	-4.110440	
	5% level	-3.482763	
	10% level	-3.169372	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(TOP10,2)
Method: Least Squares
Date: 09/10/16 Time: 17:55
Sample (adjusted): 1952 2014
Included observations: 63 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(TOP10(-1))	-0.930471	0.125055	-7.440499	0.0000
C	-0.001866	0.003959	-0.471235	0.6392
@TREND("1950")	0.000222	0.000110	2.017301	0.0481

R-squared	0.480681	Mean dependent var	0.000716
Adjusted R-squared	0.463370	S.D. dependent var	0.020510
S.E. of regression	0.015025	Akaike info criterion	-5.511794
Sum squared resid	0.013545	Schwarz criterion	-5.409740
Log likelihood	176.6215	Hannan-Quinn criter.	-5.471655
F-statistic	27.76798	Durbin-Watson stat	2.059973
Prob(F-statistic)	0.000000		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table A.55: U.S. Unit Root Test at Level of top5

Null Hypothesis: TOP5 has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.135594	0.1071
Test critical values:	1% level	-4.107947	
	5% level	-3.481595	
	10% level	-3.168695	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(TOP5)
Method: Least Squares
Date: 09/10/16 Time: 17:53
Sample (adjusted): 1951 2014
Included observations: 64 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TOP5(-1)	-0.099483	0.031727	-3.135594	0.0026
C	0.739191	0.238577	3.098330	0.0029
@TREND("1950")	0.001343	0.000324	4.140715	0.0001

R-squared	0.230809	Mean dependent var	0.005877
Adjusted R-squared	0.205589	S.D. dependent var	0.025503
S.E. of regression	0.022731	Akaike info criterion	-4.684437
Sum squared resid	0.031519	Schwarz criterion	-4.583239
Log likelihood	152.9020	Hannan-Quinn criter.	-4.644570
F-statistic	9.152037	Durbin-Watson stat	1.828323
Prob(F-statistic)	0.000334		

Source: EViews output based on data of Feenstra *et al.* (2015) and Alvaredo *et al.* (2016).

Table A.56: U.S. Unit Root Test at First-Difference of top5

Null Hypothesis: D(TOP5) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-7.200030	0.0000
Test critical values:	1% level	-4.110440	
	5% level	-3.482763	
	10% level	-3.169372	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(TOP5,2)
Method: Least Squares
Date: 09/10/16 Time: 17:53
Sample (adjusted): 1952 2014
Included observations: 63 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(TOP5(-1))	-0.898840	0.124838	-7.200030	0.0000
C	-0.004863	0.006338	-0.767238	0.4459
@TREND("1950")	0.000336	0.000175	1.921947	0.0594

R-squared	0.464316	Mean dependent var	0.001128
Adjusted R-squared	0.446460	S.D. dependent var	0.032100
S.E. of regression	0.023882	Akaike info criterion	-4.584898
Sum squared resid	0.034222	Schwarz criterion	-4.482844
Log likelihood	147.4243	Hannan-Quinn criter.	-4.544760
F-statistic	26.00317	Durbin-Watson stat	2.057929
Prob(F-statistic)	0.000000		

Source: EViews output based on data of Feenstra *et al.* (2015) and Alvaredo *et al.* (2016).

Table A.57: U.S. Unit Root Test at Level of top1

Null Hypothesis: TOP1 has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.994397	0.1419
Test critical values:	1% level	-4.107947	
	5% level	-3.481595	
	10% level	-3.168695	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(TOP1)
Method: Least Squares
Date: 09/10/16 Time: 17:53
Sample (adjusted): 1951 2014
Included observations: 64 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TOP1(-1)	-0.100685	0.033625	-2.994397	0.0040
C	0.640638	0.220494	2.905461	0.0051
@TREND("1950")	0.002164	0.000556	3.890809	0.0002

R-squared	0.200179	Mean dependent var	0.007174
Adjusted R-squared	0.173955	S.D. dependent var	0.051488
S.E. of regression	0.046796	Akaike info criterion	-3.240290
Sum squared resid	0.133583	Schwarz criterion	-3.139092
Log likelihood	106.6893	Hannan-Quinn criter.	-3.200423
F-statistic	7.633538	Durbin-Watson stat	1.871660
Prob(F-statistic)	0.001100		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table A.58: U.S. Unit Root Test at First-Difference of top1

Null Hypothesis: D(TOP1) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-7.201613	0.0000
Test critical values:	1% level	-4.110440	
	5% level	-3.482763	
	10% level	-3.169372	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(TOP1,2)
Method: Least Squares
Date: 09/10/16 Time: 17:53
Sample (adjusted): 1952 2014
Included observations: 63 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(TOP1(-1))	-0.915024	0.127058	-7.201613	0.0000
C	-0.013077	0.013217	-0.989373	0.3265
@TREND("1950")	0.000637	0.000359	1.772523	0.0814

R-squared	0.463975	Mean dependent var	0.001712
Adjusted R-squared	0.446107	S.D. dependent var	0.066826
S.E. of regression	0.049734	Akaike info criterion	-3.117797
Sum squared resid	0.148410	Schwarz criterion	-3.015743
Log likelihood	101.2106	Hannan-Quinn criter.	-3.077659
F-statistic	25.96751	Durbin-Watson stat	2.032697
Prob(F-statistic)	0.000000		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

B. Further Results of Engle-Granger Two-Step Analysis

B.1. Calculated Critical Values for ADF Test

Table B.1: Critical Values for No Trend Case

Country	Canada	France	Germany	UK	US
Observations	60	62	61	62	64
Variables	2	2	2	2	2
1% level	–4.474	–4.454	–4.464	–4.454	–4.436
5% level	–3.559	–3.552	–3.555	–3.552	–3.545
10% level	–3.164	–3.160	–3.162	–3.160	–3.157

Source: Own depiction based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).
Notes: Calculated according MacKinnon (2010) using Equation (4.3).

Table B.2: Critical Values for Linear Trend Case

Country	Canada	France	Germany	UK	US
Observations	60	62	61	62	64
Variables	2	2	2	2	2
1% level	–5.209	–5.180	–5.194	–5.180	–5.152
5% level	–4.153	–4.140	–4.146	–4.140	–4.129
10% level	–3.748	–3.740	–3.744	–3.740	–3.732

Source: Own depiction based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).
Notes: Calculated according MacKinnon (2010) using Equation (4.3).

B.2. Test Results of ECM

Table B.3: ECM Test Results

	Model I: *tfp* and *top10*				
	Canada	France	Germany	UK	US
R-squared	0.26	0.47	0.63	0.18	0.27
DW	2.06	1.77	2.17	2.09	1.69
Breusch-Godfrey Serial Correlation LM Test					
F-statistic	1.75	0.37	0.33	0.77	1.88
Obs*R-squared	4.07	0.85	0.77	1.77	4.23
Normality					
Jarque-Bera	0.34	5.57	36.25***	20.16***	18.28***
White Heteroskedasticity Test					
F-statistic	0.95	2.81^{++}	3.84^{+++}	0.29	0.18
Obs*R-squared	7.80	10.08^{++}	17.77^{+++}	1.91	1.47
Scaled explain SS	5.00	12.05^{++}	40.45^{+++}	3.59	2.36
Ramsey RESET Test					
t-statistic	1.55	0.38	1.29	0.91	0.99
F-statistic	2.41	0.14	1.66	0.83	0.99
Likelihood ratio	2.88°	0.16	1.91	0.97	1.16
	Model II: *tfp* and *top5*				
	Canada	France	Germany	UK	US
R-squared	0.14	0.40	0.63	0.17	
DW	2.03	1.56	2.13	2.00	
Breusch-Godfrey Serial Correlation LM Test					
F-statistic	1.20	1.97	0.97	0.03	
Obs*R-squared	2.56	4.18	2.09	0.06	
Normality					
Jarque-Bera	0.77	8.21**	5.91*	44.73***	
White Heteroskedasticity Test					
F-statistic	1.12	1.50	4.94^{+++}	0.27	
Obs*R-squared	3.40	5.91	12.49^{+++}	1.15	
Scaled explain SS	2.82	6.52	19.28^{+++}	2.89	

(continued)	Canada	France	Germany	UK	US
Ramsey RESET Test					
t-statistic	1.32	0.12	1.48	1.64	
F-statistic	1.74	0.01	2.19	2.70	
Likelihood ratio	1.88	0.02	2.35	2.94°	

Model II: *tfp* and *top1*

	Canada	France	Germany	UK	US
R-squared	0.20	0.26		0.25	
DW	2.10	1.94		1.88	
Breusch-Godfrey Serial Correlation LM Test					
F-statistic	0.58	0.13		0.85	
Obs*R-squared	1.35	0.30		1.97	
Normality					
Jarque-Bera	0.16	5.87*		113.88***	
White Heteroskedasticity Test					
F-statistic	1.31	0.46		0.10	
Obs*R-squared	7.71	1.93		0.71	
Scaled explain SS	6.64	2.30		2.23	
Ramsey RESET Test					
t-statistic	0.15	1.82°		0.14	
F-statistic	0.02	3.32°		0.02	
Likelihood ratio	0.03	3.59°		0.02	

Source: Own depiction based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).
Notes: *, ** and *** denote null hypothesis of normal distribution are rejected at the 10%, 5% and 1% significance levels, respectively. $^{+}$, $^{++}$ and $^{+++}$ denote null hypothesis of homoskedasticity are rejected at the 10%, 5% and 1% significance levels, respectively. °, °° and °°° denote null hypothesis of dynamic stability are rejected at the 10%, 5% and 1% significance levels, respectively.

B.3. Canada

Table B.4: Canada Model I, FMOLS Regression

Dependent Variable: TOP10
Method: Fully Modified Least Squares (FMOLS)
Date: 09/10/16 Time: 15:52
Sample (adjusted): 1951 2010
Included observations: 60 after adjustments
Cointegrating equation deterministics: C @TREND @TREND^2
Long-run covariance estimate (Bartlett kernel, Newey-West automatic
bandwidth = 6.4429, NW automatic lag length = 3)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TFP	0.345266	0.149200	2.314109	0.0244
C	6.797048	0.641703	10.59220	0.0000
@TREND	-0.010729	0.002243	-4.783785	0.0000
@TREND^2	0.000162	2.67E-05	6.074136	0.0000

R-squared	0.637685	Mean dependent var	8.233181
Adjusted R-squared	0.618276	S.D. dependent var	0.041810
S.E. of regression	0.025832	Sum squared resid	0.037369
Long-run variance	0.001184		

Source: EViews output based on data of Feenstra *et al.* (2015) and Alvaredo *et al.* (2016).

Table B.5: Canada Model I, FMOLS Hansen Instability Test

Cointegration Test - Hansen Parameter Instability
Date: 09/10/16 Time: 16:49
Equation: TOP10_FMOLS
Series: TOP10 TFP
Null hypothesis: Series are cointegrated
Cointegrating equation deterministics: C @TREND @TREND^2

Lc statistic	Stochastic Trends (m)	Deterministic Trends (k)	Excluded Trends (p2)	Prob.*
1.180591	1	2	0	< 0.01

*Hansen (1992b) Lc(m2=1, k=2) p-values, where m2=m-p2 is the number
of stochastic trends in the asymptotic distribution

Source: EViews output based on data of Feenstra *et al.* (2015) and Alvaredo *et al.* (2016).

Table B.6: Canada Model I, FMOLS ADF Unit Root Test of Residuals

Null Hypothesis: RESID10 has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.598415	0.0087
Test critical values:	1% level	-3.546099	
	5% level	-2.911730	
	10% level	-2.593551	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(RESID10)
Method: Least Squares
Date: 09/09/16 Time: 16:50
Sample (adjusted): 1952 2010
Included observations: 59 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID10(-1)	-0.305426	0.084878	-3.598415	0.0007
C	0.000487	0.002115	0.230529	0.8185

R-squared	0.185116	Mean dependent var	0.000697
Adjusted R-squared	0.170820	S.D. dependent var	0.017831
S.E. of regression	0.016237	Akaike info criterion	-5.369775
Sum squared resid	0.015027	Schwarz criterion	-5.299350
Log likelihood	160.4084	Hannan-Quinn criter.	-5.342284
F-statistic	12.94859	Durbin-Watson stat	1.840810
Prob(F-statistic)	0.000671		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table B.7: Canada Model I, FMOLS Engle-Granger Cointegration Test

Cointegration Test - Engle-Granger
Date: 09/09/16 Time: 16:49
Equation: TOP10_FMOLS
Specification: TOP10 TFP C @TREND @TREND^2
Cointegrating equation deterministics: C @TREND @TREND^2
Null hypothesis: Series are not cointegrated
Automatic lag specification (lag=0 based on Schwarz Info Criterion, maxlag=10)

	Value	Prob.*
Engle-Granger tau-statistic	-2.879747	0.5631
Engle-Granger z-statistic	-14.57082	0.5681

*MacKinnon (1996) p-values.

Intermediate Results:	
Rho - 1	-0.242847
Rho S.E.	0.084329
Residual variance	0.000262
Long-run residual variance	0.000262
Number of lags	0
Number of observations	60
Number of stochastic trends**	2

**Number of stochastic trends in asymptotic distribution.

Engle-Granger Test Equation:
Dependent Variable: D(RESID)
Method: Least Squares
Date: 09/09/16 Time: 16:49
Sample (adjusted): 1951 2010
Included observations: 60 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID(-1)	-0.242847	0.084329	-2.879747	0.0055

R-squared	0.123214	Mean dependent var	8.60E-05
Adjusted R-squared	0.123214	S.D. dependent var	0.017278
S.E. of regression	0.016178	Akaike info criterion	-5.393759
Sum squared resid	0.015443	Schwarz criterion	-5.358853
Log likelihood	162.8128	Hannan-Quinn criter.	-5.380105
Durbin-Watson stat	1.762731		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table B.8: Canada Model I, Unrestricted Error Correction Estimation

Dependent Variable: DTOP10
Method: Least Squares
Date: 09/08/16 Time: 16:08
Sample (adjusted): 1957 2010
Included observations: 54 after adjustments
HAC standard errors & covariance (Bartlett kernel, Newey-West automatic
bandwidth = 1.2340, NW automatic lag length = 3)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID10(-1)	-0.551201	0.146822	-3.754203	0.0006
DTOP10(-1)	0.313686	0.172691	1.816455	0.0768
DTOP10(-2)	0.280721	0.203189	1.381571	0.1748
DTOP10(-3)	0.348037	0.165097	2.108076	0.0413
DTOP10(-4)	0.379128	0.111449	3.401812	0.0015
DTOP10(-5)	0.140637	0.109235	1.287471	0.2053
DTOP10(-6)	0.242431	0.110733	2.189336	0.0345
DTFP(-1)	0.057464	0.129244	0.444616	0.6590
DTFP(-2)	0.029103	0.124284	0.234169	0.8160
DTFP(-3)	0.020950	0.155508	0.134719	0.8935
DTFP(-4)	0.253829	0.102419	2.478350	0.0175
DTFP(-5)	0.218792	0.128732	1.699599	0.0970
DTFP(-6)	0.227314	0.116040	1.958931	0.0571
C	-0.004373	0.002712	-1.612344	0.1148

R-squared	0.330434	Mean dependent var	0.001389
Adjusted R-squared	0.112825	S.D. dependent var	0.013648
S.E. of regression	0.012855	Akaike info criterion	-5.651720
Sum squared resid	0.006610	Schwarz criterion	-5.136058
Log likelihood	166.5964	Hannan-Quinn criter.	-5.452849
F-statistic	1.518474	Durbin-Watson stat	1.979649
Prob(F-statistic)	0.153137	Wald F-statistic	4.077548
Prob(Wald F-statistic)	0.000295		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table B.9: Canada Model I, Restricted Error Correction Model (ECM)

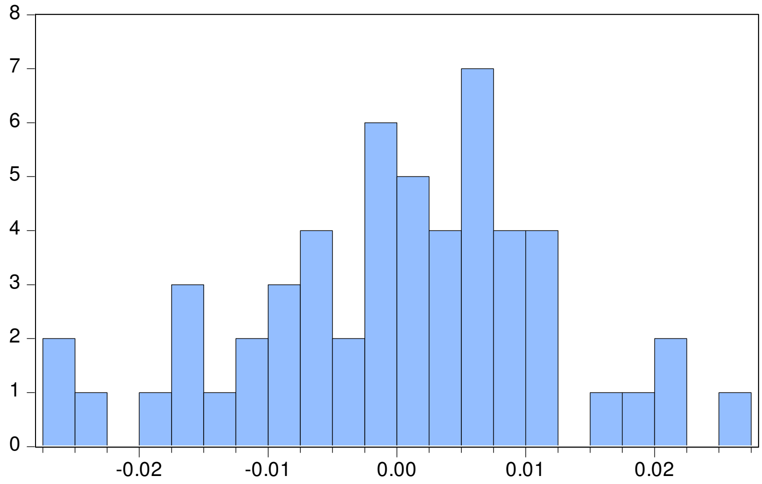
Dependent Variable: DTOP10
Method: Least Squares
Date: 09/09/16 Time: 15:46
Sample (adjusted): 1957 2010
Included observations: 54 after adjustments
HAC standard errors & covariance (Bartlett kernel, Newey-West automatic bandwidth = 3.5738, NW automatic lag length = 3)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID10(-1)	-0.380631	0.097148	-3.918053	0.0003
DTOP10(-1)	0.201623	0.157086	1.283518	0.2059
DTOP10(-3)	0.268650	0.108379	2.478790	0.0170
DTOP10(-4)	0.308386	0.086061	3.583330	0.0008
DTOP10(-6)	0.220824	0.089164	2.476593	0.0171
DTFP(-4)	0.219393	0.114265	1.920028	0.0612
DTFP(-5)	0.131726	0.116442	1.131257	0.2639
DTFP(-6)	0.161218	0.123702	1.303279	0.1991
C	-0.002195	0.002686	-0.817192	0.4181

R-squared	0.262897	Mean dependent var	0.001389
Adjusted R-squared	0.131857	S.D. dependent var	0.013648
S.E. of regression	0.012717	Akaike info criterion	-5.740808
Sum squared resid	0.007277	Schwarz criterion	-5.409311
Log likelihood	164.0018	Hannan-Quinn criter.	-5.612963
F-statistic	2.006229	Durbin-Watson stat	2.057575
Prob(F-statistic)	0.067358	Wald F-statistic	4.906735
Prob(Wald F-statistic)	0.000214		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Figure B.1: Canada Model I, ECM Jarque-Bera Normal Distribution Test



Series: Residuals	
Sample 1957 2010	
Observations 54	
Mean	-3.85e-19
Median	0.000465
Maximum	0.025939
Minimum	-0.026009
Std. Dev.	0.011718
Skewness	-0.179083
Kurtosis	2.845900
Jarque-Bera	0.342065
Probability	0.842794

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table B.10: Canada Model I, ECM Breusch-Godfrey Serial Correlation LM Test

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	1.752251	Prob. F(2,43)	0.1855
Obs*R-squared	4.069351	Prob. Chi-Square(2)	0.1307

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Date: 09/09/16 Time: 16:57
Sample: 1957 2010
Included observations: 54
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID10(-1)	-0.109332	0.142360	-0.767996	0.4467
DTOP10(-1)	0.199806	0.293319	0.681192	0.4994
DTOP10(-3)	0.085807	0.150075	0.571759	0.5705
DTOP10(-4)	-0.008561	0.140406	-0.060975	0.9517
DTOP10(-6)	0.023458	0.113398	0.206868	0.8371
DTFP(-4)	0.051969	0.140705	0.369349	0.7137
DTFP(-5)	0.010870	0.101175	0.107437	0.9149
DTFP(-6)	0.037222	0.129626	0.287150	0.7754
C	-0.000754	0.002284	-0.330325	0.7428
RESID(-1)	-0.136061	0.375407	-0.362437	0.7188
RESID(-2)	0.324849	0.182291	1.782039	0.0818

R-squared	0.075358	Mean dependent var	-3.85E-19
Adjusted R-squared	-0.139675	S.D. dependent var	0.011718
S.E. of regression	0.012509	Akaike info criterion	-5.745083
Sum squared resid	0.006729	Schwarz criterion	-5.339920
Log likelihood	166.1172	Hannan-Quinn criter.	-5.588827
F-statistic	0.350450	Durbin-Watson stat	1.969403
Prob(F-statistic)	0.960870		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table B.11: Canada Model I, ECM Heteroskedasticity Test

Heteroskedasticity Test: White

F-statistic	0.950239	Prob. F(8,45)	0.4860
Obs*R-squared	7.803960	Prob. Chi-Square(8)	0.4529
Scaled explained SS	5.001851	Prob. Chi-Square(8)	0.7574

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 09/09/16 Time: 16:57
Sample: 1957 2010
Included observations: 54
HAC standard errors & covariance (Bartlett kernel, Newey-West automatic bandwidth = 4.3607, NW automatic lag length = 3)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.000121	3.84E-05	3.158330	0.0028
RESID10(-1)^2	0.071487	0.050807	1.407047	0.1663
DTOP10(-1)^2	0.061517	0.121271	0.507269	0.6144
DTOP10(-3)^2	0.013465	0.105866	0.127185	0.8994
DTOP10(-4)^2	-0.023722	0.068491	-0.346350	0.7307
DTOP10(-6)^2	-0.098331	0.053218	-1.847690	0.0712
DTFP(-4)^2	-0.049871	0.046758	-1.066576	0.2919
DTFP(-5)^2	0.007311	0.071141	0.102762	0.9186
DTFP(-6)^2	0.026465	0.046501	0.569141	0.5721

R-squared	0.144518	Mean dependent var	0.000135
Adjusted R-squared	-0.007568	S.D. dependent var	0.000185
S.E. of regression	0.000186	Akaike info criterion	-14.19595
Sum squared resid	1.55E-06	Schwarz criterion	-13.86445
Log likelihood	392.2906	Hannan-Quinn criter.	-14.06810
F-statistic	0.950239	Durbin-Watson stat	1.994533
Prob(F-statistic)	0.486034		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table B.12: Canada Model I, ECM RESET Test

Ramsey RESET Test
Equation: TOP10_ECM
Specification: DTOP10 RESID10(-1) DTOP10(-1) DTOP10(-3) DTOP10(-4) DTOP10(-6) DTFP(-4 TO -6) C
Omitted Variables: Squares of fitted values

	Value	df	Probability
t-statistic	1.553818	44	0.1274
F-statistic	2.414351	(1, 44)	0.1274
Likelihood ratio	2.884629	1	0.0894

F-test summary:

	Sum of Sq.	df	Mean Squares
Test SSR	0.000379	1	0.000379
Restricted SSR	0.007277	45	0.000162
Unrestricted SSR	0.006898	44	0.000157

LR test summary:

	Value	df
Restricted LogL	164.0018	45
Unrestricted LogL	165.4441	44

Unrestricted Test Equation:
Dependent Variable: DTOP10
Method: Least Squares
Date: 09/09/16 Time: 16:57
Sample: 1957 2010
Included observations: 54
HAC standard errors & covariance (Bartlett kernel, Newey-West automatic bandwidth = 4.2554, NW automatic lag length = 3)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID10(-1)	-0.374403	0.082606	-4.532399	0.0000
DTOP10(-1)	0.153380	0.161547	0.949444	0.3476
DTOP10(-3)	0.231664	0.099825	2.320698	0.0250
DTOP10(-4)	0.348398	0.093695	3.718436	0.0006
DTOP10(-6)	0.235197	0.076852	3.060391	0.0038
DTFP(-4)	0.212028	0.110695	1.915427	0.0620
DTFP(-5)	0.131901	0.111726	1.180567	0.2441
DTFP(-6)	0.144990	0.121971	1.188721	0.2409
C	0.000165	0.003641	0.045296	0.9641
FITTED^2	-44.71215	29.05830	-1.538705	0.1310

R-squared	0.301239	Mean dependent var	0.001389
Adjusted R-squared	0.158311	S.D. dependent var	0.013648
S.E. of regression	0.012521	Akaike info criterion	-5.757190
Sum squared resid	0.006898	Schwarz criterion	-5.388860
Log likelihood	165.4441	Hannan-Quinn criter.	-5.615140
F-statistic	2.107625	Durbin-Watson stat	1.952643
Prob(F-statistic)	0.049274	Wald F-statistic	5.078553
Prob(Wald F-statistic)	0.000103		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table B.13: Canada Model II, FMOLS Regression

Dependent Variable: TOP5
Method: Fully Modified Least Squares (FMOLS)
Date: 09/08/16 Time: 16:09
Sample (adjusted): 1951 2010
Included observations: 60 after adjustments
Cointegrating equation deterministics: C @TREND @TREND^2
Long-run covariance estimate (Bartlett kernel, Newey-West automatic bandwidth = 6.5686, NW automatic lag length = 3)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TFP	0.388615	0.195161	1.991252	0.0513
C	6.212886	0.839377	7.401781	0.0000
@TREND	-0.016016	0.002934	-5.459443	0.0000
@TREND^2	0.000260	3.49E-05	7.452136	0.0000

R-squared	0.766937	Mean dependent var	7.804187
Adjusted R-squared	0.754451	S.D. dependent var	0.070731
S.E. of regression	0.035049	Sum squared resid	0.068793
Long-run variance	0.002026		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table B.14: Canada Model II, FMOLS Hansen Instability Test

Cointegration Test - Hansen Parameter Instability
Date: 09/09/16 Time: 16:51
Equation: TOP5_FMOLS
Series: TOP5 TFP
Null hypothesis: Series are cointegrated
Cointegrating equation deterministics: C @TREND @TREND^2

Lc statistic	Stochastic Trends (m)	Deterministic Trends (k)	Excluded Trends (p2)	Prob.*
1.396834	1	2	0	< 0.01

*Hansen (1992b) Lc(m2=1, k=2) p-values, where m2=m-p2 is the number of stochastic trends in the asymptotic distribution

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table B.15: Canada Model II, FMOLS ADF Unit Root Test of Residuals

Null Hypothesis: RESID5 has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.916334	0.0495
Test critical values:	1% level	-3.546099	
	5% level	-2.911730	
	10% level	-2.593551	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(RESID5)
Method: Least Squares
Date: 09/09/16 Time: 16:52
Sample (adjusted): 1952 2010
Included observations: 59 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID5(-1)	-0.236870	0.081222	-2.916334	0.0051
C	0.000167	0.002697	0.061854	0.9509

R-squared	0.129837	Mean dependent var	0.000325
Adjusted R-squared	0.114571	S.D. dependent var	0.022007
S.E. of regression	0.020708	Akaike info criterion	-4.883272
Sum squared resid	0.024443	Schwarz criterion	-4.812847
Log likelihood	146.0565	Hannan-Quinn criter.	-4.855781
F-statistic	8.505005	Durbin-Watson stat	1.739530
Prob(F-statistic)	0.005057		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table B.16: Canada Model II, FMOLS Engle-Granger Cointegration Test

Cointegration Test - Engle-Granger
Date: 09/09/16 Time: 16:51
Equation: TOP5_FMOLS
Specification: TOP5 TFP C @TREND @TREND^2
Cointegrating equation deterministics: C @TREND @TREND^2
Null hypothesis: Series are not cointegrated
Automatic lag specification (lag=0 based on Schwarz Info Criterion, maxlag=10)

	Value	Prob.*
Engle-Granger tau-statistic	-2.419578	0.7875
Engle-Granger z-statistic	-11.66945	0.7477

*MacKinnon (1996) p-values.

Intermediate Results:	
Rho - 1	-0.194491
Rho S.E.	0.080382
Residual variance	0.000421
Long-run residual variance	0.000421
Number of lags	0
Number of observations	60
Number of stochastic trends**	2

**Number of stochastic trends in asymptotic distribution.

Engle-Granger Test Equation:
Dependent Variable: D(RESID)
Method: Least Squares
Date: 09/09/16 Time: 16:51
Sample (adjusted): 1951 2010
Included observations: 60 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID(-1)	-0.194491	0.080382	-2.419578	0.0186

R-squared	0.089999	Mean dependent var	-0.000367
Adjusted R-squared	0.089999	S.D. dependent var	0.021503
S.E. of regression	0.020512	Akaike info criterion	-4.919043
Sum squared resid	0.024825	Schwarz criterion	-4.884137
Log likelihood	148.5713	Hannan-Quinn criter.	-4.905389
Durbin-Watson stat	1.700043		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table B.17: Canada Model II, Unrestricted Error Correction Estimation

Dependent Variable: DTOP5
Method: Least Squares
Date: 09/09/16 Time: 15:55
Sample (adjusted): 1956 2010
Included observations: 55 after adjustments
HAC standard errors & covariance (Bartlett kernel, Newey-West automatic bandwidth = 1.4123, NW automatic lag length = 3)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID5(-1)	-0.397572	0.139676	-2.846389	0.0068
DTOP5(-1)	0.377820	0.194424	1.943274	0.0585
DTOP5(-2)	0.234251	0.210610	1.112252	0.2722
DTOP5(-3)	0.173127	0.148141	1.168670	0.2490
DTOP5(-4)	0.175551	0.108587	1.616686	0.1133
DTOP5(-5)	0.161164	0.112853	1.428087	0.1605
DTFP(-1)	0.090008	0.175255	0.513583	0.6102
DTFP(-2)	0.099345	0.172947	0.574426	0.5687
DTFP(-3)	0.158202	0.177649	0.890528	0.3781
DTFP(-4)	0.142111	0.143452	0.990655	0.3274
DTFP(-5)	0.366288	0.169070	2.166495	0.0359
C	-0.004293	0.003885	-1.104786	0.2754

R-squared	0.237283	Mean dependent var	0.001700
Adjusted R-squared	0.042170	S.D. dependent var	0.018679
S.E. of regression	0.018281	Akaike info criterion	-4.975716
Sum squared resid	0.014370	Schwarz criterion	-4.537753
Log likelihood	148.8322	Hannan-Quinn criter.	-4.806352
F-statistic	1.216130	Durbin-Watson stat	2.150354
Prob(F-statistic)	0.305864	Wald F-statistic	1.651859
Prob(Wald F-statistic)	0.118366		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table B.18: Canada Model II, Error Correction Model (ECM)

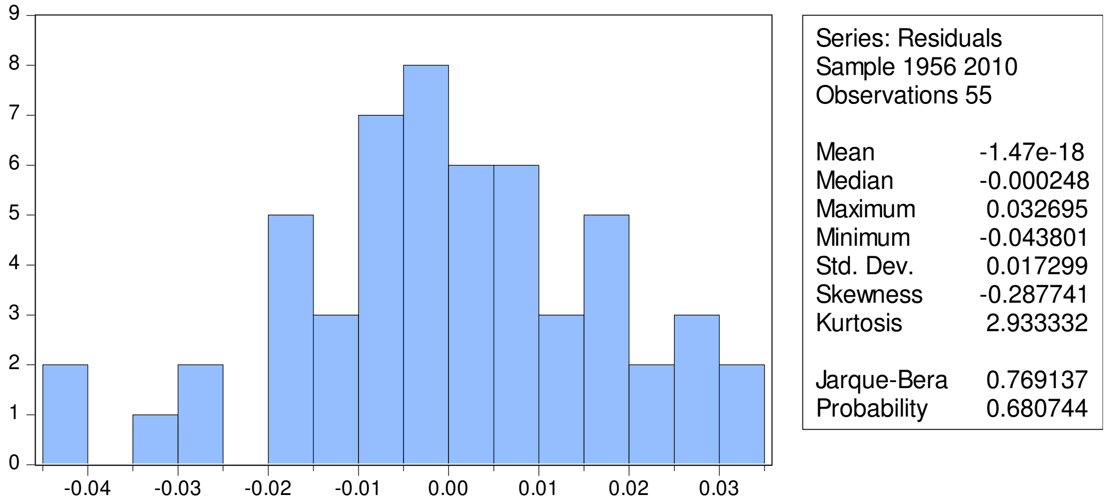
Dependent Variable: DTOP5
Method: Least Squares
Date: 09/08/16 Time: 16:12
Sample (adjusted): 1956 2010
Included observations: 55 after adjustments
HAC standard errors & covariance (Bartlett kernel, Newey-West automatic bandwidth = 5.1033, NW automatic lag length = 3)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID5(-1)	-0.202619	0.083457	-2.427811	0.0188
DTOP5(-1)	0.249864	0.191677	1.303570	0.1982
DTFP(-5)	0.246245	0.109360	2.251683	0.0287
C	0.000626	0.002830	0.221265	0.8258

R-squared	0.142240	Mean dependent var	0.001700
Adjusted R-squared	0.091784	S.D. dependent var	0.018679
S.E. of regression	0.017801	Akaike info criterion	-5.149188
Sum squared resid	0.016160	Schwarz criterion	-5.003200
Log likelihood	145.6027	Hannan-Quinn criter.	-5.092733
F-statistic	2.819072	Durbin-Watson stat	2.026070
Prob(F-statistic)	0.048122	Wald F-statistic	2.552020
Prob(Wald F-statistic)	0.065740		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Figure B.2: Canada Model II, ECM Jarque-Bera Normal Distribution Test



Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table B.19: Canada Model II, ECM Breusch-Godfrey Serial Correlation LM Test

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	1.196439	Prob. F(2,49)	0.3109
Obs*R-squared	2.560827	Prob. Chi-Square(2)	0.2779

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Date: 09/09/16 Time: 16:59
Sample: 1956 2010
Included observations: 55
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID5(-1)	-0.089254	0.120303	-0.741908	0.4617
DTOP5(-1)	-0.047622	0.349910	-0.136098	0.8923
DTFP(-5)	0.011584	0.125422	0.092361	0.9268
C	0.000142	0.002556	0.055666	0.9558
RESID(-1)	0.116760	0.424688	0.274931	0.7845
RESID(-2)	0.263172	0.175963	1.495611	0.1412

R-squared	0.046560	Mean dependent var	-1.47E-18
Adjusted R-squared	-0.050729	S.D. dependent var	0.017299
S.E. of regression	0.017733	Akaike info criterion	-5.124140
Sum squared resid	0.015408	Schwarz criterion	-4.905158
Log likelihood	146.9138	Hannan-Quinn criter.	-5.039458
F-statistic	0.478576	Durbin-Watson stat	2.062769
Prob(F-statistic)	0.790477		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table B.20: Canada Model II, ECM Heteroskedasticity Test

Heteroskedasticity Test: White

F-statistic	1.119626	Prob. F(3,51)	0.3498
Obs*R-squared	3.398494	Prob. Chi-Square(3)	0.3342
Scaled explained SS	2.824736	Prob. Chi-Square(3)	0.4194

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 09/09/16 Time: 16:59
Sample: 1956 2010
Included observations: 55
HAC standard errors & covariance (Bartlett kernel, Newey-West automatic bandwidth = 3.0146, NW automatic lag length = 3)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.000228	6.70E-05	3.406171	0.0013
RESID5(-1)^2	0.034302	0.053628	0.639617	0.5253
DTOP5(-1)^2	0.180660	0.150852	1.197596	0.2366
DTFP(-5)^2	-0.068707	0.042188	-1.628598	0.1096

R-squared	0.061791	Mean dependent var	0.000294
Adjusted R-squared	0.006602	S.D. dependent var	0.000412
S.E. of regression	0.000411	Akaike info criterion	-12.68624
Sum squared resid	8.61E-06	Schwarz criterion	-12.54026
Log likelihood	352.8717	Hannan-Quinn criter.	-12.62979
F-statistic	1.119626	Durbin-Watson stat	2.004204
Prob(F-statistic)	0.349825		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table B.21: Canada Model II, ECM RESET Test

Ramsey RESET Test
Equation: TOP5_ECM
Specification: DTOP5 RESID5(-1) DTOP5(-1) DTFP(-5) C
Omitted Variables: Squares of fitted values

	Value	df	Probability
t-statistic	1.318180	50	0.1935
F-statistic	1.737600	(1, 50)	0.1935
Likelihood ratio	1.878898	1	0.1705

F-test summary:

	Sum of Sq.	df	Mean Squares
Test SSR	0.000543	1	0.000543
Restricted SSR	0.016160	51	0.000317
Unrestricted SSR	0.015618	50	0.000312

LR test summary:

	Value	df
Restricted LogL	145.6027	51
Unrestricted LogL	146.5421	50

Unrestricted Test Equation:
Dependent Variable: DTOP5
Method: Least Squares
Date: 09/09/16 Time: 16:59
Sample: 1956 2010
Included observations: 55
HAC standard errors & covariance (Bartlett kernel, Newey-West automatic bandwidth = 4.8470, NW automatic lag length = 3)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID5(-1)	-0.232733	0.065424	-3.557318	0.0008
DTOP5(-1)	0.273424	0.175858	1.554805	0.1263
DTFP(-5)	0.248470	0.095376	2.605160	0.0121
C	0.002891	0.004036	0.716385	0.4771
FITTED^2	-42.98329	46.69320	-0.920547	0.3617

R-squared	0.171048	Mean dependent var	0.001700
Adjusted R-squared	0.104732	S.D. dependent var	0.018679
S.E. of regression	0.017674	Akaike info criterion	-5.146986
Sum squared resid	0.015618	Schwarz criterion	-4.964501
Log likelihood	146.5421	Hannan-Quinn criter.	-5.076418
F-statistic	2.579283	Durbin-Watson stat	1.988735
Prob(F-statistic)	0.048479	Wald F-statistic	6.787877
Prob(Wald F-statistic)	0.000191		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table B.22: Canada Model III, FMOLS Regression

Dependent Variable: TOP1
Method: Fully Modified Least Squares (FMOLS)
Date: 09/10/16 Time: 15:52
Sample (adjusted): 1951 2010
Included observations: 60 after adjustments
Cointegrating equation deterministics: C @TREND @TREND^2
Long-run covariance estimate (Bartlett kernel, Newey-West automatic bandwidth = 6.3439, NW automatic lag length = 3)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TFP	0.111685	0.368216	0.303315	0.7628
C	6.557455	1.583678	4.140650	0.0001
@TREND	-0.024893	0.005535	-4.497436	0.0000
@TREND^2	0.000475	6.58E-05	7.218427	0.0000

R-squared	0.835136	Mean dependent var	6.885732
Adjusted R-squared	0.826304	S.D. dependent var	0.159299
S.E. of regression	0.066391	Sum squared resid	0.246832
Long-run variance	0.007213		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table B.23: Canada Model III, FMOLS Hansen Instability Test

Cointegration Test - Hansen Parameter Instability
Date: 09/09/16 Time: 16:52
Equation: TOP1_FMOLS
Series: TOP1 TFP
Null hypothesis: Series are cointegrated
Cointegrating equation deterministics: C @TREND @TREND^2

Lc statistic	Stochastic Trends (m)	Deterministic Trends (k)	Excluded Trends (p2)	Prob.*
1.285531	1	2	0	< 0.01

*Hansen (1992b) Lc(m2=1, k=2) p-values, where m2=m-p2 is the number of stochastic trends in the asymptotic distribution

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table B.24: Canada Model III, FMOLS ADF Unit Root Test of Residuals

Null Hypothesis: RESID1 has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic - based on SIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.692907	0.0814
Test critical values:	1% level	-3.548208	
	5% level	-2.912631	
	10% level	-2.594027	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(RESID1)
Method: Least Squares
Date: 09/09/16 Time: 16:53
Sample (adjusted): 1953 2010
Included observations: 58 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID1(-1)	-0.227311	0.084411	-2.692907	0.0094
D(RESID1(-1))	0.345918	0.133403	2.593039	0.0122
C	-0.000698	0.004693	-0.148782	0.8823

R-squared	0.158044	Mean dependent var	-0.001347
Adjusted R-squared	0.127427	S.D. dependent var	0.038222
S.E. of regression	0.035703	Akaike info criterion	-3.776798
Sum squared resid	0.070111	Schwarz criterion	-3.670223
Log likelihood	112.5271	Hannan-Quinn criter.	-3.735285
F-statistic	5.162038	Durbin-Watson stat	1.986642
Prob(F-statistic)	0.008820		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table B.25: Canada Model III, FMOLS Engle-Granger Cointegration Test

Cointegration Test - Engle-Granger
Date: 09/09/16 Time: 16:52
Equation: TOP1_FMOLS
Specification: TOP1 TFP C @TREND @TREND^2
Cointegrating equation deterministics: C @TREND @TREND^2
Null hypothesis: Series are not cointegrated
Automatic lag specification (lag=1 based on Schwarz Info Criterion, maxlag=10)

	Value	Prob.*
Engle-Granger tau-statistic	-2.637740	0.6883
Engle-Granger z-statistic	-19.44167	0.2957

*MacKinnon (1996) p-values.

Intermediate Results:	
Rho - 1	-0.219684
Rho S.E.	0.083285
Residual variance	0.001254
Long-run residual variance	0.002822
Number of lags	1
Number of observations	59
Number of stochastic trends**	2

**Number of stochastic trends in asymptotic distribution.

Engle-Granger Test Equation:
Dependent Variable: D(RESID)
Method: Least Squares
Date: 09/09/16 Time: 16:52
Sample (adjusted): 1952 2010
Included observations: 59 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID(-1)	-0.219684	0.083285	-2.637740	0.0107
D(RESID(-1))	0.333321	0.131759	2.529786	0.0142

R-squared	0.143243	Mean dependent var	-0.001749
Adjusted R-squared	0.128212	S.D. dependent var	0.037933
S.E. of regression	0.035418	Akaike info criterion	-3.809909
Sum squared resid	0.071501	Schwarz criterion	-3.739484
Log likelihood	114.3923	Hannan-Quinn criter.	-3.782418
Durbin-Watson stat	1.981931		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table B.26: Canada Model III, Unrestricted Error Correction Estimation

Dependent Variable: DTOP1
Method: Least Squares
Date: 09/09/16 Time: 16:30
Sample (adjusted): 1956 2010
Included observations: 55 after adjustments
HAC standard errors & covariance (Bartlett kernel, Newey-West automatic bandwidth = 3.1331, NW automatic lag length = 3)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID1(-1)	-0.509693	0.152328	-3.346028	0.0017
DTOP1(-1)	0.600311	0.209564	2.864573	0.0064
DTOP1(-2)	0.257631	0.184845	1.393769	0.1705
DTOP1(-3)	0.167554	0.150562	1.112860	0.2720
DTOP1(-4)	0.193652	0.107373	1.803546	0.0783
DTOP1(-5)	0.174671	0.099395	1.757346	0.0860
DTFP(-1)	0.572318	0.353067	1.620988	0.1123
DTFP(-2)	0.220947	0.322305	0.685521	0.4967
DTFP(-3)	0.564915	0.324542	1.740652	0.0889
DTFP(-4)	0.258192	0.297400	0.868166	0.3901
DTFP(-5)	0.777771	0.278705	2.790662	0.0078
C	-0.013081	0.007997	-1.635837	0.1092

R-squared	0.285641	Mean dependent var	0.003303
Adjusted R-squared	0.102897	S.D. dependent var	0.038112
S.E. of regression	0.036098	Akaike info criterion	-3.614911
Sum squared resid	0.056033	Schwarz criterion	-3.176947
Log likelihood	111.4101	Hannan-Quinn criter.	-3.445547
F-statistic	1.563071	Durbin-Watson stat	2.088146
Prob(F-statistic)	0.144863	Wald F-statistic	2.939076
Prob(Wald F-statistic)	0.005546		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table B.27: Canada Model III, Error Correction Model (ECM)

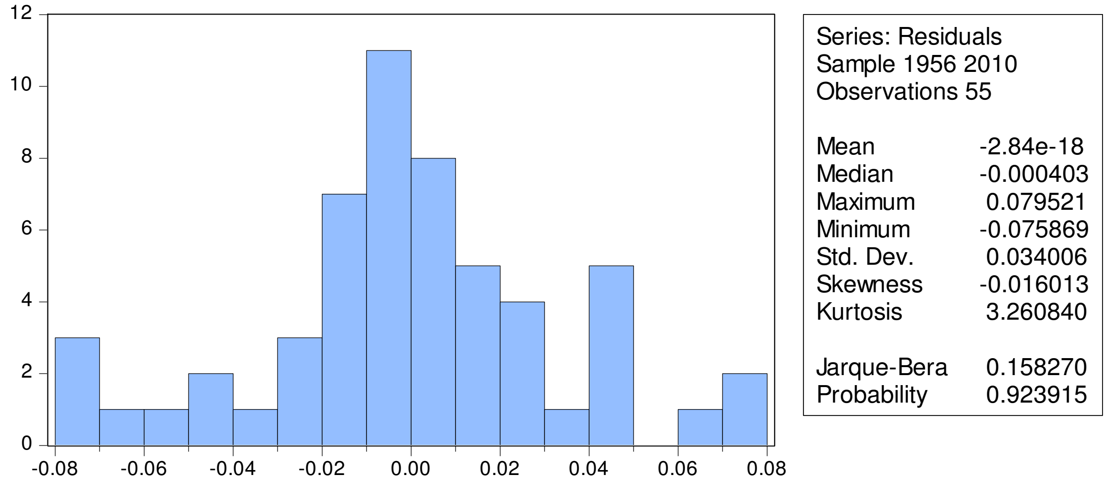
Dependent Variable: DTOP1
Method: Least Squares
Date: 09/09/16 Time: 16:41
Sample (adjusted): 1956 2010
Included observations: 55 after adjustments
HAC standard errors & covariance (Bartlett kernel, Newey-West automatic bandwidth = 4.0989, NW automatic lag length = 3)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID1(-1)	-0.258202	0.088488	-2.917911	0.0053
DTOP1(-1)	0.428675	0.207203	2.068863	0.0440
DTOP1(-4)	0.085030	0.086821	0.979372	0.3323
DTOP1(-5)	0.087389	0.087689	0.996582	0.3240
DTFP(-3)	0.148022	0.150140	0.985891	0.3291
DTFP(-5)	0.522842	0.182740	2.861128	0.0062
C	-0.001128	0.005203	-0.216884	0.8292

R-squared	0.203887	Mean dependent var	0.003303
Adjusted R-squared	0.104373	S.D. dependent var	0.038112
S.E. of regression	0.036069	Akaike info criterion	-3.688374
Sum squared resid	0.062445	Schwarz criterion	-3.432896
Log likelihood	108.4303	Hannan-Quinn criter.	-3.589579
F-statistic	2.048826	Durbin-Watson stat	2.100782
Prob(F-statistic)	0.077155	Wald F-statistic	3.092979
Prob(Wald F-statistic)	0.012150		

Source: EViews output based on data of Feenstra *et al.* (2015) and Alvaredo *et al.* (2016).

Figure B.3: Canada Model III, ECM Jarque-Bera Normal Distribution Test



Source: EViews output based on data of Feenstra *et al.* (2015) and Alvaredo *et al.* (2016).

Table B.28: Canada Model III, ECM Breusch-Godfrey Serial Correlation LM Test

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.576815	Prob. F(2,46)	0.5657
Obs*R-squared	1.345594	Prob. Chi-Square(2)	0.5103

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Date: 09/09/16 Time: 17:00
Sample: 1956 2010
Included observations: 55
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID1(-1)	-0.028297	0.143878	-0.196674	0.8449
DTOP1(-1)	0.112357	0.405143	0.277326	0.7828
DTOP1(-4)	0.009830	0.148447	0.066220	0.9475
DTOP1(-5)	-0.006386	0.135770	-0.047039	0.9627
DTFP(-3)	-0.000648	0.321651	-0.002015	0.9984
DTFP(-5)	0.035845	0.280202	0.127927	0.8988
C	-0.000561	0.005805	-0.096592	0.9235
RESID(-1)	-0.136513	0.517852	-0.263613	0.7933
RESID(-2)	0.130189	0.252353	0.515901	0.6084

R-squared	0.024465	Mean dependent var	-2.84E-18
Adjusted R-squared	-0.145193	S.D. dependent var	0.034006
S.E. of regression	0.036391	Akaike info criterion	-3.640417
Sum squared resid	0.060918	Schwarz criterion	-3.311944
Log likelihood	109.1115	Hannan-Quinn criter.	-3.513394
F-statistic	0.144204	Durbin-Watson stat	2.010114
Prob(F-statistic)	0.996519		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table B.29: Canada Model III, ECM Heteroskedasticity Test

Heteroskedasticity Test: White

F-statistic	1.305071	Prob. F(6,48)	0.2731
Obs*R-squared	7.713955	Prob. Chi-Square(6)	0.2598
Scaled explained SS	6.641620	Prob. Chi-Square(6)	0.3553

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 09/09/16 Time: 17:01
Sample: 1956 2010
Included observations: 55
HAC standard errors & covariance (Bartlett kernel, Newey-West automatic bandwidth = 2.8924, NW automatic lag length = 3)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.001528	0.000474	3.224958	0.0023
RESID1(-1)^2	0.018804	0.043694	0.430352	0.6689
DTOP1(-1)^2	0.072562	0.111887	0.648533	0.5197
DTOP1(-4)^2	-0.174312	0.075505	-2.308609	0.0253
DTOP1(-5)^2	0.019037	0.104958	0.181382	0.8568
DTFP(-3)^2	-0.557227	0.246173	-2.263562	0.0282
DTFP(-5)^2	-0.449591	0.129770	-3.464516	0.0011

R-squared	0.140254	Mean dependent var	0.001135
Adjusted R-squared	0.032785	S.D. dependent var	0.001723
S.E. of regression	0.001694	Akaike info criterion	-9.804553
Sum squared resid	0.000138	Schwarz criterion	-9.549074
Log likelihood	276.6252	Hannan-Quinn criter.	-9.705757
F-statistic	1.305071	Durbin-Watson stat	1.982144
Prob(F-statistic)	0.273117		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table B.30: Canada Model III, ECM RESET Test

Ramsey RESET Test
Equation: TOP1_ECM
Specification: DTOP1 RESID1(-1) DTOP1(-1) DTOP1(-4 TO -5) DTFP(-3) DTFP(-5) C
Omitted Variables: Squares of fitted values

	Value	df	Probability
t-statistic	0.146472	47	0.8842
F-statistic	0.021454	(1, 47)	0.8842
Likelihood ratio	0.025100	1	0.8741

F-test summary:

	Sum of Sq.	df	Mean Squares
Test SSR	2.85E-05	1	2.85E-05
Restricted SSR	0.062445	48	0.001301
Unrestricted SSR	0.062417	47	0.001328

LR test summary:

	Value	df
Restricted LogL	108.4303	48
Unrestricted LogL	108.4428	47

Unrestricted Test Equation:
Dependent Variable: DTOP1
Method: Least Squares
Date: 09/09/16 Time: 17:01
Sample: 1956 2010
Included observations: 55
HAC standard errors & covariance (Bartlett kernel, Newey-West automatic bandwidth = 4.0928, NW automatic lag length = 3)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID1(-1)	-0.260739	0.077994	-3.343073	0.0016
DTOP1(-1)	0.433582	0.198438	2.184978	0.0339
DTOP1(-4)	0.083782	0.090226	0.928579	0.3579
DTOP1(-5)	0.082672	0.096725	0.854717	0.3970
DTFP(-3)	0.143089	0.173557	0.824451	0.4138
DTFP(-5)	0.512005	0.259468	1.973291	0.0544
C	-0.000487	0.009531	-0.051063	0.9595
FITTED^2	-1.774518	20.04407	-0.088531	0.9298

R-squared	0.204250	Mean dependent var	0.003303
Adjusted R-squared	0.085734	S.D. dependent var	0.038112
S.E. of regression	0.036442	Akaike info criterion	-3.652467
Sum squared resid	0.062417	Schwarz criterion	-3.360491
Log likelihood	108.4428	Hannan-Quinn criter.	-3.539558
F-statistic	1.723400	Durbin-Watson stat	2.099915
Prob(F-statistic)	0.126469	Wald F-statistic	3.999714
Prob(Wald F-statistic)	0.001658		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

B.4. France

Table B.31: France Model I, FMOLS Regression

Dependent Variable: TOP10
Method: Fully Modified Least Squares (FMOLS)
Date: 09/08/16 Time: 16:23
Sample (adjusted): 1951 2012
Included observations: 62 after adjustments
Cointegrating equation deterministics: C @TREND @TREND^2
Long-run covariance estimate (Bartlett kernel, Newey-West automatic
bandwidth = 7.0213, NW automatic lag length = 3)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TFP	0.452463	0.234534	1.929203	0.0586
C	6.626370	0.810841	8.172223	0.0000
@TREND	-0.024739	0.010532	-2.348933	0.0223
@TREND^2	0.000240	0.000103	2.326163	0.0235

R-squared	0.458130	Mean dependent var	8.104953
Adjusted R-squared	0.430103	S.D. dependent var	0.050569
S.E. of regression	0.038175	Sum squared resid	0.084526
Long-run variance	0.004109		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table B.32: France Model I, FMOLS Hansen Instability Test

Cointegration Test - Hansen Parameter Instability
Date: 09/09/16 Time: 17:09
Equation: TOP10_FMOLS
Series: TOP10 TFP
Null hypothesis: Series are cointegrated
Cointegrating equation deterministics: C @TREND @TREND^2

Lc statistic	Stochastic Trends (m)	Deterministic Trends (k)	Excluded Trends (p2)	Prob.*
0.229469	1	2	0	> 0.2

*Hansen (1992b) Lc(m2=1, k=2) p-values, where m2=m-p2 is the number
of stochastic trends in the asymptotic distribution

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table B.33: France Model I, FMOLS ADF Unit Root Test of Residuals

Null Hypothesis: RESID10 has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.451213	0.1325
Test critical values:	1% level	-3.542097	
	5% level	-2.910019	
	10% level	-2.592645	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(RESID10)
Method: Least Squares
Date: 09/09/16 Time: 17:11
Sample (adjusted): 1952 2012
Included observations: 61 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID10(-1)	-0.144979	0.059146	-2.451213	0.0172
C	0.001035	0.002199	0.470612	0.6397

R-squared	0.092426	Mean dependent var	0.000953
Adjusted R-squared	0.077043	S.D. dependent var	0.017872
S.E. of regression	0.017170	Akaike info criterion	-5.259055
Sum squared resid	0.017394	Schwarz criterion	-5.189846
Log likelihood	162.4012	Hannan-Quinn criter.	-5.231931
F-statistic	6.008444	Durbin-Watson stat	1.884801
Prob(F-statistic)	0.017219		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table B.34: France Model I, FMOLS Engle-Granger Cointegration Test

Cointegration Test - Engle-Granger
Date: 09/09/16 Time: 17:10
Equation: TOP10_FMOLS
Specification: TOP10 TFP C @TREND @TREND^2
Cointegrating equation deterministics: C @TREND @TREND^2
Null hypothesis: Series are not cointegrated
Automatic lag specification (lag=0 based on Schwarz Info Criterion, maxlag=10)

	Value	Prob.*
Engle-Granger tau-statistic	-3.070492	0.4615
Engle-Granger z-statistic	-11.00941	0.7865

*MacKinnon (1996) p-values.

Intermediate Results:	
Rho - 1	-0.177571
Rho S.E.	0.057831
Residual variance	0.000322
Long-run residual variance	0.000322
Number of lags	0
Number of observations	62
Number of stochastic trends**	2

**Number of stochastic trends in asymptotic distribution.

Engle-Granger Test Equation:
Dependent Variable: D(RESID)
Method: Least Squares
Date: 09/09/16 Time: 17:10
Sample (adjusted): 1951 2012
Included observations: 62 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID(-1)	-0.177571	0.057831	-3.070492	0.0032

R-squared	0.128961	Mean dependent var	0.001436
Adjusted R-squared	0.128961	S.D. dependent var	0.019241
S.E. of regression	0.017957	Akaike info criterion	-5.185648
Sum squared resid	0.019670	Schwarz criterion	-5.151339
Log likelihood	161.7551	Hannan-Quinn criter.	-5.172177
Durbin-Watson stat	1.680607		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table B.35: France Model I, Unrestricted Error Correction Estimation

Dependent Variable: DTOP10
Method: Least Squares
Date: 09/08/16 Time: 16:51
Sample (adjusted): 1959 2012
Included observations: 54 after adjustments
HAC standard errors & covariance (Bartlett kernel, Newey-West automatic bandwidth = 4.7699, NW automatic lag length = 3)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID10(-1)	-0.231863	0.101196	-2.291233	0.0279
DTOP10(-1)	0.116822	0.143576	0.813658	0.4212
DTOP10(-2)	0.223685	0.144094	1.552355	0.1293
DTOP10(-3)	0.007911	0.133953	0.059057	0.9532
DTOP10(-4)	0.348671	0.142927	2.439506	0.0198
DTOP10(-5)	0.167233	0.154602	1.081703	0.2866
DTOP10(-6)	0.080874	0.097854	0.826476	0.4140
DTOP10(-7)	-0.006993	0.138601	-0.050451	0.9600
DTOP10(-8)	0.080443	0.087533	0.919004	0.3642
DTFP(-1)	0.100515	0.115560	0.869811	0.3902
DTFP(-2)	0.199896	0.145495	1.373899	0.1780
DTFP(-3)	0.021153	0.117690	0.179738	0.8584
DTFP(-4)	0.420594	0.172779	2.434284	0.0200
DTFP(-5)	-0.095198	0.108782	-0.875126	0.3873
DTFP(-6)	-0.142691	0.127649	-1.117842	0.2710
DTFP(-7)	-0.020456	0.169889	-0.120406	0.9048
DTFP(-8)	-0.505978	0.129799	-3.898172	0.0004
C	0.003302	0.003165	1.043446	0.3037

R-squared	0.597345	Mean dependent var	-0.000954
Adjusted R-squared	0.407202	S.D. dependent var	0.016782
S.E. of regression	0.012921	Akaike info criterion	-5.598752
Sum squared resid	0.006010	Schwarz criterion	-4.935757
Log likelihood	169.1663	Hannan-Quinn criter.	-5.343061
F-statistic	3.141563	Durbin-Watson stat	1.984968
Prob(F-statistic)	0.001901	Wald F-statistic	11.64199
Prob(Wald F-statistic)	0.000000		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table B.36: France Model I, Restricted Error Correction Model (ECM)

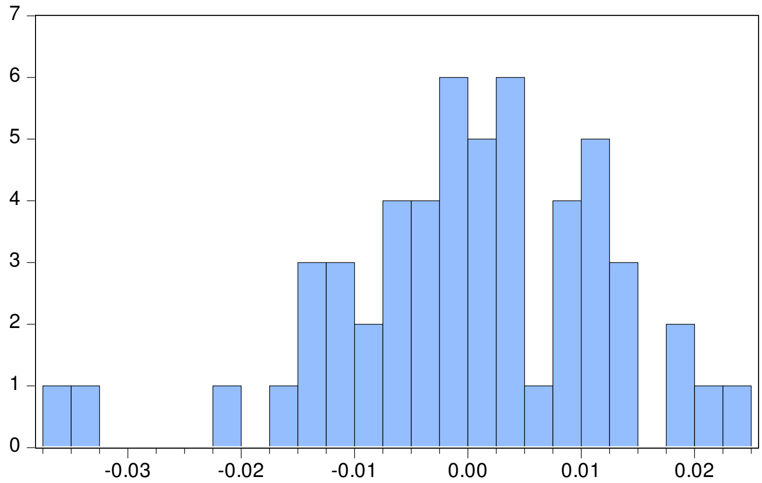
Dependent Variable: DTOP10
Method: Least Squares
Date: 09/08/16 Time: 16:30
Sample (adjusted): 1959 2012
Included observations: 54 after adjustments
HAC standard errors & covariance (Bartlett kernel, Newey-West automatic bandwidth = 3.8518, NW automatic lag length = 3)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID10(-1)	-0.132998	0.056075	-2.371797	0.0217
DTOP10(-4)	0.354554	0.123068	2.880957	0.0059
DTFP(-4)	0.483599	0.105453	4.585939	0.0000
DTFP(-8)	-0.590939	0.146966	-4.020911	0.0002
C	0.003080	0.002346	1.312549	0.1954

R-squared	0.474370	Mean dependent var	-0.000954
Adjusted R-squared	0.431462	S.D. dependent var	0.016782
S.E. of regression	0.012654	Akaike info criterion	-5.813717
Sum squared resid	0.007846	Schwarz criterion	-5.629551
Log likelihood	161.9703	Hannan-Quinn criter.	-5.742691
F-statistic	11.05539	Durbin-Watson stat	1.774417
Prob(F-statistic)	0.000002	Wald F-statistic	9.886279
Prob(Wald F-statistic)	0.000006		

Source: EViews output based on data of Feenstra *et al.* (2015) and Alvaredo *et al.* (2016).

Figure B.4: France Model I, ECM Jarque-Bera Normal Distribution Test



Series: Residuals	
Sample 1959 2012	
Observations 54	
Mean	-9.32e-19
Median	0.000137
Maximum	0.022992
Minimum	-0.036654
Std. Dev.	0.012167
Skewness	-0.644703
Kurtosis	3.902408
Jarque-Bera	5.573048
Probability	0.061635

Source: EViews output based on data of Feenstra *et al.* (2015) and Alvaredo *et al.* (2016).

Table B.37: France Model I, ECM Breusch-Godfrey Serial Correlation LM Test

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.374437	Prob. F(2,47)	0.6897
Obs*R-squared	0.846913	Prob. Chi-Square(2)	0.6548

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Date: 09/09/16 Time: 17:16
Sample: 1959 2012
Included observations: 54
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID10(-1)	-0.012117	0.062685	-0.193306	0.8476
DTOP10(-4)	0.022240	0.115890	0.191910	0.8486
DTFP(-4)	0.007964	0.113166	0.070377	0.9442
DTFP(-8)	-0.001693	0.114778	-0.014751	0.9883
C	-4.07E-05	0.002801	-0.014541	0.9885
RESID(-1)	0.122172	0.159976	0.763692	0.4489
RESID(-2)	-0.060612	0.162329	-0.373391	0.7105

R-squared	0.015684	Mean dependent var	-9.32E-19
Adjusted R-squared	-0.109974	S.D. dependent var	0.012167
S.E. of regression	0.012818	Akaike info criterion	-5.755450
Sum squared resid	0.007723	Schwarz criterion	-5.497619
Log likelihood	162.3972	Hannan-Quinn criter.	-5.656015
F-statistic	0.124812	Durbin-Watson stat	1.995944
Prob(F-statistic)	0.992750		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table B.38: France Model I, ECM Heteroskedasticity Test

Heteroskedasticity Test: White

F-statistic	2.812210	Prob. F(4,49)	0.0353
Obs*R-squared	10.08214	Prob. Chi-Square(4)	0.0391
Scaled explained SS	12.04719	Prob. Chi-Square(4)	0.0170

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 09/09/16 Time: 17:16
Sample: 1959 2012
Included observations: 54
HAC standard errors & covariance (Bartlett kernel, Newey-West automatic bandwidth = 6.5475, NW automatic lag length = 3)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.000100	2.57E-05	3.886340	0.0003
RESID10(-1)^2	-0.018189	0.021639	-0.840569	0.4047
DTOP10(-4)^2	-0.003678	0.038310	-0.096010	0.9239
DTFP(-4)^2	-0.032094	0.020118	-1.595285	0.1171
DTFP(-8)^2	0.117794	0.065138	1.808377	0.0767

R-squared	0.186706	Mean dependent var	0.000145
Adjusted R-squared	0.120315	S.D. dependent var	0.000250
S.E. of regression	0.000234	Akaike info criterion	-13.79162
Sum squared resid	2.69E-06	Schwarz criterion	-13.60745
Log likelihood	377.3737	Hannan-Quinn criter.	-13.72059
F-statistic	2.812210	Durbin-Watson stat	2.097178
Prob(F-statistic)	0.035258		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table B.39: France Model I, ECM RESET Test

Ramsey RESET Test
Equation: TOP10_ECM
Specification: DTOP10 RESID10(-1) DTOP10(-4) DTFP(-4) DTFP(-8) C
Omitted Variables: Squares of fitted values

	Value	df	Probability
t-statistic	0.380110	48	0.7055
F-statistic	0.144484	(1, 48)	0.7055
Likelihood ratio	0.162300	1	0.6870

F-test summary:

	Sum of Sq.	df	Mean Squares
Test SSR	2.35E-05	1	2.35E-05
Restricted SSR	0.007846	49	0.000160
Unrestricted SSR	0.007822	48	0.000163

LR test summary:

	Value	df
Restricted LogL	161.9703	49
Unrestricted LogL	162.0515	48

Unrestricted Test Equation:
Dependent Variable: DTOP10
Method: Least Squares
Date: 09/09/16 Time: 17:16
Sample: 1959 2012
Included observations: 54
HAC standard errors & covariance (Bartlett kernel, Newey-West automatic bandwidth = 3.9458, NW automatic lag length = 3)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID10(-1)	-0.129868	0.059645	-2.177359	0.0344
DTOP10(-4)	0.346563	0.128891	2.688819	0.0098
DTFP(-4)	0.469439	0.117057	4.010354	0.0002
DTFP(-8)	-0.580610	0.152570	-3.805534	0.0004
C	0.002745	0.002420	1.134060	0.2624
FITTED^2	2.799824	6.208933	0.450935	0.6541

R-squared	0.475948	Mean dependent var	-0.000954
Adjusted R-squared	0.421359	S.D. dependent var	0.016782
S.E. of regression	0.012766	Akaike info criterion	-5.779685
Sum squared resid	0.007822	Schwarz criterion	-5.558687
Log likelihood	162.0515	Hannan-Quinn criter.	-5.694455
F-statistic	8.718788	Durbin-Watson stat	1.758706
Prob(F-statistic)	0.000006	Wald F-statistic	9.467192
Prob(Wald F-statistic)	0.000002		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table B.40: France Model II, FMOLS Regression

Dependent Variable: TOP5
Method: Fully Modified Least Squares (FMOLS)
Date: 09/08/16 Time: 16:42
Sample (adjusted): 1951 2012
Included observations: 62 after adjustments
Cointegrating equation deterministics: C @TREND @TREND^2
Long-run covariance estimate (Bartlett kernel, Newey-West automatic
bandwidth = 6.9653, NW automatic lag length = 3)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TFP	0.629038	0.259816	2.421092	0.0186
C	5.636719	0.898247	6.275244	0.0000
@TREND	-0.035000	0.011667	-2.999840	0.0040
@TREND^2	0.000347	0.000114	3.035073	0.0036

R-squared	0.567077	Mean dependent var	7.690505
Adjusted R-squared	0.544685	S.D. dependent var	0.062797
S.E. of regression	0.042374	Sum squared resid	0.104141
Long-run variance	0.005042		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table B.41: France Model II, FMOLS Hansen Instability Test

Cointegration Test - Hansen Parameter Instability
Date: 09/09/16 Time: 17:23
Equation: TOP5_FMOLS
Series: TOP5 TFP
Null hypothesis: Series are cointegrated
Cointegrating equation deterministics: C @TREND @TREND^2

Lc statistic	Stochastic Trends (m)	Deterministic Trends (k)	Excluded Trends (p2)	Prob.*
0.213034	1	2	0	> 0.2

*Hansen (1992b) Lc(m2=1, k=2) p-values, where m2=m-p2 is the number
of stochastic trends in the asymptotic distribution

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table B.42: France Model II, FMOLS ADF Unit Root Test of Residuals

Null Hypothesis: RESID5 has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.644176	0.0899
Test critical values:	1% level	-3.542097	
	5% level	-2.910019	
	10% level	-2.592645	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(RESID5)
Method: Least Squares
Date: 09/09/16 Time: 17:22
Sample (adjusted): 1952 2012
Included observations: 61 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID5(-1)	-0.167300	0.063271	-2.644176	0.0105
C	0.001187	0.002608	0.455077	0.6507

R-squared	0.105948	Mean dependent var	0.001072
Adjusted R-squared	0.090794	S.D. dependent var	0.021361
S.E. of regression	0.020368	Akaike info criterion	-4.917446
Sum squared resid	0.024477	Schwarz criterion	-4.848237
Log likelihood	151.9821	Hannan-Quinn criter.	-4.890323
F-statistic	6.991669	Durbin-Watson stat	1.835302
Prob(F-statistic)	0.010475		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table B.43: France Model II, FMOLS Engle-Granger Cointegration Test

Cointegration Test - Engle-Granger
Date: 09/09/16 Time: 17:21
Equation: TOP5_FMOLS
Specification: TOP5 TFP C @TREND @TREND^2
Cointegrating equation deterministics: C @TREND @TREND^2
Null hypothesis: Series are not cointegrated
Automatic lag specification (lag=0 based on Schwarz Info Criterion, maxlag=10)

	Value	Prob.*
Engle-Granger tau-statistic	-3.149305	0.4212
Engle-Granger z-statistic	-11.85583	0.7378

*MacKinnon (1996) p-values.

Intermediate Results:	
Rho - 1	-0.191223
Rho S.E.	0.060719
Residual variance	0.000440
Long-run residual variance	0.000440
Number of lags	0
Number of observations	62
Number of stochastic trends**	2

**Number of stochastic trends in asymptotic distribution.

Engle-Granger Test Equation:
Dependent Variable: D(RESID)
Method: Least Squares
Date: 09/09/16 Time: 17:21
Sample (adjusted): 1951 2012
Included observations: 62 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID(-1)	-0.191223	0.060719	-3.149305	0.0025

R-squared	0.135705	Mean dependent var	0.001554
Adjusted R-squared	0.135705	S.D. dependent var	0.022555
S.E. of regression	0.020969	Akaike info criterion	-4.875541
Sum squared resid	0.026822	Schwarz criterion	-4.841233
Log likelihood	152.1418	Hannan-Quinn criter.	-4.862071
Durbin-Watson stat	1.670965		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table B.44: France Model II, Unrestricted Error Correction Estimation

Dependent Variable: DTOP5
Method: Least Squares
Date: 09/09/16 Time: 17:45
Sample (adjusted): 1959 2012
Included observations: 54 after adjustments
HAC standard errors & covariance (Bartlett kernel, Newey-West automatic bandwidth = 4.3508, NW automatic lag length = 3)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID5(-1)	-0.322731	0.142642	-2.262524	0.0298
DTOP5(-1)	0.253088	0.151999	1.665067	0.1046
DTOP5(-2)	0.166571	0.164946	1.009852	0.3193
DTOP5(-3)	0.075118	0.156129	0.481124	0.6333
DTOP5(-4)	0.369475	0.151055	2.445970	0.0195
DTOP5(-5)	0.123975	0.164850	0.752048	0.4569
DTOP5(-6)	0.202255	0.139096	1.454072	0.1546
DTOP5(-7)	0.047668	0.132645	0.359365	0.7214
DTOP5(-8)	0.115400	0.105135	1.097644	0.2796
DTFP(-1)	0.152595	0.149573	1.020204	0.3144
DTFP(-2)	0.164372	0.178352	0.921617	0.3629
DTFP(-3)	-0.021429	0.154614	-0.138596	0.8905
DTFP(-4)	0.493260	0.193941	2.543350	0.0154
DTFP(-5)	-0.130191	0.148309	-0.877835	0.3859
DTFP(-6)	-0.102001	0.182174	-0.559908	0.5790
DTFP(-7)	0.058094	0.221260	0.262558	0.7944
DTFP(-8)	-0.564526	0.159564	-3.537929	0.0011
C	0.002774	0.005104	0.543421	0.5902

R-squared	0.530775	Mean dependent var	-0.001072
Adjusted R-squared	0.309196	S.D. dependent var	0.020329
S.E. of regression	0.016896	Akaike info criterion	-5.062233
Sum squared resid	0.010278	Schwarz criterion	-4.399238
Log likelihood	154.6803	Hannan-Quinn criter.	-4.806542
F-statistic	2.395423	Durbin-Watson stat	1.852016
Prob(F-statistic)	0.013604	Wald F-statistic	6.899239
Prob(Wald F-statistic)	0.000001		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table B.45: France Model II, Restricted Error Correction Model (ECM)

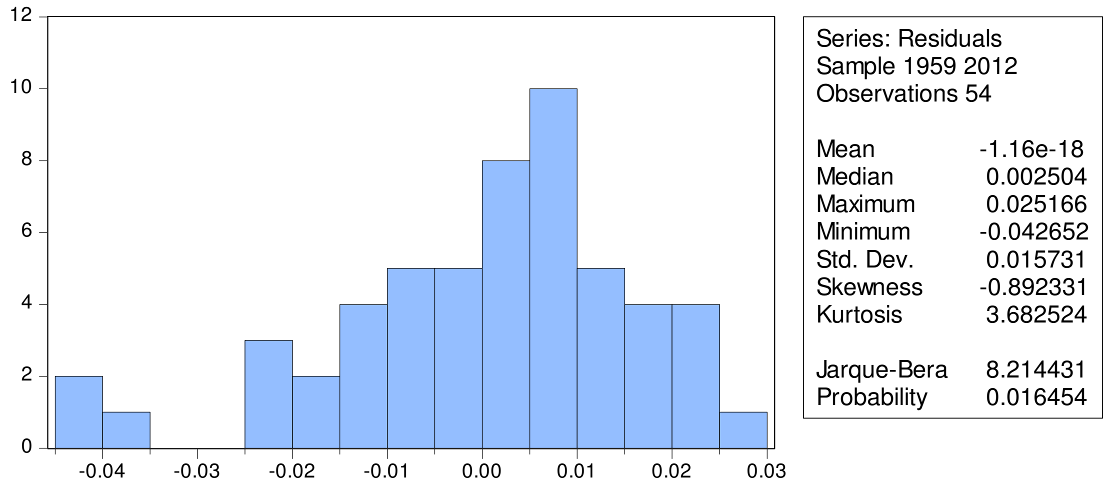
Dependent Variable: DTOP5
Method: Least Squares
Date: 09/08/16 Time: 16:47
Sample (adjusted): 1959 2012
Included observations: 54 after adjustments
HAC standard errors & covariance (Bartlett kernel, Newey-West automatic bandwidth = 4.7644, NW automatic lag length = 3)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID5(-1)	-0.129468	0.067503	-1.917967	0.0610
DTOP5(-4)	0.298046	0.133951	2.225031	0.0307
DTFP(-4)	0.518457	0.143573	3.611105	0.0007
DTFP(-8)	-0.660956	0.181431	-3.643020	0.0006
C	0.003824	0.003368	1.135269	0.2618

R-squared	0.401197	Mean dependent var	-0.001072
Adjusted R-squared	0.352315	S.D. dependent var	0.020329
S.E. of regression	0.016361	Akaike info criterion	-5.299865
Sum squared resid	0.013116	Schwarz criterion	-5.115699
Log likelihood	148.0963	Hannan-Quinn criter.	-5.228839
F-statistic	8.207469	Durbin-Watson stat	1.559298
Prob(F-statistic)	0.000038	Wald F-statistic	6.191693
Prob(Wald F-statistic)	0.000409		

Source: EViews output based on data of Feenstra *et al.* (2015) and Alvaredo *et al.* (2016).

Figure B.5: France Model II, ECM Jarque-Bera Normal Distribution Test



Source: EViews output based on data of Feenstra *et al.* (2015) and Alvaredo *et al.* (2016).

Table B.46: France Model II, ECM Breusch-Godfrey Serial Correlation LM Test

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	1.970430	Prob. F(2,47)	0.1507
Obs*R-squared	4.177519	Prob. Chi-Square(2)	0.1238

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Date: 09/09/16 Time: 17:39
Sample: 1959 2012
Included observations: 54
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID5(-1)	-0.024841	0.073712	-0.336996	0.7376
DTOP5(-4)	0.047885	0.124532	0.384520	0.7023
DTFP(-4)	0.040000	0.139174	0.287408	0.7751
DTFP(-8)	-0.024091	0.142997	-0.168473	0.8669
C	-0.000113	0.003509	-0.032063	0.9746
RESID(-1)	0.271588	0.157190	1.727765	0.0906
RESID(-2)	-0.169394	0.159892	-1.059428	0.2948

R-squared	0.077361	Mean dependent var	-1.16E-18
Adjusted R-squared	-0.040422	S.D. dependent var	0.015731
S.E. of regression	0.016046	Akaike info criterion	-5.306308
Sum squared resid	0.012101	Schwarz criterion	-5.048477
Log likelihood	150.2703	Hannan-Quinn criter.	-5.206873
F-statistic	0.656810	Durbin-Watson stat	2.014001
Prob(F-statistic)	0.684512		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table B.47: France Model II, ECM Heteroskedasticity Test

Heteroskedasticity Test: White

F-statistic	1.504531	Prob. F(4,49)	0.2154
Obs*R-squared	5.906759	Prob. Chi-Square(4)	0.2062
Scaled explained SS	6.523302	Prob. Chi-Square(4)	0.1633

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 09/09/16 Time: 17:41
Sample: 1959 2012
Included observations: 54
HAC standard errors & covariance (Bartlett kernel, Newey-West automatic bandwidth = 4.6348, NW automatic lag length = 3)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.000221	7.28E-05	3.030553	0.0039
RESID5(-1)^2	-0.016227	0.033140	-0.489640	0.6266
DTOP5(-4)^2	-0.054371	0.036393	-1.494001	0.1416
DTFP(-4)^2	-0.062329	0.030121	-2.069260	0.0438
DTFP(-8)^2	0.145324	0.090050	1.613820	0.1130

R-squared	0.109384	Mean dependent var	0.000243
Adjusted R-squared	0.036681	S.D. dependent var	0.000402
S.E. of regression	0.000394	Akaike info criterion	-12.75188
Sum squared resid	7.61E-06	Schwarz criterion	-12.56771
Log likelihood	349.3006	Hannan-Quinn criter.	-12.68085
F-statistic	1.504531	Durbin-Watson stat	1.884409
Prob(F-statistic)	0.215402		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table B.48: France Model II, ECM RESET Test

Ramsey RESET Test
Equation: TOP5_ECM
Specification: DTOP5 RESID5(-1) DTOP5(-4) DTFP(-4) DTFP(-8) C
Omitted Variables: Squares of fitted values

	Value	df	Probability
t-statistic	0.117147	48	0.9072
F-statistic	0.013723	(1, 48)	0.9072
Likelihood ratio	0.015437	1	0.9011

F-test summary:

	Sum of Sq.	df	Mean Squares
Test SSR	3.75E-06	1	3.75E-06
Restricted SSR	0.013116	49	0.000268
Unrestricted SSR	0.013112	48	0.000273

LR test summary:

	Value	df
Restricted LogL	148.0963	49
Unrestricted LogL	148.1041	48

Unrestricted Test Equation:
Dependent Variable: DTOP5
Method: Least Squares
Date: 09/09/16 Time: 17:40
Sample: 1959 2012
Included observations: 54
HAC standard errors & covariance (Bartlett kernel, Newey-West automatic bandwidth = 4.7458, NW automatic lag length = 3)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID5(-1)	-0.130533	0.067823	-1.924613	0.0602
DTOP5(-4)	0.300151	0.134068	2.238803	0.0298
DTFP(-4)	0.523237	0.144625	3.617890	0.0007
DTFP(-8)	-0.664250	0.181335	-3.663108	0.0006
C	0.003960	0.003422	1.157388	0.2528
FITTED^2	-0.924234	7.893924	-0.117082	0.9073

R-squared	0.401368	Mean dependent var	-0.001072
Adjusted R-squared	0.339010	S.D. dependent var	0.020329
S.E. of regression	0.016528	Akaike info criterion	-5.263113
Sum squared resid	0.013112	Schwarz criterion	-5.042115
Log likelihood	148.1041	Hannan-Quinn criter.	-5.177883
F-statistic	6.436559	Durbin-Watson stat	1.561821
Prob(F-statistic)	0.000119	Wald F-statistic	5.082344
Prob(Wald F-statistic)	0.000809		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table B.49: France Model III, FMOLS Regression

Dependent Variable: TOP1
Method: Fully Modified Least Squares (FMOLS)
Date: 09/08/16 Time: 16:52
Sample (adjusted): 1951 2012
Included observations: 62 after adjustments
Cointegrating equation deterministics: C @TREND @TREND^2
Long-run covariance estimate (Bartlett kernel, Newey-West automatic bandwidth = 6.3508, NW automatic lag length = 3)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TFP	0.885770	0.284958	3.108422	0.0029
C	3.874545	0.985170	3.932868	0.0002
@TREND	-0.052979	0.012796	-4.140209	0.0001
@TREND^2	0.000556	0.000126	4.425414	0.0000

R-squared	0.703807	Mean dependent var	6.737084
Adjusted R-squared	0.688486	S.D. dependent var	0.088820
S.E. of regression	0.049574	Sum squared resid	0.142537
Long-run variance	0.006065		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table B.50: France Model III, FMOLS Hansen Instability Test

Cointegration Test - Hansen Parameter Instability
Date: 09/09/16 Time: 17:50
Equation: TOP1_FMOLS
Series: TOP1 TFP
Null hypothesis: Series are cointegrated
Cointegrating equation deterministics: C @TREND @TREND^2

Lc statistic	Stochastic Trends (m)	Deterministic Trends (k)	Excluded Trends (p2)	Prob.*
0.170234	1	2	0	> 0.2

*Hansen (1992b) Lc(m2=1, k=2) p-values, where m2=m-p2 is the number of stochastic trends in the asymptotic distribution

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table B.51: France Model III, FMOLS ADF Unit Root Test of Residuals

Null Hypothesis: RESID1 has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.345450	0.0170
Test critical values:	1% level	-3.542097	
	5% level	-2.910019	
	10% level	-2.592645	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(RESID1)
Method: Least Squares
Date: 09/09/16 Time: 17:48
Sample (adjusted): 1952 2012
Included observations: 61 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID1(-1)	-0.282119	0.084329	-3.345450	0.0014
C	0.001612	0.004076	0.395332	0.6940

R-squared	0.159449	Mean dependent var	0.001528
Adjusted R-squared	0.145202	S.D. dependent var	0.034435
S.E. of regression	0.031837	Akaike info criterion	-4.024162
Sum squared resid	0.059801	Schwarz criterion	-3.954953
Log likelihood	124.7369	Hannan-Quinn criter.	-3.997039
F-statistic	11.19203	Durbin-Watson stat	1.662899
Prob(F-statistic)	0.001433		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table B.52: France Model III, FMOLS Engle-Granger Cointegration Test

Cointegration Test - Engle-Granger
Date: 09/09/16 Time: 17:51
Equation: TOP1_FMOLS
Specification: TOP1 TFP C @TREND @TREND^2
Cointegrating equation deterministics: C @TREND @TREND^2
Null hypothesis: Series are not cointegrated
Automatic lag specification (lag=0 based on Schwarz Info Criterion, maxlag=10)

	Value	Prob.*
Engle-Granger tau-statistic	-3.631547	0.2122
Engle-Granger z-statistic	-17.84426	0.3789

*MacKinnon (1996) p-values.

Intermediate Results:	
Rho - 1	-0.287811
Rho S.E.	0.079253
Residual variance	0.001016
Long-run residual variance	0.001016
Number of lags	0
Number of observations	62
Number of stochastic trends**	2

**Number of stochastic trends in asymptotic distribution.

Engle-Granger Test Equation:
Dependent Variable: D(RESID)
Method: Least Squares
Date: 09/09/16 Time: 17:51
Sample (adjusted): 1951 2012
Included observations: 62 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID(-1)	-0.287811	0.079253	-3.631547	0.0006

R-squared	0.174853	Mean dependent var	0.002071
Adjusted R-squared	0.174853	S.D. dependent var	0.035084
S.E. of regression	0.031869	Akaike info criterion	-4.038363
Sum squared resid	0.061954	Schwarz criterion	-4.004054
Log likelihood	126.1893	Hannan-Quinn criter.	-4.024892
Durbin-Watson stat	1.607563		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table B.53: France Model III, Unrestricted Error Correction Estimation

Dependent Variable: DTOP1
Method: Least Squares
Date: 09/09/16 Time: 17:58
Sample (adjusted): 1959 2012
Included observations: 54 after adjustments
HAC standard errors & covariance (Bartlett kernel, Newey-West automatic bandwidth = 2.3536, NW automatic lag length = 3)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID1(-1)	-0.685417	0.245765	-2.788913	0.0084
DTOP1(-1)	0.642215	0.227660	2.820933	0.0077
DTOP1(-2)	0.065880	0.249977	0.263544	0.7936
DTOP1(-3)	0.266830	0.203061	1.314042	0.1971
DTOP1(-4)	0.433951	0.209275	2.073594	0.0453
DTOP1(-5)	0.179570	0.235365	0.762942	0.4505
DTOP1(-6)	0.270374	0.206155	1.311508	0.1980
DTOP1(-7)	0.083395	0.194139	0.429564	0.6701
DTOP1(-8)	0.254338	0.180993	1.405233	0.1685
DTFP(-1)	0.280959	0.325923	0.862039	0.3944
DTFP(-2)	-0.178132	0.359311	-0.495760	0.6231
DTFP(-3)	-0.087668	0.300571	-0.291671	0.7722
DTFP(-4)	0.653380	0.263198	2.482469	0.0178
DTFP(-5)	-0.029961	0.387149	-0.077389	0.9387
DTFP(-6)	0.150377	0.330943	0.454390	0.6523
DTFP(-7)	0.272884	0.356090	0.766336	0.4485
DTFP(-8)	-0.572598	0.340323	-1.682512	0.1011
C	-0.004037	0.012259	-0.329336	0.7438

R-squared	0.464237	Mean dependent var	-0.000144
Adjusted R-squared	0.211238	S.D. dependent var	0.036483
S.E. of regression	0.032401	Akaike info criterion	-3.760054
Sum squared resid	0.037794	Schwarz criterion	-3.097059
Log likelihood	119.5215	Hannan-Quinn criter.	-3.504363
F-statistic	1.834934	Durbin-Watson stat	1.811025
Prob(F-statistic)	0.062107	Wald F-statistic	3.719250
Prob(Wald F-statistic)	0.000450		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table B.54: France Model III, Restricted Error Correction Model (ECM)

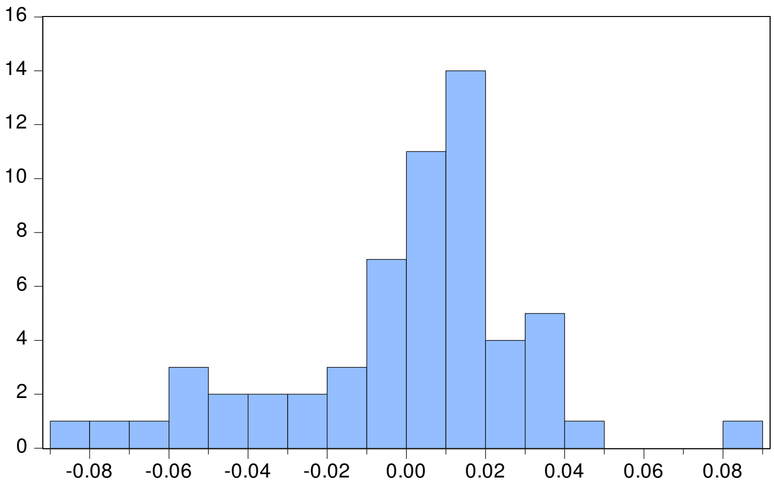
Dependent Variable: DTOP1
Method: Least Squares
Date: 09/09/16 Time: 17:59
Sample (adjusted): 1955 2012
Included observations: 58 after adjustments
HAC standard errors & covariance (Bartlett kernel, Newey-West automatic bandwidth = 3.2200, NW automatic lag length = 3)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID1(-1)	-0.438056	0.165363	-2.649059	0.0106
DTOP1(-1)	0.440337	0.149592	2.943591	0.0048
DTOP1(-4)	0.348504	0.234651	1.485201	0.1434
DTFP(-4)	0.280993	0.187189	1.501121	0.1393
C	-0.004166	0.005604	-0.743419	0.4605

R-squared	0.257662	Mean dependent var	-0.000381
Adjusted R-squared	0.201637	S.D. dependent var	0.035667
S.E. of regression	0.031869	Akaike info criterion	-3.972121
Sum squared resid	0.053828	Schwarz criterion	-3.794496
Log likelihood	120.1915	Hannan-Quinn criter.	-3.902932
F-statistic	4.599023	Durbin-Watson stat	1.940872
Prob(F-statistic)	0.002915	Wald F-statistic	3.049253
Prob(Wald F-statistic)	0.024623		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Figure B.6: France Model III, ECM Jarque-Bera Normal Distribution Test



Series: Residuals	
Sample 1955 2012	
Observations 58	
Mean	7.18e-19
Median	0.007009
Maximum	0.083367
Minimum	-0.081468
Std. Dev.	0.030730
Skewness	-0.652709
Kurtosis	3.851331
Jarque-Bera	5.869802
Probability	0.053136

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table B.55: France Model III, ECM Breusch-Godfrey Serial Correlation Test

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.134360	Prob. F(2,51)	0.8746
Obs*R-squared	0.304001	Prob. Chi-Square(2)	0.8590

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Date: 09/09/16 Time: 18:02
Sample: 1955 2012
Included observations: 58
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID1(-1)	0.049251	0.180237	0.273259	0.7858
DTOP1(-1)	0.002548	0.278804	0.009137	0.9927
DTOP1(-4)	-0.006343	0.173689	-0.036520	0.9710
DTFP(-4)	-0.030144	0.251593	-0.119811	0.9051
C	0.000354	0.006335	0.055817	0.9557
RESID(-1)	-0.030617	0.398173	-0.076894	0.9390
RESID(-2)	-0.106237	0.218807	-0.485530	0.6294

R-squared	0.005241	Mean dependent var	7.18E-19
Adjusted R-squared	-0.111789	S.D. dependent var	0.030730
S.E. of regression	0.032402	Akaike info criterion	-3.908410
Sum squared resid	0.053545	Schwarz criterion	-3.659736
Log likelihood	120.3439	Hannan-Quinn criter.	-3.811547
F-statistic	0.044787	Durbin-Watson stat	1.958548
Prob(F-statistic)	0.999595		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table B.56: France Model III, ECM Heteroskedasticity Test

Heteroskedasticity Test: White

F-statistic	0.456691	Prob. F(4,53)	0.7671
Obs*R-squared	1.932491	Prob. Chi-Square(4)	0.7482
Scaled explained SS	2.300546	Prob. Chi-Square(4)	0.6807

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 09/09/16 Time: 18:03
Sample: 1955 2012
Included observations: 58
HAC standard errors & covariance (Bartlett kernel, Newey-West automatic bandwidth = 4.7629, NW automatic lag length = 3)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.001035	0.000371	2.791685	0.0073
RESID1(-1)^2	-0.007392	0.051969	-0.142234	0.8874
DTOP1(-1)^2	0.085996	0.039249	2.191012	0.0329
DTOP1(-4)^2	-0.133085	0.115729	-1.149974	0.2553
DTFP(-4)^2	-0.126042	0.137250	-0.918339	0.3626

R-squared	0.033319	Mean dependent var	0.000928
Adjusted R-squared	-0.039638	S.D. dependent var	0.001581
S.E. of regression	0.001612	Akaike info criterion	-9.940633
Sum squared resid	0.000138	Schwarz criterion	-9.763008
Log likelihood	293.2784	Hannan-Quinn criter.	-9.871445
F-statistic	0.456691	Durbin-Watson stat	1.993609
Prob(F-statistic)	0.767088		

Source: EViews output based on data of Feenstra *et al.* (2015) and Alvaredo *et al.* (2016).

Table B.57: France Model III, ECM RESET Test

Ramsey RESET Test
Equation: TOP1_ECM
Specification: DTOP1 RESID1(-1) DTOP1(-1) DTOP1(-4) DTFP(-4) C
Omitted Variables: Squares of fitted values

	Value	df	Probability
t-statistic	1.821113	52	0.0743
F-statistic	3.316452	(1, 52)	0.0743
Likelihood ratio	3.585946	1	0.0583

F-test summary:

	Sum of Sq.	df	Mean Squares
Test SSR	0.003227	1	0.003227
Restricted SSR	0.053828	53	0.001016
Unrestricted SSR	0.050600	52	0.000973

LR test summary:

	Value	df
Restricted LogL	120.1915	53
Unrestricted LogL	121.9845	52

Unrestricted Test Equation:
Dependent Variable: DTOP1
Method: Least Squares
Date: 09/09/16 Time: 18:03
Sample: 1955 2012
Included observations: 58
HAC standard errors & covariance (Bartlett kernel, Newey-West automatic bandwidth = 4.0384, NW automatic lag length = 3)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID1(-1)	-0.414337	0.144460	-2.868185	0.0060
DTOP1(-1)	0.462057	0.125841	3.671748	0.0006
DTOP1(-4)	0.415165	0.226816	1.830402	0.0729
DTFP(-4)	0.293581	0.198004	1.482702	0.1442
C	-0.009830	0.007748	-1.268650	0.2102
FITTED^2	16.69201	10.32137	1.617229	0.1119

R-squared	0.302169	Mean dependent var	-0.000381
Adjusted R-squared	0.235070	S.D. dependent var	0.035667
S.E. of regression	0.031194	Akaike info criterion	-3.999465
Sum squared resid	0.050600	Schwarz criterion	-3.786315
Log likelihood	121.9845	Hannan-Quinn criter.	-3.916439
F-statistic	4.503315	Durbin-Watson stat	1.888271
Prob(F-statistic)	0.001744	Wald F-statistic	3.895680
Prob(Wald F-statistic)	0.004494		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

B.5. Germany

Table B.58: Germany Model I, FMOLS Regression

Dependent Variable: TOP10
Method: Fully Modified Least Squares (FMOLS)
Date: 09/08/16 Time: 17:11
Sample (adjusted): 1951 2011
Included observations: 61 after adjustments
Cointegrating equation deterministics: C @TREND @TREND^2
Long-run covariance estimate (Bartlett kernel, Newey-West automatic bandwidth = 3.2469, NW automatic lag length = 3)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TFP	-0.016051	0.112963	-0.142093	0.8875
C	8.184506	0.401302	20.39488	0.0000
@TREND	-0.007668	0.003575	-2.144755	0.0362
@TREND^2	0.000173	2.84E-05	6.102146	0.0000

R-squared	0.924663	Mean dependent var	8.099185
Adjusted R-squared	0.920698	S.D. dependent var	0.072799
S.E. of regression	0.020501	Sum squared resid	0.023956
Long-run variance	0.000872		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table B.59: Germany Model I, FMOLS Hansen Instability Test

Cointegration Test - Hansen Parameter Instability
Date: 09/09/16 Time: 18:24
Equation: TOP10_FMOLS
Series: TOP10 TFP
Null hypothesis: Series are cointegrated
Cointegrating equation deterministics: C @TREND @TREND^2

Lc statistic	Stochastic Trends (m)	Deterministic Trends (k)	Excluded Trends (p2)	Prob.*
0.289039	1	2	0	> 0.2

*Hansen (1992b) Lc(m2=1, k=2) p-values, where m2=m-p2 is the number of stochastic trends in the asymptotic distribution

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table B.60: Germany Model I, FMOLS ADF Unit Root Test of Residuals

Null Hypothesis: RESID10 has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic - based on SIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.081239	0.0000
Test critical values:	1% level	-3.546099	
	5% level	-2.911730	
	10% level	-2.593551	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(RESID10)
Method: Least Squares
Date: 09/09/16 Time: 18:23
Sample (adjusted): 1953 2011
Included observations: 59 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID10(-1)	-0.435726	0.071651	-6.081239	0.0000
D(RESID10(-1))	0.743980	0.102442	7.262449	0.0000
C	-0.000379	0.001319	-0.287545	0.7748

R-squared	0.545293	Mean dependent var	-0.000702
Adjusted R-squared	0.529053	S.D. dependent var	0.014757
S.E. of regression	0.010127	Akaike info criterion	-6.297736
Sum squared resid	0.005743	Schwarz criterion	-6.192098
Log likelihood	188.7832	Hannan-Quinn criter.	-6.256499
F-statistic	33.57808	Durbin-Watson stat	2.050093
Prob(F-statistic)	0.000000		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table B.61: Germany Model I, FMOLS Engle-Granger Cointegration Test

Cointegration Test - Engle-Granger
Date: 09/09/16 Time: 18:24
Equation: TOP10_FMOLS
Specification: TOP10 TFP C @TREND @TREND^2
Cointegrating equation deterministics: C @TREND @TREND^2
Null hypothesis: Series are not cointegrated
Automatic lag specification (lag=1 based on Schwarz Info Criterion, maxlag=10)

	Value	Prob.*
Engle-Granger tau-statistic	-6.107824	0.0005
Engle-Granger z-statistic	-100.4972	0.0000

*MacKinnon (1996) p-values.

Intermediate Results:	
Rho - 1	-0.431967
Rho S.E.	0.070724
Residual variance	0.000100
Long-run residual variance	0.001504
Number of lags	1
Number of observations	60
Number of stochastic trends**	2

**Number of stochastic trends in asymptotic distribution.

Engle-Granger Test Equation:
Dependent Variable: D(RESID)
Method: Least Squares
Date: 09/09/16 Time: 18:24
Sample (adjusted): 1952 2011
Included observations: 60 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID(-1)	-0.431967	0.070724	-6.107824	0.0000
D(RESID(-1))	0.742102	0.101496	7.311649	0.0000

R-squared	0.538746	Mean dependent var	-0.000732
Adjusted R-squared	0.530793	S.D. dependent var	0.014602
S.E. of regression	0.010002	Akaike info criterion	-6.339204
Sum squared resid	0.005803	Schwarz criterion	-6.269393
Log likelihood	192.1761	Hannan-Quinn criter.	-6.311897
Durbin-Watson stat	2.026081		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table B.62: Germany Model I, Unrestricted Error Correction Estimation

Dependent Variable: DTOP10
Method: Least Squares
Date: 09/09/16 Time: 18:40
Sample (adjusted): 1958 2011
Included observations: 54 after adjustments
HAC standard errors & covariance (Bartlett kernel, Newey-West automatic bandwidth = 2.3859, NW automatic lag length = 3)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID10(-1)	-0.426041	0.136408	-3.123289	0.0034
DTOP10(-1)	0.491015	0.268973	1.825515	0.0758
DTOP10(-2)	0.096779	0.227126	0.426101	0.6724
DTOP10(-3)	0.030097	0.119392	0.252088	0.8023
DTOP10(-4)	-0.041224	0.105106	-0.392210	0.6971
DTOP10(-5)	0.372243	0.095837	3.884139	0.0004
DTOP10(-6)	-0.635404	0.198854	-3.195333	0.0028
DTOP10(-7)	0.478693	0.231588	2.067002	0.0456
DTFP(-1)	0.202886	0.085121	2.383516	0.0222
DTFP(-2)	-0.069058	0.087461	-0.789585	0.4347
DTFP(-3)	-0.082944	0.090821	-0.913264	0.3669
DTFP(-4)	-0.147638	0.117888	-1.252357	0.2181
DTFP(-5)	-0.102797	0.090098	-1.140950	0.2610
DTFP(-6)	-0.002413	0.099325	-0.024297	0.9807
DTFP(-7)	0.092141	0.114982	0.801355	0.4279
C	0.003905	0.004708	0.829491	0.4120

R-squared	0.697808	Mean dependent var	0.003385
Adjusted R-squared	0.578522	S.D. dependent var	0.015890
S.E. of regression	0.010316	Akaike info criterion	-6.069092
Sum squared resid	0.004044	Schwarz criterion	-5.479764
Log likelihood	179.8655	Hannan-Quinn criter.	-5.841811
F-statistic	5.849860	Durbin-Watson stat	1.952673
Prob(F-statistic)	0.000005	Wald F-statistic	20.12821
Prob(Wald F-statistic)	0.000000		

Source: EViews output based on data of Feenstra *et al.* (2015) and Alvaredo *et al.* (2016).

Table B.63: Germany Model I, Restricted Error Correction Model (ECM)

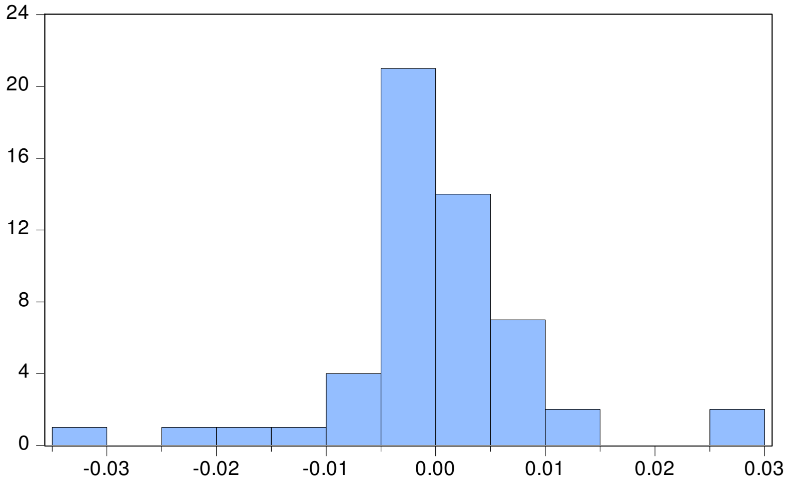
Dependent Variable: DTOP10
Method: Least Squares
Date: 09/09/16 Time: 18:44
Sample (adjusted): 1958 2011
Included observations: 54 after adjustments
HAC standard errors & covariance (Bartlett kernel, Newey-West automatic bandwidth = 2.9539, NW automatic lag length = 3)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID10(-1)	-0.424360	0.063585	-6.673856	0.0000
DTOP10(-1)	0.713904	0.197938	3.606706	0.0007
DTOP10(-5)	0.281154	0.122049	2.303611	0.0257
DTOP10(-6)	-0.490570	0.138488	-3.542332	0.0009
DTOP10(-7)	0.414445	0.200483	2.067227	0.0442
DTFP(-1)	0.113666	0.051487	2.207682	0.0322
C	-0.000772	0.002037	-0.378703	0.7066

R-squared	0.632517	Mean dependent var	0.003385
Adjusted R-squared	0.585604	S.D. dependent var	0.015890
S.E. of regression	0.010229	Akaike info criterion	-6.206810
Sum squared resid	0.004917	Schwarz criterion	-5.948979
Log likelihood	174.5839	Hannan-Quinn criter.	-6.107375
F-statistic	13.48283	Durbin-Watson stat	2.165192
Prob(F-statistic)	0.000000	Wald F-statistic	18.96310
Prob(Wald F-statistic)	0.000000		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Figure B.7: Germany Model I, ECM Jarque-Bera Normal Distribution Test



Series: Residuals
Sample 1958 2011
Observations 54

Mean	1.50e-19
Median	-0.000451
Maximum	0.029599
Minimum	-0.034704
Std. Dev.	0.009632
Skewness	-0.101608
Kurtosis	7.008619
Jarque-Bera	36.24823
Probability	0.000000

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table B.64: Germany Model I, ECM Breusch-Godfrey Serial Correlation LM Test

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.325254	Prob. F(2,45)	0.7240
Obs*R-squared	0.769486	Prob. Chi-Square(2)	0.6806

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Date: 09/09/16 Time: 18:42
Sample: 1958 2011
Included observations: 54
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID10(-1)	0.020716	0.121502	0.170500	0.8654
DTOP10(-1)	0.063926	0.142135	0.449754	0.6550
DTOP10(-5)	0.015071	0.150703	0.100006	0.9208
DTOP10(-6)	0.012980	0.190924	0.067983	0.9461
DTOP10(-7)	0.004059	0.185020	0.021938	0.9826
DTFP(-1)	0.010730	0.092857	0.115557	0.9085
C	-0.000473	0.002253	-0.209748	0.8348
RESID(-1)	-0.170283	0.255100	-0.667517	0.5079
RESID(-2)	-0.003464	0.223752	-0.015481	0.9877

R-squared	0.014250	Mean dependent var	1.50E-19
Adjusted R-squared	-0.160995	S.D. dependent var	0.009632
S.E. of regression	0.010379	Akaike info criterion	-6.147088
Sum squared resid	0.004847	Schwarz criterion	-5.815591
Log likelihood	174.9714	Hannan-Quinn criter.	-6.019243
F-statistic	0.081313	Durbin-Watson stat	2.000729
Prob(F-statistic)	0.999556		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table B.65: Germany Model I, ECM Heteroskedasticity Test

Heteroskedasticity Test: White

F-statistic	3.842943	Prob. F(6,47)	0.0034
Obs*R-squared	17.77270	Prob. Chi-Square(6)	0.0068
Scaled explained SS	40.44885	Prob. Chi-Square(6)	0.0000

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 09/09/16 Time: 18:43
Sample: 1958 2011
Included observations: 54
HAC standard errors & covariance (Bartlett kernel, Newey-West automatic bandwidth = 3.4631, NW automatic lag length = 3)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	3.97E-05	3.55E-05	1.118862	0.2689
RESID10(-1)^2	-0.038065	0.026098	-1.458549	0.1513
DTOP10(-1)^2	0.233644	0.111897	2.088025	0.0422
DTOP10(-5)^2	-0.038667	0.035093	-1.101851	0.2761
DTOP10(-6)^2	-0.050466	0.041225	-1.224167	0.2270
DTOP10(-7)^2	0.185337	0.104847	1.767697	0.0836
DTFP(-1)^2	-0.006235	0.012695	-0.491130	0.6256

R-squared	0.329124	Mean dependent var	9.11E-05
Adjusted R-squared	0.243480	S.D. dependent var	0.000225
S.E. of regression	0.000196	Akaike info criterion	-14.11673
Sum squared resid	1.81E-06	Schwarz criterion	-13.85890
Log likelihood	388.1518	Hannan-Quinn criter.	-14.01730
F-statistic	3.842943	Durbin-Watson stat	1.285587
Prob(F-statistic)	0.003367		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table B.66: Germany Model I, ECM RESET Test

Ramsey RESET Test
Equation: TOP10_ECM
Specification: DTOP10 RESID10(-1) DTOP10(-1) DTOP10(-5 TO -7) DTFP(
-1) C
Omitted Variables: Squares of fitted values

	Value	df	Probability
t-statistic	1.287332	46	0.2044
F-statistic	1.657223	(1, 46)	0.2044
Likelihood ratio	1.911211	1	0.1668

F-test summary:

	Sum of Sq.	df	Mean Squares
Test SSR	0.000171	1	0.000171
Restricted SSR	0.004917	47	0.000105
Unrestricted SSR	0.004746	46	0.000103

LR test summary:

	Value	df
Restricted LogL	174.5839	47
Unrestricted LogL	175.5395	46

Unrestricted Test Equation:
Dependent Variable: DTOP10
Method: Least Squares
Date: 09/09/16 Time: 18:43
Sample: 1958 2011
Included observations: 54
HAC standard errors & covariance (Bartlett kernel, Newey-West automatic
bandwidth = 3.4607, NW automatic lag length = 3)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID10(-1)	-0.508139	0.080893	-6.281609	0.0000
DTOP10(-1)	0.884772	0.174076	5.082665	0.0000
DTOP10(-5)	0.240827	0.136501	1.764290	0.0843
DTOP10(-6)	-0.381447	0.182568	-2.089349	0.0422
DTOP10(-7)	0.363606	0.219188	1.658875	0.1039
DTFP(-1)	0.091385	0.052687	1.734467	0.0895
C	0.000605	0.002436	0.248467	0.8049
FITTED^2	-10.13607	7.876749	-1.286834	0.2046

R-squared	0.645296	Mean dependent var	0.003385
Adjusted R-squared	0.591319	S.D. dependent var	0.015890
S.E. of regression	0.010158	Akaike info criterion	-6.205166
Sum squared resid	0.004746	Schwarz criterion	-5.910502
Log likelihood	175.5395	Hannan-Quinn criter.	-6.091526
F-statistic	11.95506	Durbin-Watson stat	2.150425
Prob(F-statistic)	0.000000	Wald F-statistic	16.07281
Prob(Wald F-statistic)	0.000000		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table B.67: Germany Model II, FMOLS Regression

Dependent Variable: TOP5
Method: Fully Modified Least Squares (FMOLS)
Date: 09/08/16 Time: 17:21
Sample (adjusted): 1951 2011
Included observations: 61 after adjustments
Cointegrating equation deterministics: C @TREND @TREND^2
Long-run covariance estimate (Bartlett kernel, Newey-West automatic bandwidth = 4.7069, NW automatic lag length = 3)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TFP	0.313974	0.178867	1.755355	0.0846
C	6.733470	0.635424	10.59682	0.0000
@TREND	-0.022583	0.005661	-3.989381	0.0002
@TREND^2	0.000301	4.49E-05	6.699303	0.0000

R-squared	0.857166	Mean dependent var	7.741471
Adjusted R-squared	0.849648	S.D. dependent var	0.075737
S.E. of regression	0.029367	Sum squared resid	0.049159
Long-run variance	0.002186		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table B.68: Germany Model II, FMOLS Hansen Instability Test

Cointegration Test - Hansen Parameter Instability
Date: 09/09/16 Time: 18:49
Equation: TOP5_FMOLS
Series: TOP5 TFP
Null hypothesis: Series are cointegrated
Cointegrating equation deterministics: C @TREND @TREND^2

Lc statistic	Stochastic Trends (m)	Deterministic Trends (k)	Excluded Trends (p2)	Prob.*
0.521003	1	2	0	0.1651

*Hansen (1992b) Lc(m2=1, k=2) p-values, where m2=m-p2 is the number of stochastic trends in the asymptotic distribution

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table B.69: Germany Model II, FMOLS ADF Unit Root Test of Residuals

Null Hypothesis: RESID5 has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic - based on SIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.812193	0.0000
Test critical values:	1% level	-3.546099	
	5% level	-2.911730	
	10% level	-2.593551	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(RESID5)
Method: Least Squares
Date: 09/09/16 Time: 18:48
Sample (adjusted): 1953 2011
Included observations: 59 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID5(-1)	-0.357758	0.061553	-5.812193	0.0000
D(RESID5(-1))	0.757282	0.099257	7.629512	0.0000
C	-0.000469	0.001672	-0.280389	0.7802

R-squared	0.559122	Mean dependent var	-0.000333
Adjusted R-squared	0.543376	S.D. dependent var	0.018998
S.E. of regression	0.012838	Akaike info criterion	-5.823339
Sum squared resid	0.009229	Schwarz criterion	-5.717702
Log likelihood	174.7885	Hannan-Quinn criter.	-5.782103
F-statistic	35.50964	Durbin-Watson stat	1.975371
Prob(F-statistic)	0.000000		

Source: EViews output based on data of Feenstra *et al.* (2015) and Alvaredo *et al.* (2016).

Table B.70: Germany Model II, FMOLS Engle-Granger Cointegration Test

Cointegration Test - Engle-Granger
Date: 09/09/16 Time: 18:49
Equation: TOP5_FMOLS
Specification: TOP5 TFP C @TREND @TREND^2
Cointegrating equation deterministics: C @TREND @TREND^2
Null hypothesis: Series are not cointegrated
Automatic lag specification (lag=1 based on Schwarz Info Criterion, maxlag=10)

	Value	Prob.*
Engle-Granger tau-statistic	-5.863741	0.0010
Engle-Granger z-statistic	-86.53764	0.0000

*MacKinnon (1996) p-values.

Intermediate Results:	
Rho - 1	-0.356609
Rho S.E.	0.060816
Residual variance	0.000161
Long-run residual variance	0.002635
Number of lags	1
Number of observations	60
Number of stochastic trends**	2

**Number of stochastic trends in asymptotic distribution.

Engle-Granger Test Equation:
Dependent Variable: D(RESID)
Method: Least Squares
Date: 09/09/16 Time: 18:49
Sample (adjusted): 1952 2011
Included observations: 60 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID(-1)	-0.356609	0.060816	-5.863741	0.0000
D(RESID(-1))	0.752749	0.098003	7.680881	0.0000

R-squared	0.553886	Mean dependent var	-0.000435
Adjusted R-squared	0.546195	S.D. dependent var	0.018840
S.E. of regression	0.012692	Akaike info criterion	-5.862969
Sum squared resid	0.009343	Schwarz criterion	-5.793157
Log likelihood	177.8891	Hannan-Quinn criter.	-5.835661
Durbin-Watson stat	1.949138		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table B.71: Unrestricted Error Correction Estimation

Dependent Variable: DTOP5
Method: Least Squares
Date: 09/09/16 Time: 18:51
Sample (adjusted): 1955 2011
Included observations: 57 after adjustments
HAC standard errors & covariance (Bartlett kernel, Newey-West automatic bandwidth = 2.2706, NW automatic lag length = 3)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID5(-1)	-0.330303	0.098919	-3.339131	0.0017
DTOP5(-1)	0.617136	0.199708	3.090189	0.0034
DTOP5(-2)	-0.022220	0.224234	-0.099093	0.9215
DTOP5(-3)	0.162197	0.192236	0.843735	0.4031
DTOP5(-4)	-0.224283	0.167429	-1.339570	0.1868
DTFP(-1)	0.021560	0.130984	0.164602	0.8700
DTFP(-2)	-0.001012	0.139084	-0.007275	0.9942
DTFP(-3)	-0.198353	0.108664	-1.825376	0.0743
DTFP(-4)	-0.126546	0.112291	-1.126952	0.2655
C	0.006831	0.002899	2.356734	0.0227

R-squared	0.656713	Mean dependent var	0.002057
Adjusted R-squared	0.590978	S.D. dependent var	0.020433
S.E. of regression	0.013068	Akaike info criterion	-5.679342
Sum squared resid	0.008026	Schwarz criterion	-5.320912
Log likelihood	171.8612	Hannan-Quinn criter.	-5.540044
F-statistic	9.990204	Durbin-Watson stat	2.006188
Prob(F-statistic)	0.000000	Wald F-statistic	9.221458
Prob(Wald F-statistic)	0.000000		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

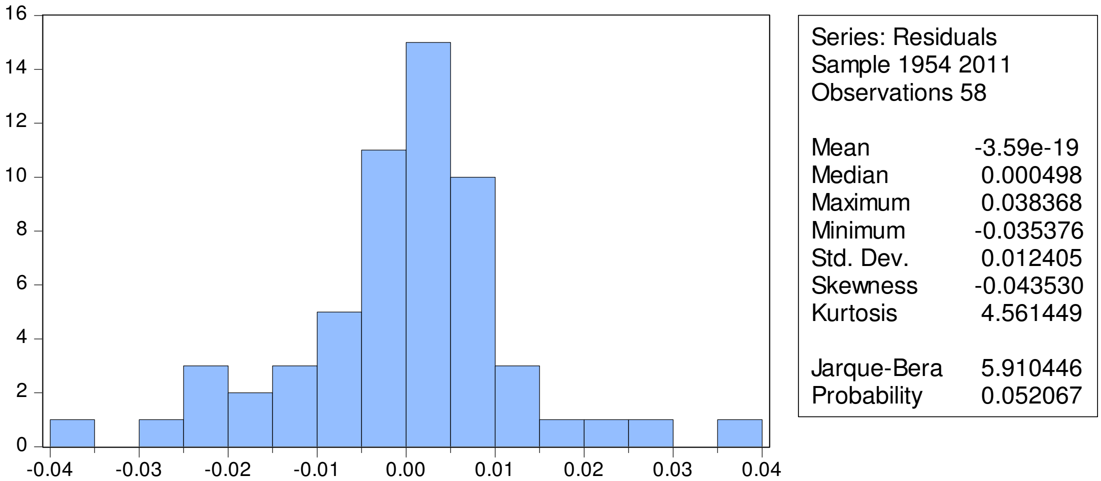
Table B.72: Germany Model II, Restricted Error Correction Model (ECM)

Dependent Variable: DTOP5
Method: Least Squares
Date: 09/09/16 Time: 18:52
Sample (adjusted): 1954 2011
Included observations: 58 after adjustments
HAC standard errors & covariance (Bartlett kernel, Newey-West automatic bandwidth = 3.4839, NW automatic lag length = 3)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID5(-1)	-0.336840	0.053847	-6.255484	0.0000
DTOP5(-1)	0.701261	0.101835	6.886271	0.0000
DTFP(-3)	-0.223987	0.104754	-2.138221	0.0370
C	0.004850	0.002558	1.895584	0.0634
R-squared	0.627224	Mean dependent var	0.001843	
Adjusted R-squared	0.606515	S.D. dependent var	0.020318	
S.E. of regression	0.012745	Akaike info criterion	-5.820818	
Sum squared resid	0.008772	Schwarz criterion	-5.678719	
Log likelihood	172.8037	Hannan-Quinn criter.	-5.765468	
F-statistic	30.28642	Durbin-Watson stat	2.126453	
Prob(F-statistic)	0.000000	Wald F-statistic	39.51503	
Prob(Wald F-statistic)	0.000000			

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Figure B.8: Germany Model II, ECM Jarque-Bera Normal Distribution Test



Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table B.73: Germany Model II, ECM Breusch-Godfrey Serial Correlation LM Test

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.972105	Prob. F(2,52)	0.3851
Obs*R-squared	2.090385	Prob. Chi-Square(2)	0.3516

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Date: 09/09/16 Time: 18:58
Sample: 1954 2011
Included observations: 58
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID5(-1)	0.067611	0.080639	0.838448	0.4056
DTOP5(-1)	0.099324	0.116949	0.849293	0.3996
DTFP(-3)	0.017435	0.103228	0.168894	0.8665
C	-0.000466	0.002654	-0.175744	0.8612
RESID(-1)	-0.270519	0.205320	-1.317550	0.1934
RESID(-2)	-0.201619	0.196416	-1.026488	0.3094

R-squared	0.036041	Mean dependent var	-3.59E-19
Adjusted R-squared	-0.056647	S.D. dependent var	0.012405
S.E. of regression	0.012752	Akaike info criterion	-5.788559
Sum squared resid	0.008456	Schwarz criterion	-5.575410
Log likelihood	173.8682	Hannan-Quinn criter.	-5.705533
F-statistic	0.388842	Durbin-Watson stat	1.882592
Prob(F-statistic)	0.854236		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table B.74: Germany Model II, ECM Heteroskedasticity Test

Heteroskedasticity Test: White

F-statistic	4.940507	Prob. F(3,54)	0.0042
Obs*R-squared	12.49098	Prob. Chi-Square(3)	0.0059
Scaled explained SS	19.28079	Prob. Chi-Square(3)	0.0002

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 09/09/16 Time: 18:59
Sample: 1954 2011
Included observations: 58
HAC standard errors & covariance (Bartlett kernel, Newey-West automatic bandwidth = 6.4670, NW automatic lag length = 3)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	9.67E-05	6.85E-05	1.411553	0.1638
RESID5(-1)^2	-0.006005	0.010034	-0.598529	0.5520
DTOP5(-1)^2	0.165671	0.064989	2.549225	0.0137
DTFP(-3)^2	-0.009349	0.038978	-0.239847	0.8114

R-squared	0.215362	Mean dependent var	0.000151
Adjusted R-squared	0.171771	S.D. dependent var	0.000288
S.E. of regression	0.000262	Akaike info criterion	-13.58981
Sum squared resid	3.71E-06	Schwarz criterion	-13.44771
Log likelihood	398.1045	Hannan-Quinn criter.	-13.53446
F-statistic	4.940507	Durbin-Watson stat	1.181343
Prob(F-statistic)	0.004195		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table B.75: Germany Model II, ECM RESET Test

Ramsey RESET Test
Equation: TOP5_ECM
Specification: DTOP5 RESID5(-1) DTOP5(-1) DTFP(-3) C
Omitted Variables: Squares of fitted values

	Value	df	Probability
t-statistic	1.481309	53	0.1444
F-statistic	2.194278	(1, 53)	0.1444
Likelihood ratio	2.352907	1	0.1250

F-test summary:

	Sum of Sq.	df	Mean Squares
Test SSR	0.000349	1	0.000349
Restricted SSR	0.008772	54	0.000162
Unrestricted SSR	0.008423	53	0.000159

LR test summary:

	Value	df
Restricted LogL	172.8037	54
Unrestricted LogL	173.9802	53

Unrestricted Test Equation:
Dependent Variable: DTOP5
Method: Least Squares
Date: 09/09/16 Time: 19:00
Sample: 1954 2011
Included observations: 58
HAC standard errors & covariance (Bartlett kernel, Newey-West automatic bandwidth = 4.0069, NW automatic lag length = 3)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID5(-1)	-0.398357	0.090563	-4.398679	0.0001
DTOP5(-1)	0.832314	0.146092	5.697183	0.0000
DTFP(-3)	-0.230995	0.100565	-2.296969	0.0256
C	0.006459	0.003422	1.887525	0.0646
FITTED^2	-6.667629	6.162225	-1.082017	0.2841

R-squared	0.642044	Mean dependent var	0.001843
Adjusted R-squared	0.615029	S.D. dependent var	0.020318
S.E. of regression	0.012607	Akaike info criterion	-5.826903
Sum squared resid	0.008423	Schwarz criterion	-5.649278
Log likelihood	173.9802	Hannan-Quinn criter.	-5.757715
F-statistic	23.76575	Durbin-Watson stat	2.199681
Prob(F-statistic)	0.000000	Wald F-statistic	28.36093
Prob(Wald F-statistic)	0.000000		

Source: EViews output based on data of Feenstra *et al.* (2015) and Alvaredo *et al.* (2016).

B.6. United Kingdom

Table B.76: UK Model I, FMOLS Regression

Dependent Variable: TOP10
Method: Fully Modified Least Squares (FMOLS)
Date: 09/08/16 Time: 19:57
Sample (adjusted): 1951 2012
Included observations: 62 after adjustments
Cointegrating equation deterministics: C @TREND @TREND^2
Long-run covariance estimate (Bartlett kernel, Newey-West automatic bandwidth = 6.9086, NW automatic lag length = 3)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TFP	1.830632	0.562026	3.257200	0.0019
C	0.729786	2.237753	0.326124	0.7455
@TREND	-0.025165	0.007143	-3.522978	0.0008
@TREND^2	0.000188	4.83E-05	3.894008	0.0003

R-squared	0.879777	Mean dependent var	8.113275
Adjusted R-squared	0.873559	S.D. dependent var	0.147437
S.E. of regression	0.052426	Sum squared resid	0.159414
Long-run variance	0.011797		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table B.77: UK Model I, FMOLS Hansen Instability Test

Cointegration Test - Hansen Parameter Instability
Date: 09/10/16 Time: 16:31
Equation: TOP10_FMOLS
Series: TOP10 TFP
Null hypothesis: Series are cointegrated
Cointegrating equation deterministics: C @TREND @TREND^2

Lc statistic	Stochastic Trends (m)	Deterministic Trends (k)	Excluded Trends (p2)	Prob.*
0.400094	1	2	0	> 0.2

*Hansen (1992b) Lc(m2=1, k=2) p-values, where m2=m-p2 is the number of stochastic trends in the asymptotic distribution

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table B.78: UK Model I, FMOLS ADF Unit Root Test of Residuals

Null Hypothesis: RESID10 has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.871873	0.0546
Test critical values:	1% level	-3.542097	
	5% level	-2.910019	
	10% level	-2.592645	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(RESID10)
Method: Least Squares
Date: 09/10/16 Time: 16:30
Sample (adjusted): 1952 2012
Included observations: 61 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID10(-1)	-0.249012	0.086707	-2.871873	0.0057
C	-0.000596	0.004412	-0.135147	0.8930

R-squared	0.122646	Mean dependent var	-0.000377
Adjusted R-squared	0.107776	S.D. dependent var	0.036474
S.E. of regression	0.034453	Akaike info criterion	-3.866219
Sum squared resid	0.070032	Schwarz criterion	-3.797010
Log likelihood	119.9197	Hannan-Quinn criter.	-3.839096
F-statistic	8.247654	Durbin-Watson stat	1.858615
Prob(F-statistic)	0.005660		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table B.79: UK Model I, FMOLS Engle-Granger Cointegration Test

Cointegration Test - Engle-Granger
Date: 09/10/16 Time: 16:31
Equation: TOP10_FMOLS
Specification: TOP10 TFP C @TREND @TREND^2
Cointegrating equation deterministics: C @TREND @TREND^2
Null hypothesis: Series are not cointegrated
Automatic lag specification (lag=0 based on Schwarz Info Criterion, maxlag=10)

	Value	Prob.*
Engle-Granger tau-statistic	-2.457166	0.7709
Engle-Granger z-statistic	-11.54214	0.7562

*MacKinnon (1996) p-values.

Intermediate Results:	
Rho - 1	-0.186164
Rho S.E.	0.075764
Residual variance	0.000864
Long-run residual variance	0.000864
Number of lags	0
Number of observations	62
Number of stochastic trends**	2

**Number of stochastic trends in asymptotic distribution.

Engle-Granger Test Equation:
Dependent Variable: D(RESID)
Method: Least Squares
Date: 09/10/16 Time: 16:31
Sample (adjusted): 1951 2012
Included observations: 62 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID(-1)	-0.186164	0.075764	-2.457166	0.0169

R-squared	0.089999	Mean dependent var	-0.000259
Adjusted R-squared	0.089999	S.D. dependent var	0.030808
S.E. of regression	0.029389	Akaike info criterion	-4.200400
Sum squared resid	0.052686	Schwarz criterion	-4.166091
Log likelihood	131.2124	Hannan-Quinn criter.	-4.186929
Durbin-Watson stat	1.784222		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table B.80: UK Model I, Unrestricted Error Correction Estimation

Dependent Variable: DTOP10
Method: Least Squares
Date: 09/10/16 Time: 16:42
Sample (adjusted): 1959 2012
Included observations: 54 after adjustments
HAC standard errors & covariance (Bartlett kernel, Newey-West automatic bandwidth = 4.4505, NW automatic lag length = 3)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID10(-1)	-0.147895	0.068646	-2.154451	0.0380
DTOP10(-1)	0.234339	0.101830	2.301269	0.0273
DTOP10(-2)	0.175772	0.144506	1.216359	0.2318
DTOP10(-3)	0.092684	0.154802	0.598728	0.5531
DTOP10(-4)	0.002071	0.164389	0.012598	0.9900
DTOP10(-5)	-0.070257	0.120672	-0.582214	0.5641
DTOP10(-6)	0.275222	0.153626	1.791501	0.0816
DTOP10(-7)	-0.031273	0.196359	-0.159267	0.8743
DTOP10(-8)	0.224572	0.132411	1.696015	0.0985
DTFP(-1)	0.170390	0.368910	0.461874	0.6470
DTFP(-2)	-0.106084	0.187127	-0.566907	0.5743
DTFP(-3)	0.016089	0.154269	0.104291	0.9175
DTFP(-4)	-0.214245	0.121544	-1.762692	0.0864
DTFP(-5)	-0.148768	0.325749	-0.456696	0.6506
DTFP(-6)	-0.417557	0.223267	-1.870219	0.0696
DTFP(-7)	-0.175593	0.263269	-0.666973	0.5090
DTFP(-8)	-0.029496	0.159844	-0.184532	0.8546
C	0.010556	0.009526	1.108103	0.2752

R-squared	0.246043	Mean dependent var	0.005094
Adjusted R-squared	-0.109992	S.D. dependent var	0.022831
S.E. of regression	0.024054	Akaike info criterion	-4.355860
Sum squared resid	0.020829	Schwarz criterion	-3.692865
Log likelihood	135.6082	Hannan-Quinn criter.	-4.100169
F-statistic	0.691063	Durbin-Watson stat	2.081853
Prob(F-statistic)	0.790495	Wald F-statistic	3.530936
Prob(Wald F-statistic)	0.000714		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table B.81: UK Model I, Restricted Error Correction Model (ECM)

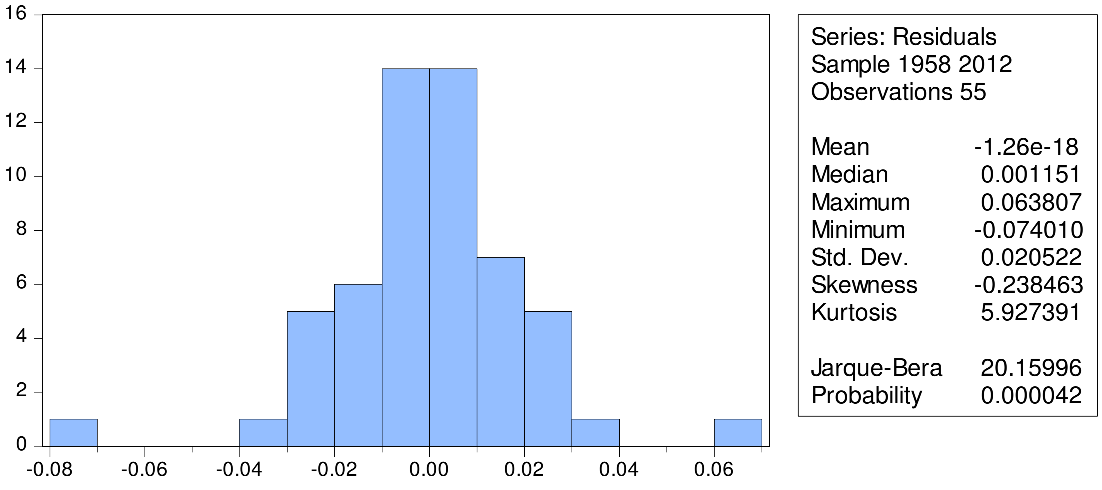
Dependent Variable: DTOP10
Method: Least Squares
Date: 09/10/16 Time: 16:44
Sample (adjusted): 1958 2012
Included observations: 55 after adjustments
HAC standard errors & covariance (Bartlett kernel, Newey-West automatic bandwidth = 3.5592, NW automatic lag length = 3)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID10(-1)	-0.112943	0.056177	-2.010484	0.0500
DTOP10(-1)	0.221608	0.131971	1.679221	0.0996
DTOP10(-6)	0.255758	0.128090	1.996705	0.0515
DTOP10(-8)	0.223514	0.106521	2.098312	0.0412
DTFP(-4)	-0.136555	0.116913	-1.168003	0.2486
DTFP(-6)	-0.313603	0.219057	-1.431605	0.1587
C	0.006626	0.004767	1.389925	0.1710

R-squared	0.177026	Mean dependent var	0.005038
Adjusted R-squared	0.074154	S.D. dependent var	0.022622
S.E. of regression	0.021767	Akaike info criterion	-4.698405
Sum squared resid	0.022743	Schwarz criterion	-4.442926
Log likelihood	136.2061	Hannan-Quinn criter.	-4.599609
F-statistic	1.720836	Durbin-Watson stat	2.091490
Prob(F-statistic)	0.136493	Wald F-statistic	1.791015
Prob(Wald F-statistic)	0.120954		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Figure B.9: UK Model I, ECM Jarque-Bera Normal Distribution Test



Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table B.82: UK Model I, ECM Breusch-Godfrey Serial Correlation LM Test

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.766374	Prob. F(2,46)	0.4705
Obs*R-squared	1.773538	Prob. Chi-Square(2)	0.4120

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Date: 09/10/16 Time: 16:58
Sample: 1958 2012
Included observations: 55
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID10(-1)	-0.007671	0.068956	-0.111240	0.9119
DTOP10(-1)	0.236032	0.364784	0.647047	0.5208
DTOP10(-6)	-0.010570	0.163589	-0.064612	0.9488
DTOP10(-8)	-0.004871	0.166049	-0.029334	0.9767
DTFP(-4)	-0.054344	0.220636	-0.246308	0.8065
DTFP(-6)	-0.038066	0.216503	-0.175823	0.8612
C	-1.23E-05	0.004589	-0.002674	0.9979
RESID(-1)	-0.281389	0.419273	-0.671134	0.5055
RESID(-2)	0.128492	0.170468	0.753760	0.4548

R-squared	0.032246	Mean dependent var	-1.26E-18
Adjusted R-squared	-0.136059	S.D. dependent var	0.020522
S.E. of regression	0.021874	Akaike info criterion	-4.658455
Sum squared resid	0.022010	Schwarz criterion	-4.329983
Log likelihood	137.1075	Hannan-Quinn criter.	-4.531432
F-statistic	0.191593	Durbin-Watson stat	2.029607
Prob(F-statistic)	0.990840		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table B.83: UK Model I, ECM Heteroskedasticity Test

Heteroskedasticity Test: White

F-statistic	0.288392	Prob. F(6,48)	0.9396
Obs*R-squared	1.913710	Prob. Chi-Square(6)	0.9275
Scaled explained SS	3.591039	Prob. Chi-Square(6)	0.7318

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 09/10/16 Time: 16:59
Sample: 1958 2012
Included observations: 55
HAC standard errors & covariance (Bartlett kernel, Newey-West automatic bandwidth = 2.4349, NW automatic lag length = 3)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.000623	0.000269	2.317628	0.0248
RESID10(-1)^2	-0.033698	0.030203	-1.115735	0.2701
DTOP10(-1)^2	0.016338	0.041518	0.393528	0.6957
DTOP10(-6)^2	-0.055802	0.035265	-1.582373	0.1201
DTOP10(-8)^2	-0.104968	0.053793	-1.951332	0.0569
DTFP(-4)^2	-0.170625	0.158995	-1.073142	0.2886
DTFP(-6)^2	-0.013549	0.161987	-0.083639	0.9337

R-squared	0.034795	Mean dependent var	0.000414
Adjusted R-squared	-0.085856	S.D. dependent var	0.000926
S.E. of regression	0.000965	Akaike info criterion	-10.92984
Sum squared resid	4.47E-05	Schwarz criterion	-10.67436
Log likelihood	307.5705	Hannan-Quinn criter.	-10.83104
F-statistic	0.288392	Durbin-Watson stat	1.845900
Prob(F-statistic)	0.939625		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table B.84: UK Model I, ECM RESET Test

Ramsey RESET Test
Equation: TOP10_ECM
Specification: DTOP10 RESID10(-1) DTOP10(-1) DTOP10(-6) DTOP10(-8)
DTFP(-4) DTFP(-6) C
Omitted Variables: Squares of fitted values

	Value	df	Probability
t-statistic	0.912367	47	0.3662
F-statistic	0.832413	(1, 47)	0.3662
Likelihood ratio	0.965575	1	0.3258

F-test summary:

	Sum of Sq.	df	Mean Squares
Test SSR	0.000396	1	0.000396
Restricted SSR	0.022743	48	0.000474
Unrestricted SSR	0.022347	47	0.000475

LR test summary:

	Value	df
Restricted LogL	136.2061	48
Unrestricted LogL	136.6889	47

Unrestricted Test Equation:
Dependent Variable: DTOP10
Method: Least Squares
Date: 09/10/16 Time: 16:59
Sample: 1958 2012
Included observations: 55
HAC standard errors & covariance (Bartlett kernel, Newey-West automatic
bandwidth = 3.9626, NW automatic lag length = 3)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID10(-1)	-0.158007	0.107498	-1.469858	0.1483
DTOP10(-1)	0.277504	0.152702	1.817290	0.0756
DTOP10(-6)	0.358435	0.265492	1.350076	0.1835
DTOP10(-8)	0.284776	0.185336	1.536535	0.1311
DTFP(-4)	-0.139473	0.120475	-1.157693	0.2528
DTFP(-6)	-0.450167	0.377250	-1.193286	0.2387
C	0.010360	0.007419	1.396408	0.1692
FITTED^2	-28.22917	45.93146	-0.614593	0.5418

R-squared	0.191348	Mean dependent var	0.005038
Adjusted R-squared	0.070910	S.D. dependent var	0.022622
S.E. of regression	0.021805	Akaike info criterion	-4.679597
Sum squared resid	0.022347	Schwarz criterion	-4.387622
Log likelihood	136.6889	Hannan-Quinn criter.	-4.566688
F-statistic	1.588769	Durbin-Watson stat	2.056015
Prob(F-statistic)	0.162181	Wald F-statistic	3.875828
Prob(Wald F-statistic)	0.002085		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table B.85: UK Model II, FMOLS Regression

Dependent Variable: TOP5
Method: Fully Modified Least Squares (FMOLS)
Date: 09/08/16 Time: 19:57
Sample (adjusted): 1951 2012
Included observations: 62 after adjustments
Cointegrating equation deterministics: C @TREND @TREND^2
Long-run covariance estimate (Bartlett kernel, Newey-West automatic bandwidth = 6.9496, NW automatic lag length = 3)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TFP	2.263266	0.736249	3.074048	0.0032
C	-1.306923	2.931437	-0.445830	0.6574
@TREND	-0.038867	0.009357	-4.153671	0.0001
@TREND^2	0.000337	6.33E-05	5.321343	0.0000

R-squared	0.866405	Mean dependent var	7.712537
Adjusted R-squared	0.859495	S.D. dependent var	0.181077
S.E. of regression	0.067875	Sum squared resid	0.267207
Long-run variance	0.020244		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table B.86: UK Model II, FMOLS Hansen Instability Test

Cointegration Test - Hansen Parameter Instability
Date: 09/10/16 Time: 17:13
Equation: TOP5_FMOLS
Series: TOP5 TFP
Null hypothesis: Series are cointegrated
Cointegrating equation deterministics: C @TREND @TREND^2

Lc statistic	Stochastic Trends (m)	Deterministic Trends (k)	Excluded Trends (p2)	Prob.*
0.434506	1	2	0	> 0.2

*Hansen (1992b) Lc(m2=1, k=2) p-values, where m2=m-p2 is the number of stochastic trends in the asymptotic distribution

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table B.87: UK Model II, FMOLS ADF Unit Root Test of Residuals

Null Hypothesis: RESID5 has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.644012	0.0899
Test critical values:	1% level	-3.542097	
	5% level	-2.910019	
	10% level	-2.592645	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(RESID5)
Method: Least Squares
Date: 09/10/16 Time: 17:12
Sample (adjusted): 1952 2012
Included observations: 61 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID5(-1)	-0.219644	0.083072	-2.644012	0.0105
C	-0.000970	0.005445	-0.178162	0.8592

R-squared	0.105936	Mean dependent var	-0.000716
Adjusted R-squared	0.090782	S.D. dependent var	0.044592
S.E. of regression	0.042520	Akaike info criterion	-3.445444
Sum squared resid	0.106669	Schwarz criterion	-3.376235
Log likelihood	107.0861	Hannan-Quinn criter.	-3.418321
F-statistic	6.990797	Durbin-Watson stat	1.854293
Prob(F-statistic)	0.010480		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table B.88: UK Model II, FMOLS Engle-Granger Cointegration Test

Cointegration Test - Engle-Granger
Date: 09/10/16 Time: 17:13
Equation: TOP5_FMOLS
Specification: TOP5 TFP C @TREND @TREND^2
Cointegrating equation deterministics: C @TREND @TREND^2
Null hypothesis: Series are not cointegrated
Automatic lag specification (lag=0 based on Schwarz Info Criterion, maxlag=10)

	Value	Prob.*
Engle-Granger tau-statistic	-2.279315	0.8407
Engle-Granger z-statistic	-10.30094	0.8246

*MacKinnon (1996) p-values.

Intermediate Results:	
Rho - 1	-0.166144
Rho S.E.	0.072892
Residual variance	0.001346
Long-run residual variance	0.001346
Number of lags	0
Number of observations	62
Number of stochastic trends**	2

**Number of stochastic trends in asymptotic distribution.

Engle-Granger Test Equation:
Dependent Variable: D(RESID)
Method: Least Squares
Date: 09/10/16 Time: 17:13
Sample (adjusted): 1951 2012
Included observations: 62 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID(-1)	-0.166144	0.072892	-2.279315	0.0262

R-squared	0.078354	Mean dependent var	-0.000451
Adjusted R-squared	0.078354	S.D. dependent var	0.038215
S.E. of regression	0.036687	Akaike info criterion	-3.756778
Sum squared resid	0.082103	Schwarz criterion	-3.722469
Log likelihood	117.4601	Hannan-Quinn criter.	-3.743307
Durbin-Watson stat	1.736097		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table B.89: UK Model II, Unrestricted Error Correction Estimation

Dependent Variable: DTOP5
Method: Least Squares
Date: 09/10/16 Time: 17:18
Sample (adjusted): 1957 2012
Included observations: 56 after adjustments
HAC standard errors & covariance (Bartlett kernel, Newey-West automatic bandwidth = 4.1402, NW automatic lag length = 3)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID5(-1)	-0.117321	0.054932	-2.135757	0.0386
DTOP5(-1)	0.258272	0.123934	2.083949	0.0433
DTOP5(-2)	0.207085	0.092781	2.231979	0.0310
DTOP5(-3)	0.113415	0.156549	0.724470	0.4728
DTOP5(-4)	-0.098561	0.165103	-0.596965	0.5537
DTOP5(-5)	-0.037700	0.130371	-0.289173	0.7739
DTOP5(-6)	0.317146	0.198342	1.598990	0.1173
DTFP(-1)	0.453230	0.423628	1.069877	0.2908
DTFP(-2)	-0.161116	0.229546	-0.701890	0.4866
DTFP(-3)	0.104475	0.176132	0.593161	0.5563
DTFP(-4)	-0.213762	0.134822	-1.585510	0.1204
DTFP(-5)	0.095026	0.227891	0.416980	0.6788
DTFP(-6)	-0.423409	0.218197	-1.940489	0.0591
C	0.003736	0.007670	0.487165	0.6287

R-squared	0.318435	Mean dependent var	0.005414
Adjusted R-squared	0.107474	S.D. dependent var	0.028277
S.E. of regression	0.026714	Akaike info criterion	-4.194933
Sum squared resid	0.029973	Schwarz criterion	-3.688596
Log likelihood	131.4581	Hannan-Quinn criter.	-3.998627
F-statistic	1.509452	Durbin-Watson stat	2.104176
Prob(F-statistic)	0.154250	Wald F-statistic	4.092239
Prob(Wald F-statistic)	0.000245		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table B.90: UK Model II, Restricted Error Correction Model (ECM)

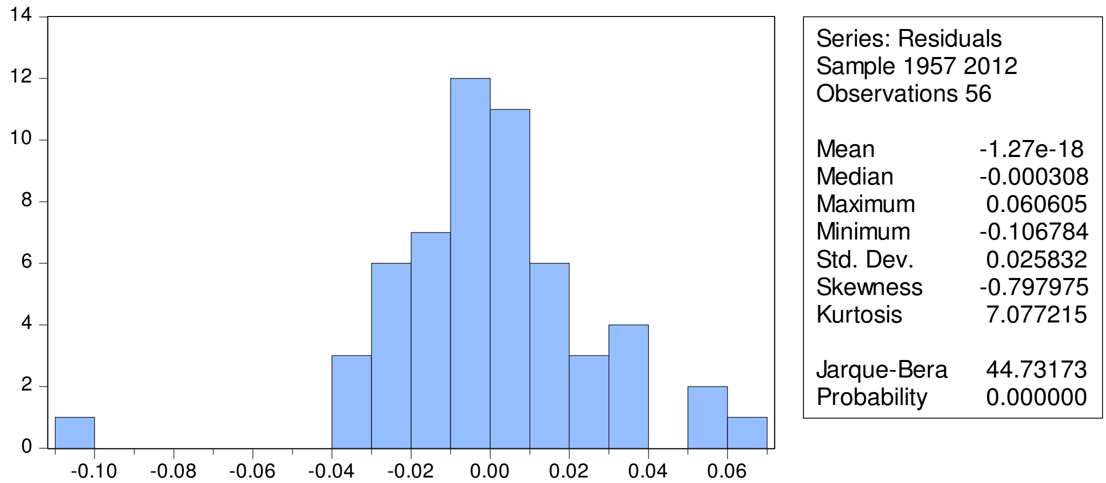
Dependent Variable: DTOP5
Method: Least Squares
Date: 09/10/16 Time: 17:19
Sample (adjusted): 1957 2012
Included observations: 56 after adjustments
HAC standard errors & covariance (Bartlett kernel, Newey-West automatic bandwidth = 4.1565, NW automatic lag length = 3)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID5(-1)	-0.127675	0.060824	-2.099082	0.0408
DTOP5(-1)	0.238797	0.102313	2.333985	0.0236
DTOP5(-2)	0.264641	0.076329	3.467090	0.0011
DTFP(-6)	-0.271265	0.151752	-1.787554	0.0798
C	0.006073	0.003707	1.638388	0.1075

R-squared	0.165440	Mean dependent var	0.005414
Adjusted R-squared	0.099984	S.D. dependent var	0.028277
S.E. of regression	0.026826	Akaike info criterion	-4.313849
Sum squared resid	0.036701	Schwarz criterion	-4.133014
Log likelihood	125.7878	Hannan-Quinn criter.	-4.243740
F-statistic	2.527508	Durbin-Watson stat	2.002345
Prob(F-statistic)	0.051848	Wald F-statistic	4.099207
Prob(Wald F-statistic)	0.005892		

Source: EViews output based on data of Feenstra *et al.* (2015) and Alvaredo *et al.* (2016).

Figure B.10: UK Model II, ECM Jarque-Bera Normal Distribution Test



Source: EViews output based on data of Feenstra *et al.* (2015) and Alvaredo *et al.* (2016).

Table B.91: UK Model II, ECM Breusch-Godfrey Serial Correlation LM Test

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.026326	Prob. F(2,49)	0.9740
Obs*R-squared	0.060109	Prob. Chi-Square(2)	0.9704

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Date: 09/10/16 Time: 17:25
Sample: 1957 2012
Included observations: 56
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID5(-1)	0.001418	0.067334	0.021062	0.9833
DTOP5(-1)	0.071133	0.428635	0.165952	0.8689
DTOP5(-2)	-0.084282	0.398198	-0.211657	0.8333
DTFP(-6)	0.007037	0.226060	0.031128	0.9753
C	-3.52E-06	0.004426	-0.000796	0.9994
RESID(-1)	-0.076771	0.470595	-0.163136	0.8711
RESID(-2)	0.084489	0.412593	0.204775	0.8386

R-squared	0.001073	Mean dependent var	-1.27E-18
Adjusted R-squared	-0.121244	S.D. dependent var	0.025832
S.E. of regression	0.027353	Akaike info criterion	-4.243494
Sum squared resid	0.036662	Schwarz criterion	-3.990325
Log likelihood	125.8178	Hannan-Quinn criter.	-4.145341
F-statistic	0.008775	Durbin-Watson stat	1.993123
Prob(F-statistic)	0.999997		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table B.92: UK Model II, ECM Heteroskedasticity Test

Heteroskedasticity Test: White

F-statistic	0.266465	Prob. F(4,51)	0.8982
Obs*R-squared	1.146398	Prob. Chi-Square(4)	0.8868
Scaled explained SS	2.889178	Prob. Chi-Square(4)	0.5765

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 09/10/16 Time: 17:26
Sample: 1957 2012
Included observations: 56
HAC standard errors & covariance (Bartlett kernel, Newey-West automatic bandwidth = 1.9717, NW automatic lag length = 3)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.000718	0.000381	1.883432	0.0653
RESID5(-1)^2	-0.003269	0.022442	-0.145678	0.8848
DTOP5(-1)^2	0.085017	0.053166	1.599083	0.1160
DTOP5(-2)^2	-0.060081	0.048541	-1.237724	0.2215
DTFP(-6)^2	-0.179064	0.156289	-1.145722	0.2573

R-squared	0.020471	Mean dependent var	0.000655
Adjusted R-squared	-0.056354	S.D. dependent var	0.001630
S.E. of regression	0.001676	Akaike info criterion	-9.860284
Sum squared resid	0.000143	Schwarz criterion	-9.679449
Log likelihood	281.0879	Hannan-Quinn criter.	-9.790174
F-statistic	0.266465	Durbin-Watson stat	1.849460
Prob(F-statistic)	0.898167		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table B.93: UK Model II, ECM RESET Test

Ramsey RESET Test
Equation: TOP5_ECM
Specification: DTOP5 RESID5(-1) DTOP5(-1 TO -2) DTFP(-6) C
Omitted Variables: Squares of fitted values

	Value	df	Probability
t-statistic	1.643058	50	0.1066
F-statistic	2.699639	(1, 50)	0.1066
Likelihood ratio	2.944793	1	0.0862

F-test summary:

	Sum of Sq.	df	Mean Squares
Test SSR	0.001880	1	0.001880
Restricted SSR	0.036701	51	0.000720
Unrestricted SSR	0.034821	50	0.000696

LR test summary:

	Value	df
Restricted LogL	125.7878	51
Unrestricted LogL	127.2602	50

Unrestricted Test Equation:
Dependent Variable: DTOP5
Method: Least Squares
Date: 09/10/16 Time: 17:26
Sample: 1957 2012
Included observations: 56
HAC standard errors & covariance (Bartlett kernel, Newey-West automatic bandwidth = 4.6125, NW automatic lag length = 3)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID5(-1)	-0.054763	0.076299	-0.717739	0.4763
DTOP5(-1)	0.135736	0.098449	1.378740	0.1741
DTOP5(-2)	0.159123	0.091036	1.747918	0.0866
DTFP(-6)	-0.017632	0.161725	-0.109022	0.9136
C	-0.001172	0.004489	-0.261077	0.7951
FITTED^2	34.92140	14.26292	2.448405	0.0179

R-squared	0.208192	Mean dependent var	0.005414
Adjusted R-squared	0.129011	S.D. dependent var	0.028277
S.E. of regression	0.026390	Akaike info criterion	-4.330720
Sum squared resid	0.034821	Schwarz criterion	-4.113718
Log likelihood	127.2602	Hannan-Quinn criter.	-4.246589
F-statistic	2.629320	Durbin-Watson stat	1.976878
Prob(F-statistic)	0.034635	Wald F-statistic	7.531548
Prob(Wald F-statistic)	0.000025		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table B.94: UK Model III, FMOLS Regression

Dependent Variable: TOP1
Method: Fully Modified Least Squares (FMOLS)
Date: 09/08/16 Time: 20:01
Sample (adjusted): 1951 2012
Included observations: 62 after adjustments
Cointegrating equation deterministics: C @TREND @TREND^2
Long-run covariance estimate (Bartlett kernel, Newey-West automatic
bandwidth = 6.9830, NW automatic lag length = 3)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TFP	2.980620	1.284024	2.321311	0.0238
C	-4.835432	5.112448	-0.945815	0.3482
@TREND	-0.068803	0.016319	-4.216099	0.0001
@TREND^2	0.000705	0.000110	6.386019	0.0000

R-squared	0.841970	Mean dependent var	6.828807
Adjusted R-squared	0.833796	S.D. dependent var	0.283666
S.E. of regression	0.115645	Sum squared resid	0.775682
Long-run variance	0.061573		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table B.95: UK Model III, FMOLS Hansen Instability Test

Cointegration Test - Hansen Parameter Instability
Date: 09/10/16 Time: 17:30
Equation: TOP1_FMOLS
Series: TOP1 TFP
Null hypothesis: Series are cointegrated
Cointegrating equation deterministics: C @TREND @TREND^2

Lc statistic	Stochastic Trends (m)	Deterministic Trends (k)	Excluded Trends (p2)	Prob.*
0.516342	1	2	0	0.1687

*Hansen (1992b) Lc(m2=1, k=2) p-values, where m2=m-p2 is the number
of stochastic trends in the asymptotic distribution

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table B.96: UK Model III, FMOLS ADF Unit Root Test of Residuals

Null Hypothesis: RESID1 has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.050230	0.2653
Test critical values:	1% level	-3.542097	
	5% level	-2.910019	
	10% level	-2.592645	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(RESID1)
Method: Least Squares
Date: 09/10/16 Time: 17:30
Sample (adjusted): 1952 2012
Included observations: 61 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID1(-1)	-0.150674	0.073491	-2.050230	0.0448
C	-0.002045	0.008091	-0.252779	0.8013

R-squared	0.066507	Mean dependent var	-0.001833
Adjusted R-squared	0.050685	S.D. dependent var	0.064854
S.E. of regression	0.063189	Akaike info criterion	-2.653146
Sum squared resid	0.235576	Schwarz criterion	-2.583937
Log likelihood	82.92097	Hannan-Quinn criter.	-2.626023
F-statistic	4.203443	Durbin-Watson stat	1.859819
Prob(F-statistic)	0.044794		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table B.97: UK Model III, FMOLS Engle-Granger Cointegration Test

Cointegration Test - Engle-Granger
Date: 09/10/16 Time: 17:30
Equation: TOP1_FMOLS
Specification: TOP1 TFP C @TREND @TREND^2
Cointegrating equation deterministics: C @TREND @TREND^2
Null hypothesis: Series are not cointegrated
Automatic lag specification (lag=0 based on Schwarz Info Criterion, maxlag=10)

	Value	Prob.*
Engle-Granger tau-statistic	-1.867905	0.9448
Engle-Granger z-statistic	-7.721539	0.9336

*MacKinnon (1996) p-values.

Intermediate Results:	
Rho - 1	-0.124541
Rho S.E.	0.066674
Residual variance	0.003287
Long-run residual variance	0.003287
Number of lags	0
Number of observations	62
Number of stochastic trends**	2

**Number of stochastic trends in asymptotic distribution.

Engle-Granger Test Equation:
Dependent Variable: D(RESID)
Method: Least Squares
Date: 09/10/16 Time: 17:30
Sample (adjusted): 1951 2012
Included observations: 62 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID(-1)	-0.124541	0.066674	-1.867905	0.0666

R-squared	0.053654	Mean dependent var	-0.001274
Adjusted R-squared	0.053654	S.D. dependent var	0.058935
S.E. of regression	0.057333	Akaike info criterion	-2.863899
Sum squared resid	0.200508	Schwarz criterion	-2.829591
Log likelihood	89.78088	Hannan-Quinn criter.	-2.850429
Durbin-Watson stat	1.736867		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table B.98: UK Model III, Unrestricted Error Correction Estimation

Dependent Variable: DTOP1
Method: Least Squares
Date: 09/10/16 Time: 17:35
Sample (adjusted): 1958 2012
Included observations: 55 after adjustments
HAC standard errors & covariance (Bartlett kernel, Newey-West automatic bandwidth = 5.3488, NW automatic lag length = 3)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID1(-1)	-0.151055	0.040013	-3.775161	0.0005
DTOP1(-1)	0.178103	0.098308	1.811683	0.0777
DTOP1(-2)	0.269242	0.110182	2.443609	0.0192
DTOP1(-3)	0.277273	0.131169	2.113867	0.0410
DTOP1(-4)	-0.104869	0.162381	-0.645819	0.5222
DTOP1(-5)	-0.036427	0.143748	-0.253410	0.8013
DTOP1(-6)	0.298649	0.180782	1.651984	0.1066
DTOP1(-7)	-0.021731	0.120101	-0.180941	0.8574
DTFP(-1)	1.117097	0.680785	1.640897	0.1089
DTFP(-2)	0.012090	0.420159	0.028775	0.9772
DTFP(-3)	0.172849	0.461031	0.374919	0.7098
DTFP(-4)	-0.341766	0.286162	-1.194308	0.2396
DTFP(-5)	0.200502	0.344084	0.582713	0.5634
DTFP(-6)	-0.821141	0.444424	-1.847650	0.0722
DTFP(-7)	-0.695771	0.394005	-1.765895	0.0852
C	0.006786	0.013833	0.490591	0.6265

R-squared	0.442456	Mean dependent var	0.006878
Adjusted R-squared	0.228016	S.D. dependent var	0.050655
S.E. of regression	0.044507	Akaike info criterion	-3.148292
Sum squared resid	0.077254	Schwarz criterion	-2.564340
Log likelihood	102.5780	Hannan-Quinn criter.	-2.922473
F-statistic	2.063306	Durbin-Watson stat	2.027139
Prob(F-statistic)	0.035194	Wald F-statistic	9.974160
Prob(Wald F-statistic)	0.000000		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table B.99: UK Model III, Restricted Error Correction Model (ECM)

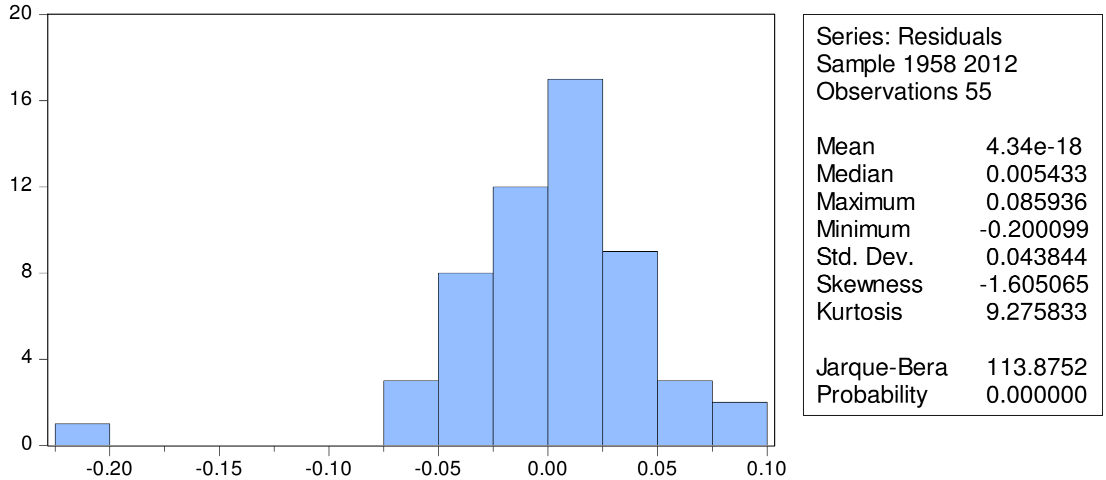
Dependent Variable: DTOP1
Method: Least Squares
Date: 09/10/16 Time: 17:35
Sample (adjusted): 1958 2012
Included observations: 55 after adjustments
HAC standard errors & covariance (Bartlett kernel, Newey-West automatic bandwidth = 3.2323, NW automatic lag length = 3)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID1(-1)	-0.179031	0.053315	-3.357978	0.0015
DTOP1(-1)	0.191939	0.075568	2.539956	0.0144
DTOP1(-2)	0.244962	0.089008	2.752130	0.0083
DTOP1(-3)	0.286599	0.139338	2.056864	0.0452
DTFP(-6)	-0.501092	0.310299	-1.614870	0.1129
DTFP(-7)	-0.498433	0.273631	-1.821547	0.0748
C	0.013388	0.006207	2.157064	0.0360

R-squared	0.250839	Mean dependent var	0.006878
Adjusted R-squared	0.157194	S.D. dependent var	0.050655
S.E. of regression	0.046504	Akaike info criterion	-3.180152
Sum squared resid	0.103805	Schwarz criterion	-2.924674
Log likelihood	94.45419	Hannan-Quinn criter.	-3.081357
F-statistic	2.678608	Durbin-Watson stat	1.882440
Prob(F-statistic)	0.025296	Wald F-statistic	8.300649
Prob(Wald F-statistic)	0.000003		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Figure B.11: UK Model III, ECM Jarque-Bera Normal Distribution Test



Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table B.100: UK Model III, ECM Breusch-Godfrey Serial Correlation LM Test

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.852999	Prob. F(2,46)	0.4328
Obs*R-squared	1.966836	Prob. Chi-Square(2)	0.3740

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Date: 09/10/16 Time: 17:40
Sample: 1958 2012
Included observations: 55
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID1(-1)	-0.068854	0.082784	-0.831726	0.4099
DTOP1(-1)	-0.394089	0.517345	-0.761753	0.4501
DTOP1(-2)	0.019601	0.481424	0.040715	0.9677
DTOP1(-3)	0.144569	0.198305	0.729025	0.4697
DTFP(-6)	0.069640	0.440537	0.158080	0.8751
DTFP(-7)	-0.159499	0.483394	-0.329957	0.7429
C	0.002830	0.009693	0.291930	0.7717
RESID(-1)	0.501622	0.590646	0.849277	0.4001
RESID(-2)	0.116494	0.477434	0.243999	0.8083

R-squared	0.035761	Mean dependent var	4.34E-18
Adjusted R-squared	-0.131933	S.D. dependent var	0.043844
S.E. of regression	0.046647	Akaike info criterion	-3.143841
Sum squared resid	0.100093	Schwarz criterion	-2.815368
Log likelihood	95.45562	Hannan-Quinn criter.	-3.016818
F-statistic	0.213250	Durbin-Watson stat	1.993083
Prob(F-statistic)	0.986977		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table B.101: UK Model III, ECM Heteroskedasticity Test

Heteroskedasticity Test: White

F-statistic	0.104192	Prob. F(6,48)	0.9956
Obs*R-squared	0.707112	Prob. Chi-Square(6)	0.9943
Scaled explained SS	2.228573	Prob. Chi-Square(6)	0.8975

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 09/10/16 Time: 17:40
Sample: 1958 2012
Included observations: 55
HAC standard errors & covariance (Bartlett kernel, Newey-West automatic bandwidth = 1.7935, NW automatic lag length = 3)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.002149	0.001430	1.503136	0.1394
RESID1(-1)^2	-0.022835	0.023261	-0.981672	0.3312
DTOP1(-1)^2	-0.048628	0.048100	-1.010962	0.3171
DTOP1(-2)^2	-0.035825	0.056951	-0.629055	0.5323
DTOP1(-3)^2	-0.021118	0.062823	-0.336145	0.7382
DTFP(-6)^2	0.200367	1.070743	0.187129	0.8523
DTFP(-7)^2	0.541959	0.650858	0.832684	0.4091

R-squared	0.012857	Mean dependent var	0.001887
Adjusted R-squared	-0.110536	S.D. dependent var	0.005480
S.E. of regression	0.005774	Akaike info criterion	-7.352328
Sum squared resid	0.001601	Schwarz criterion	-7.096849
Log likelihood	209.1890	Hannan-Quinn criter.	-7.253532
F-statistic	0.104192	Durbin-Watson stat	1.900423
Prob(F-statistic)	0.995571		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table B.102: UK Model III, ECM RESET Test

Ramsey RESET Test
Equation: TOP1_ECM
Specification: DTOP1 RESID1(-1) DTOP1(-1 TO -3) DTFP(-6) DTFP(-7) C
Omitted Variables: Squares of fitted values

	Value	df	Probability
t-statistic	0.142529	47	0.8873
F-statistic	0.020314	(1, 47)	0.8873
Likelihood ratio	0.023767	1	0.8775

F-test summary:

	Sum of Sq.	df	Mean Squares
Test SSR	4.48E-05	1	4.48E-05
Restricted SSR	0.103805	48	0.002163
Unrestricted SSR	0.103760	47	0.002208

LR test summary:

	Value	df
Restricted LogL	94.45419	48
Unrestricted LogL	94.46607	47

Unrestricted Test Equation:
Dependent Variable: DTOP1
Method: Least Squares
Date: 09/10/16 Time: 17:41
Sample: 1958 2012
Included observations: 55
HAC standard errors & covariance (Bartlett kernel, Newey-West automatic bandwidth = 3.1977, NW automatic lag length = 3)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID1(-1)	-0.185301	0.064262	-2.883532	0.0059
DTOP1(-1)	0.199479	0.071092	2.805919	0.0073
DTOP1(-2)	0.252269	0.094178	2.678647	0.0102
DTOP1(-3)	0.291838	0.147261	1.981768	0.0534
DTFP(-6)	-0.527297	0.350992	-1.502306	0.1397
DTFP(-7)	-0.522543	0.274139	-1.906122	0.0628
C	0.014753	0.011189	1.318490	0.1937
FITTED^2	-1.378801	6.963999	-0.197990	0.8439

R-squared	0.251162	Mean dependent var	0.006878
Adjusted R-squared	0.139633	S.D. dependent var	0.050655
S.E. of regression	0.046986	Akaike info criterion	-3.144221
Sum squared resid	0.103760	Schwarz criterion	-2.852245
Log likelihood	94.46607	Hannan-Quinn criter.	-3.031311
F-statistic	2.251991	Durbin-Watson stat	1.882588
Prob(F-statistic)	0.046279	Wald F-statistic	7.507580
Prob(Wald F-statistic)	0.000005		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

B.7. United States

Table B.103: U.S. Model I, FMOLS Regression

Dependent Variable: TOP10
Method: Fully Modified Least Squares (FMOLS)
Date: 09/25/16 Time: 18:04
Sample (adjusted): 1951 2014
Included observations: 64 after adjustments
Cointegrating equation deterministics: C
Long-run covariance estimate (Bartlett kernel, Newey-West automatic
bandwidth = 7.2549, NW automatic lag length = 3)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TFP	0.914516	0.098358	9.297823	0.0000
C	4.208424	0.429711	9.793623	0.0000

R-squared	0.884063	Mean dependent var	8.200650
Adjusted R-squared	0.882193	S.D. dependent var	0.147385
S.E. of regression	0.050587	Sum squared resid	0.158660
Long-run variance	0.014305		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table B.104: U.S. Model I, FMOLS Hansen Instability Test

Cointegration Test - Hansen Parameter Instability
Date: 09/10/16 Time: 17:57
Equation: TOP10_FMOLS
Series: TOP10 TFP
Null hypothesis: Series are cointegrated
Cointegrating equation deterministics: C

Lc statistic	Stochastic Trends (m)	Deterministic Trends (k)	Excluded Trends (p2)	Prob.*
0.661237	1	0	0	0.0124

*Hansen (1992b) Lc(m2=1, k=0) p-values, where m2=m-p2 is the number
of stochastic trends in the asymptotic distribution

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table B.105: U.S. Model I, FMOLS ADF Unit Root Test of Residuals

Null Hypothesis: RESID10 has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.962595	0.0440
Test critical values:	1% level	-3.538362	
	5% level	-2.908420	
	10% level	-2.591799	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(RESID10)
Method: Least Squares
Date: 09/10/16 Time: 17:50
Sample (adjusted): 1952 2014
Included observations: 63 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID10(-1)	-0.133395	0.045026	-2.962595	0.0043
C	-0.001944	0.002253	-0.862595	0.3917

R-squared	0.125786	Mean dependent var	-0.001782
Adjusted R-squared	0.111455	S.D. dependent var	0.018968
S.E. of regression	0.017879	Akaike info criterion	-5.179095
Sum squared resid	0.019500	Schwarz criterion	-5.111059
Log likelihood	165.1415	Hannan-Quinn criter.	-5.152336
F-statistic	8.776972	Durbin-Watson stat	1.930231
Prob(F-statistic)	0.004344		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table B.106: U.S. Model I, FMOLS Engle-Granger Cointegration Test

Cointegration Test - Engle-Granger
Date: 09/10/16 Time: 17:58
Equation: TOP10_FMOLS
Specification: TOP10 TFP C
Cointegrating equation deterministics: C
Null hypothesis: Series are not cointegrated
Automatic lag specification (lag=0 based on Schwarz Info Criterion, maxlag=10)

	Value	Prob.*
Engle-Granger tau-statistic	-2.546273	0.2714
Engle-Granger z-statistic	-6.922770	0.5593

*MacKinnon (1996) p-values.

Intermediate Results:	
Rho - 1	-0.108168
Rho S.E.	0.042481
Residual variance	0.000316
Long-run residual variance	0.000316
Number of lags	0
Number of observations	64
Number of stochastic trends**	2

**Number of stochastic trends in asymptotic distribution.

Engle-Granger Test Equation:
Dependent Variable: D(RESID)
Method: Least Squares
Date: 09/10/16 Time: 17:58
Sample (adjusted): 1951 2014
Included observations: 64 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID(-1)	-0.108168	0.042481	-2.546273	0.0133

R-squared	0.087439	Mean dependent var	-0.001487
Adjusted R-squared	0.087439	S.D. dependent var	0.018621
S.E. of regression	0.017788	Akaike info criterion	-5.205091
Sum squared resid	0.019934	Schwarz criterion	-5.171359
Log likelihood	167.5629	Hannan-Quinn criter.	-5.191802
Durbin-Watson stat	1.962813		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table B.107: U.S. Model I, Unrestricted Error Correction Estimation

Dependent Variable: DTOP10
Method: Least Squares
Date: 09/10/16 Time: 18:20
Sample (adjusted): 1959 2014
Included observations: 56 after adjustments
HAC standard errors & covariance (Bartlett kernel, Newey-West automatic bandwidth = 7.3705, NW automatic lag length = 3)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID10(-1)	-0.101922	0.053922	-1.890187	0.0664
DTOP10(-1)	0.103519	0.149238	0.693652	0.4921
DTOP10(-2)	0.171654	0.084876	2.022419	0.0502
DTOP10(-3)	-0.220089	0.115310	-1.908678	0.0639
DTOP10(-4)	0.177504	0.178620	0.993751	0.3266
DTOP10(-5)	0.296022	0.118813	2.491504	0.0172
DTOP10(-6)	-0.130997	0.139363	-0.939975	0.3532
DTOP10(-7)	0.155642	0.081246	1.915697	0.0630
DTOP10(-8)	0.285593	0.102894	2.775617	0.0085
DTFP(-1)	0.044128	0.106405	0.414718	0.6807
DTFP(-2)	0.238483	0.113341	2.104109	0.0420
DTFP(-3)	0.080425	0.175568	0.458082	0.6495
DTFP(-4)	0.138591	0.167109	0.829344	0.4121
DTFP(-5)	-0.102180	0.152624	-0.669493	0.5072
DTFP(-6)	-0.098222	0.206640	-0.475328	0.6373
DTFP(-7)	0.015483	0.169848	0.091161	0.9278
DTFP(-8)	-0.232377	0.224379	-1.035645	0.3069
C	-8.72E-05	0.003748	-0.023272	0.9816

R-squared	0.376728	Mean dependent var	0.006932
Adjusted R-squared	0.097896	S.D. dependent var	0.015022
S.E. of regression	0.014268	Akaike info criterion	-5.406505
Sum squared resid	0.007736	Schwarz criterion	-4.755499
Log likelihood	169.3821	Hannan-Quinn criter.	-5.154111
F-statistic	1.351092	Durbin-Watson stat	1.890141
Prob(F-statistic)	0.215416	Wald F-statistic	6.598706
Prob(Wald F-statistic)	0.000001		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table B.108: U.S. Model I, Restricted Error Correction Model (ECM)

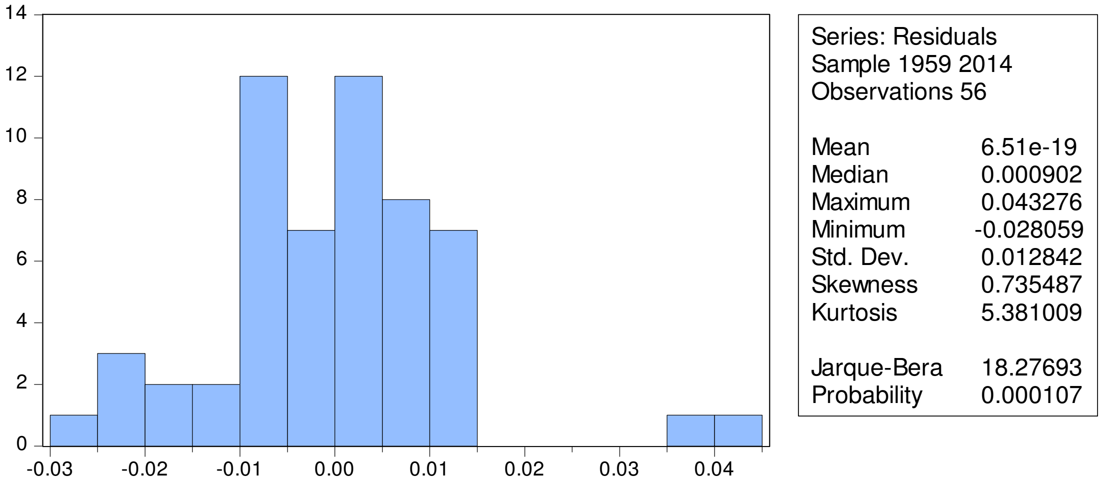
Dependent Variable: DTOP10
Method: Least Squares
Date: 10/03/16 Time: 19:06
Sample (adjusted): 1959 2014
Included observations: 56 after adjustments
HAC standard errors & covariance (Bartlett kernel, Newey-West automatic bandwidth = 5.5930, NW automatic lag length = 3)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID10(-1)	-0.099797	0.053251	-1.874095	0.0670
DTOP10(-2)	0.197644	0.070748	2.793647	0.0075
DTOP10(-3)	-0.170077	0.079878	-2.129201	0.0384
DTOP10(-5)	0.321863	0.137719	2.337089	0.0237
DTOP10(-7)	0.062138	0.090265	0.688394	0.4945
DTOP10(-8)	0.346769	0.094273	3.678367	0.0006
DTFP(-2)	0.253573	0.127340	1.991306	0.0522
C	-0.000876	0.001928	-0.454105	0.6518

R-squared	0.269190	Mean dependent var	0.006932
Adjusted R-squared	0.162613	S.D. dependent var	0.015022
S.E. of regression	0.013747	Akaike info criterion	-5.604476
Sum squared resid	0.009071	Schwarz criterion	-5.315140
Log likelihood	164.9253	Hannan-Quinn criter.	-5.492301
F-statistic	2.525787	Durbin-Watson stat	1.687433
Prob(F-statistic)	0.026961	Wald F-statistic	5.942275
Prob(Wald F-statistic)	0.000052		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Figure B.12: U.S. Model I, ECM Jarque-Bera Normal Distribution Test



Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table B.109: U.S. Model I, ECM Breusch-Godfrey Serial Correlation LM Test

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	1.881519	Prob. F(2,46)	0.1639
Obs*R-squared	4.234672	Prob. Chi-Square(2)	0.1204

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Date: 10/03/16 Time: 19:14
Sample: 1959 2014
Included observations: 56
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID10(-1)	-0.001568	0.050278	-0.031192	0.9753
DTOP10(-2)	0.322354	0.253721	1.270507	0.2103
DTOP10(-3)	0.028856	0.134702	0.214219	0.8313
DTOP10(-5)	0.034902	0.136035	0.256566	0.7987
DTOP10(-7)	-0.019378	0.134364	-0.144218	0.8860
DTOP10(-8)	-0.047512	0.123534	-0.384604	0.7023
DTFP(-2)	0.053192	0.170928	0.311196	0.7571
C	-0.002668	0.003460	-0.771168	0.4446
RESID(-1)	0.194738	0.153796	1.266214	0.2118
RESID(-2)	-0.489427	0.308810	-1.584879	0.1198

R-squared	0.075619	Mean dependent var	6.51E-19
Adjusted R-squared	-0.105238	S.D. dependent var	0.012842
S.E. of regression	0.013501	Akaike info criterion	-5.611679
Sum squared resid	0.008385	Schwarz criterion	-5.250009
Log likelihood	167.1270	Hannan-Quinn criter.	-5.471460
F-statistic	0.418115	Durbin-Watson stat	2.030619
Prob(F-statistic)	0.918796		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table B.110: U.S. Model I, ECM Heteroskedasticity Test

Heteroskedasticity Test: White

F-statistic	0.184728	Prob. F(7,48)	0.9873
Obs*R-squared	1.469035	Prob. Chi-Square(7)	0.9834
Scaled explained SS	2.364191	Prob. Chi-Square(7)	0.9370

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 10/03/16 Time: 19:15
Sample: 1959 2014
Included observations: 56
HAC standard errors & covariance (Bartlett kernel, Newey-West automatic bandwidth = 3.1815, NW automatic lag length = 3)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.000186	0.000126	1.481916	0.1449
RESID10(-1)^2	-0.004682	0.017516	-0.267324	0.7904
DTOP10(-2)^2	-0.032999	0.026201	-1.259478	0.2139
DTOP10(-3)^2	-0.034153	0.029944	-1.140540	0.2597
DTOP10(-5)^2	0.059025	0.038532	1.531854	0.1321
DTOP10(-7)^2	0.014790	0.035144	0.420837	0.6758
DTOP10(-8)^2	-0.039375	0.041604	-0.946443	0.3487
DTFP(-2)^2	-0.031525	0.151862	-0.207589	0.8364

R-squared	0.026233	Mean dependent var	0.000162
Adjusted R-squared	-0.115775	S.D. dependent var	0.000342
S.E. of regression	0.000361	Akaike info criterion	-12.88185
Sum squared resid	6.27E-06	Schwarz criterion	-12.59251
Log likelihood	368.6917	Hannan-Quinn criter.	-12.76967
F-statistic	0.184728	Durbin-Watson stat	1.233733
Prob(F-statistic)	0.987302		

Source: EViews output based on data of Feenstra *et al.* (2015) and Alvaredo *et al.* (2016).

Table B.111: U.S. Model I, ECM RESET Test

Ramsey RESET Test
Equation: TOP10_ECM2
Specification: DTOP10 RESID10(-1) DTOP10(-2 TO -3) DTOP10(-5) DTOP10(-7) DTOP10(-8) DTFP(-2) C
Omitted Variables: Squares of fitted values

	Value	df	Probability
t-statistic	0.993285	47	0.3257
F-statistic	0.986616	(1, 47)	0.3257
Likelihood ratio	1.163374	1	0.2808

F-test summary:

	Sum of Sq.	df	Mean Squares
Test SSR	0.000186	1	0.000186
Restricted SSR	0.009071	48	0.000189
Unrestricted SSR	0.008884	47	0.000189

LR test summary:

	Value	df
Restricted LogL	164.9253	48
Unrestricted LogL	165.5070	47

Unrestricted Test Equation:
Dependent Variable: DTOP10
Method: Least Squares
Date: 10/03/16 Time: 19:15
Sample: 1959 2014
Included observations: 56
HAC standard errors & covariance (Bartlett kernel, Newey-West automatic bandwidth = 5.8828, NW automatic lag length = 3)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID10(-1)	-0.082864	0.046502	-1.781942	0.0812
DTOP10(-2)	0.133808	0.069208	1.933423	0.0592
DTOP10(-3)	-0.079298	0.082718	-0.958651	0.3426
DTOP10(-5)	0.186628	0.141969	1.314566	0.1950
DTOP10(-7)	0.055587	0.102309	0.543329	0.5895
DTOP10(-8)	0.242913	0.088714	2.738148	0.0087
DTFP(-2)	0.143631	0.138748	1.035192	0.3059
C	-0.001397	0.001832	-0.762394	0.4496
FITTED^2	27.27225	16.45907	1.656974	0.1042

R-squared	0.284215	Mean dependent var	0.006932
Adjusted R-squared	0.162380	S.D. dependent var	0.015022
S.E. of regression	0.013749	Akaike info criterion	-5.589537
Sum squared resid	0.008884	Schwarz criterion	-5.264034
Log likelihood	165.5070	Hannan-Quinn criter.	-5.463340
F-statistic	2.332775	Durbin-Watson stat	1.676855
Prob(F-statistic)	0.033687	Wald F-statistic	6.119574
Prob(Wald F-statistic)	0.000021		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table B.112: U.S. Model II, FMOLS Regression

Dependent Variable: TOP5
Method: Fully Modified Least Squares (FMOLS)
Date: 09/10/16 Time: 18:34
Sample (adjusted): 1951 2014
Included observations: 64 after adjustments
Cointegrating equation deterministics: C
Long-run covariance estimate (Bartlett kernel, Newey-West automatic
bandwidth = 7.2696, NW automatic lag length = 3)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TFP	1.176834	0.156731	7.508613	0.0000
C	2.678446	0.684734	3.911661	0.0002

R-squared	0.834942	Mean dependent var	7.816020
Adjusted R-squared	0.832280	S.D. dependent var	0.195138
S.E. of regression	0.079916	Sum squared resid	0.395967
Long-run variance	0.036323		

Source: EViews output based on data of Feenstra *et al.* (2015) and Alvaredo *et al.* (2016).

Table B.113: U.S. Model II, FMOLS Hansen Instability Test

Cointegration Test - Hansen Parameter Instability
Date: 09/10/16 Time: 18:35
Equation: TOP5_FMOLS
Series: TOP5 TFP
Null hypothesis: Series are cointegrated
Cointegrating equation deterministics: C

Lc statistic	Stochastic Trends (m)	Deterministic Trends (k)	Excluded Trends (p2)	Prob.*
0.686251	1	0	0	< 0.01

*Hansen (1992b) Lc(m2=1, k=0) p-values, where m2=m-p2 is the number
of stochastic trends in the asymptotic distribution

Source: EViews output based on data of Feenstra *et al.* (2015) and Alvaredo *et al.* (2016).

Table B.114: U.S. Model II, FMOLS ADF Unit Root Test of Residuals

Null Hypothesis: RESID5 has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.022237	0.0382
Test critical values:	1% level	-3.538362	
	5% level	-2.908420	
	10% level	-2.591799	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(RESID5)
Method: Least Squares
Date: 09/10/16 Time: 18:35
Sample (adjusted): 1952 2014
Included observations: 63 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID5(-1)	-0.126816	0.041961	-3.022237	0.0037
C	-0.003158	0.003320	-0.951091	0.3453

R-squared	0.130235	Mean dependent var	-0.002986
Adjusted R-squared	0.115977	S.D. dependent var	0.028024
S.E. of regression	0.026348	Akaike info criterion	-4.403584
Sum squared resid	0.042349	Schwarz criterion	-4.335548
Log likelihood	140.7129	Hannan-Quinn criter.	-4.376825
F-statistic	9.133914	Durbin-Watson stat	1.865008
Prob(F-statistic)	0.003665		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table B.115: U.S. Model II, FMOLS Engle-Granger Cointegration Test

Cointegration Test - Engle-Granger
Date: 09/10/16 Time: 18:36
Equation: TOP5_FMOLS
Specification: TOP5 TFP C
Cointegrating equation deterministics: C
Null hypothesis: Series are not cointegrated
Automatic lag specification (lag=0 based on Schwarz Info Criterion, maxlag=10)

	Value	Prob.*
Engle-Granger tau-statistic	-2.722648	0.2051
Engle-Granger z-statistic	-6.842140	0.5660

*MacKinnon (1996) p-values.

Intermediate Results:	
Rho - 1	-0.106908
Rho S.E.	0.039266
Residual variance	0.000686
Long-run residual variance	0.000686
Number of lags	0
Number of observations	64
Number of stochastic trends**	2

**Number of stochastic trends in asymptotic distribution.

Engle-Granger Test Equation:
Dependent Variable: D(RESID)
Method: Least Squares
Date: 09/10/16 Time: 18:36
Sample (adjusted): 1951 2014
Included observations: 64 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID(-1)	-0.106908	0.039266	-2.722648	0.0084

R-squared	0.096529	Mean dependent var	-0.002704
Adjusted R-squared	0.096529	S.D. dependent var	0.027562
S.E. of regression	0.026198	Akaike info criterion	-4.430800
Sum squared resid	0.043238	Schwarz criterion	-4.397067
Log likelihood	142.7856	Hannan-Quinn criter.	-4.417511
Durbin-Watson stat	1.870437		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table B.116: U.S. Model II, Failed Unrestricted Error Correction Estimation

Dependent Variable: DTOP5
Method: Least Squares
Date: 10/03/16 Time: 18:48
Sample (adjusted): 1971 2014
Included observations: 44 after adjustments
HAC standard errors & covariance (Bartlett kernel, Newey-West automatic bandwidth = 8.7958, NW automatic lag length = 3)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID5(-1)	0.833017	0.250318	3.327829	0.0797
DTOP5(-1)	-0.224012	0.345975	-0.647480	0.5837
DTOP5(-2)	-0.628065	0.301276	-2.084684	0.1725
DTOP5(-3)	-1.480891	0.416693	-3.553914	0.0709
DTOP5(-4)	-0.713483	0.344041	-2.073831	0.1738
DTOP5(-5)	-0.178495	0.343536	-0.519581	0.6551
DTOP5(-6)	0.199702	0.356651	0.559936	0.6319
DTOP5(-7)	-0.147830	0.158541	-0.932440	0.4495
DTOP5(-8)	-0.314208	0.219898	-1.428882	0.2893
DTOP5(-9)	-0.591812	0.237561	-2.491198	0.1304
DTOP5(-10)	-0.202366	0.301902	-0.670305	0.5717
DTOP5(-11)	-0.041014	0.234937	-0.174573	0.8775
DTOP5(-12)	0.205744	0.297374	0.691869	0.5605
DTOP5(-13)	-0.390622	0.219765	-1.777450	0.2175
DTOP5(-14)	-0.125860	0.212549	-0.592147	0.6138
DTOP5(-15)	-0.602613	0.341684	-1.763653	0.2198
DTOP5(-16)	-1.151335	0.254078	-4.531428	0.0454
DTOP5(-17)	-0.184893	0.193557	-0.955241	0.4403
DTOP5(-18)	0.168752	0.214937	0.785125	0.5146
DTOP5(-19)	-0.593661	0.155366	-3.821055	0.0622
DTOP5(-20)	0.514244	0.094885	5.419663	0.0324
DTFP(-1)	0.621399	0.245846	2.527596	0.1273
DTFP(-2)	0.317832	0.206686	1.537750	0.2639
DTFP(-3)	0.926836	0.257432	3.600318	0.0692
DTFP(-4)	1.863174	0.363708	5.122724	0.0361
DTFP(-5)	0.607857	0.367356	1.654681	0.2398
DTFP(-6)	-1.322589	0.338916	-3.902407	0.0598
DTFP(-7)	-0.587041	0.482606	-1.216399	0.3479
DTFP(-8)	-1.891507	0.358482	-5.276429	0.0341
DTFP(-9)	-1.057109	0.709002	-1.490981	0.2745
DTFP(-10)	-2.182809	0.515143	-4.237288	0.0514
DTFP(-11)	-0.058819	0.388510	-0.151396	0.8936
DTFP(-12)	-0.360287	0.337338	-1.068029	0.3973
DTFP(-13)	-1.388259	0.174510	-7.955195	0.0154
DTFP(-14)	0.747809	0.506680	1.475900	0.2780
DTFP(-15)	0.922905	0.261726	3.526233	0.0719
DTFP(-16)	-0.628845	0.477407	-1.317209	0.3184
DTFP(-17)	-0.927050	0.423108	-2.191048	0.1598
DTFP(-18)	0.509501	0.667675	0.763097	0.5251
DTFP(-19)	2.092142	0.477994	4.376921	0.0484
DTFP(-20)	0.819521	0.433083	1.892293	0.1990
C	0.110217	0.044859	2.456992	0.1333

R-squared	0.992903	Mean dependent var	0.012130
Adjusted R-squared	0.847414	S.D. dependent var	0.025694
S.E. of regression	0.010037	Akaike info criterion	-7.547108
Sum squared resid	0.000201	Schwarz criterion	-5.844017
Log likelihood	208.0364	Hannan-Quinn criter.	-6.915520
F-statistic	6.824590	Durbin-Watson stat	2.750672
Prob(F-statistic)	0.135849	Wald F-statistic	674.5320

Prob(Wald F-statistic)	0.001481

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table B.117: U.S. Model II, First-Difference Regression

Dependent Variable: DTOP5
Method: Least Squares
Date: 09/25/16 Time: 20:28
Sample (adjusted): 1951 2014
Included observations: 64 after adjustments
HAC standard errors & covariance (Bartlett kernel, Newey-West automatic bandwidth = 75.5525, NW automatic lag length = 3)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DTFP	0.168112	0.153039	1.098493	0.2764
C	-0.026829	0.002577	-10.40941	0.0000
@TREND	0.001995	0.000177	11.29243	0.0000
@TREND^2	-2.39E-05	2.57E-06	-9.308935	0.0000

R-squared	0.201446	Mean dependent var	0.005877
Adjusted R-squared	0.161518	S.D. dependent var	0.025503
S.E. of regression	0.023353	Akaike info criterion	-4.615724
Sum squared resid	0.032722	Schwarz criterion	-4.480794
Log likelihood	151.7032	Hannan-Quinn criter.	-4.562568
F-statistic	5.045274	Durbin-Watson stat	1.967326
Prob(F-statistic)	0.003492	Wald F-statistic	76.51012
Prob(Wald F-statistic)	0.000000		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table B.118: U.S. Model III, FMOLS Regression

Dependent Variable: TOP1
Method: Fully Modified Least Squares (FMOLS)
Date: 09/10/16 Time: 20:30
Sample (adjusted): 1951 2014
Included observations: 64 after adjustments
Cointegrating equation deterministics: C
Long-run covariance estimate (Bartlett kernel, Newey-West automatic
bandwidth = 7.2647, NW automatic lag length = 3)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TFP	1.798662	0.311047	5.782607	0.0000
C	-0.856444	1.358914	-0.630242	0.5309

R-squared	0.750407	Mean dependent var	6.997199
Adjusted R-squared	0.746381	S.D. dependent var	0.314324
S.E. of regression	0.158295	Sum squared resid	1.553561
Long-run variance	0.143063		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table B.119: U.S. Model III, FMOLS Hansen Instability Test

Cointegration Test - Hansen Parameter Instability
Date: 09/10/16 Time: 20:31
Equation: TOP1_FMOLS
Series: TOP1 TFP
Null hypothesis: Series are cointegrated
Cointegrating equation deterministics: C

Lc statistic	Stochastic Trends (m)	Deterministic Trends (k)	Excluded Trends (p2)	Prob.*
0.662191	1	0	0	0.0122

*Hansen (1992b) Lc(m2=1, k=0) p-values, where m2=m-p2 is the number
of stochastic trends in the asymptotic distribution

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table B.120: U.S. Model III, FMOLS ADF Unit Root Test of Residuals

Null Hypothesis: RESID1 has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.024475	0.0380
Test critical values:	1% level	-3.538362	
	5% level	-2.908420	
	10% level	-2.591799	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(RESID1)
Method: Least Squares
Date: 09/10/16 Time: 20:30
Sample (adjusted): 1952 2014
Included observations: 63 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID1(-1)	-0.122429	0.040479	-3.024475	0.0036
C	-0.006474	0.006353	-1.019062	0.3122

R-squared	0.130403	Mean dependent var	-0.006433
Adjusted R-squared	0.116147	S.D. dependent var	0.053636
S.E. of regression	0.050425	Akaike info criterion	-3.105433
Sum squared resid	0.155103	Schwarz criterion	-3.037397
Log likelihood	99.82113	Hannan-Quinn criter.	-3.078674
F-statistic	9.147448	Durbin-Watson stat	1.823804
Prob(F-statistic)	0.003641		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table B.121: U.S. Model III, FMOLS Engle-Granger Cointegration Test

Cointegration Test - Engle-Granger
Date: 09/10/16 Time: 20:31
Equation: TOP1_FMOLS
Specification: TOP1 TFP C
Cointegrating equation deterministics: C
Null hypothesis: Series are not cointegrated
Automatic lag specification (lag=0 based on Schwarz Info Criterion, maxlag=10)

	Value	Prob.*
Engle-Granger tau-statistic	-2.708512	0.2100
Engle-Granger z-statistic	-6.610510	0.5855

*MacKinnon (1996) p-values.

Intermediate Results:	
Rho - 1	-0.103289
Rho S.E.	0.038135
Residual variance	0.002537
Long-run residual variance	0.002537
Number of lags	0
Number of observations	64
Number of stochastic trends**	2

**Number of stochastic trends in asymptotic distribution.

Engle-Granger Test Equation:
Dependent Variable: D(RESID)
Method: Least Squares
Date: 09/10/16 Time: 20:31
Sample (adjusted): 1951 2014
Included observations: 64 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID(-1)	-0.103289	0.038135	-2.708512	0.0087

R-squared	0.093288	Mean dependent var	-0.005819
Adjusted R-squared	0.093288	S.D. dependent var	0.052897
S.E. of regression	0.050369	Akaike info criterion	-3.123366
Sum squared resid	0.159836	Schwarz criterion	-3.089633
Log likelihood	100.9477	Hannan-Quinn criter.	-3.110077
Durbin-Watson stat	1.827304		

Source: EViews output based on data of Feenstra *et al.* (2015) and Alvaredo *et al.* (2016).

Table B.122: U.S. Model III, Failed Unrestricted Error Correction Estimation

Dependent Variable: DTOP1
Method: Least Squares
Date: 10/03/16 Time: 18:53
Sample (adjusted): 1971 2014
Included observations: 44 after adjustments
HAC standard errors & covariance (Bartlett kernel, Newey-West automatic bandwidth = 7.5897, NW automatic lag length = 3)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID1(-1)	0.937681	0.366069	2.561489	0.1246
DTOP1(-1)	-0.928770	0.497705	-1.866103	0.2030
DTOP1(-2)	-0.579361	0.272551	-2.125703	0.1674
DTOP1(-3)	-1.508178	0.339385	-4.443855	0.0471
DTOP1(-4)	-1.362282	0.636094	-2.141635	0.1655
DTOP1(-5)	-0.421051	0.344399	-1.222568	0.3460
DTOP1(-6)	0.039660	0.428514	0.092553	0.9347
DTOP1(-7)	-0.180567	0.126124	-1.431664	0.2886
DTOP1(-8)	-0.303352	0.292625	-1.036655	0.4088
DTOP1(-9)	-0.637955	0.247085	-2.581925	0.1229
DTOP1(-10)	-0.314307	0.247681	-1.268997	0.3321
DTOP1(-11)	0.062014	0.541008	0.114627	0.9192
DTOP1(-12)	0.104489	0.210612	0.496121	0.6690
DTOP1(-13)	-0.107635	0.216586	-0.496959	0.6685
DTOP1(-14)	-0.037723	0.195417	-0.193040	0.8648
DTOP1(-15)	-0.596793	0.475455	-1.255202	0.3362
DTOP1(-16)	-0.933876	0.610898	-1.528693	0.2659
DTOP1(-17)	-0.294550	0.272921	-1.079250	0.3933
DTOP1(-18)	-0.012936	0.362299	-0.035706	0.9748
DTOP1(-19)	-0.338665	0.257350	-1.315973	0.3188
DTOP1(-20)	0.236513	0.074075	3.192902	0.0857
DTFP(-1)	0.499872	0.404313	1.236348	0.3418
DTFP(-2)	-0.100524	0.978549	-0.102728	0.9276
DTFP(-3)	1.053702	0.956404	1.101733	0.3854
DTFP(-4)	3.566829	0.990795	3.599967	0.0692
DTFP(-5)	1.824269	1.434839	1.271410	0.3314
DTFP(-6)	-2.990891	0.799900	-3.739078	0.0647
DTFP(-7)	-2.493568	1.914983	-1.302135	0.3226
DTFP(-8)	-3.889409	0.667649	-5.825532	0.0282
DTFP(-9)	-3.942456	1.405727	-2.804568	0.1071
DTFP(-10)	-4.883930	2.233528	-2.186644	0.1603
DTFP(-11)	-1.988676	1.140139	-1.744240	0.2232
DTFP(-12)	-1.852706	0.668504	-2.771419	0.1093
DTFP(-13)	-3.653025	0.826028	-4.422400	0.0475
DTFP(-14)	-0.584146	1.238241	-0.471755	0.6836
DTFP(-15)	1.468664	2.034754	0.721789	0.5454
DTFP(-16)	-0.439383	2.776988	-0.158223	0.8888
DTFP(-17)	-2.691781	1.584421	-1.698905	0.2314
DTFP(-18)	-0.968445	2.598497	-0.372694	0.7452
DTFP(-19)	3.831566	4.163056	0.920373	0.4545
DTFP(-20)	2.786458	2.305511	1.208607	0.3503
C	0.326571	0.120954	2.699966	0.1142

R-squared	0.989060	Mean dependent var	0.018980
Adjusted R-squared	0.764799	S.D. dependent var	0.054756
S.E. of regression	0.026555	Akaike info criterion	-5.601137
Sum squared resid	0.001410	Schwarz criterion	-3.898047
Log likelihood	165.2250	Hannan-Quinn criter.	-4.969549
F-statistic	4.410292	Durbin-Watson stat	2.513169
Prob(F-statistic)	0.201881	Wald F-statistic	3660.481

Prob(Wald F-statistic)	0.000273

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table B.123: U.S. Model III, First-Difference Regression

Dependent Variable: DTOP1
Method: Least Squares
Date: 09/25/16 Time: 20:27
Sample (adjusted): 1951 2014
Included observations: 64 after adjustments
HAC standard errors & covariance (Bartlett kernel, Newey-West automatic bandwidth = 198.5258, NW automatic lag length = 3)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DTFP	0.405991	0.211010	1.924041	0.0591
C	-0.055838	0.002817	-19.81836	0.0000
@TREND	0.003926	0.000204	19.26775	0.0000
@TREND^2	-4.84E-05	3.03E-06	-15.99461	0.0000

R-squared	0.181631	Mean dependent var	0.007174
Adjusted R-squared	0.140712	S.D. dependent var	0.051488
S.E. of regression	0.047729	Akaike info criterion	-3.186114
Sum squared resid	0.136681	Schwarz criterion	-3.051184
Log likelihood	105.9556	Hannan-Quinn criter.	-3.132958
F-statistic	4.438849	Durbin-Watson stat	2.026320
Prob(F-statistic)	0.006969	Wald F-statistic	222.0672
Prob(Wald F-statistic)	0.000000		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

C. Further Results of Bounds Testing Analysis

C.1. Critical Bounds

Table C.1: Critical Values for Unrestricted Intercept and Unrestricted Trend Case

	0.100		0.050		0.025		0.010	
k	$I(0)$	$I(1)$	$I(0)$	$I(1)$	$I(0)$	$I(1)$	$I(0)$	$I(1)$
1	-3.13	-3.40	-3.41	-3.69	-3.65	-3.96	-3.96	-4.26

Source: Own depiction based on Pesaran *et al.* (2001), p. 304.

C.2. Italy

Table C.2: Italy Model I, ARDL Regression

Dependent Variable: TOP10
Method: ARDL
Date: 09/26/16 Time: 14:59
Sample (adjusted): 1978 2009
Included observations: 32 after adjustments
Maximum dependent lags: 7 (Automatic selection)
Model selection method: Schwarz criterion (SIC)
Dynamic regressors (7 lags, automatic): TFP
Fixed regressors: C @TREND
Number of models evalulated: 56
Selected Model: ARDL(4, 2)
Note: final equation sample is larger than selection sample

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
TOP10(-1)	0.990238	0.228773	4.328475	0.0002
TOP10(-2)	-0.302910	0.307434	-0.985284	0.3347
TOP10(-3)	0.131810	0.148834	0.885619	0.3850
TOP10(-4)	-0.079068	0.080420	-0.983189	0.3357
TFP	0.435149	0.138796	3.135177	0.0046
TFP(-1)	-0.296469	0.234450	-1.264528	0.2187
TFP(-2)	-0.066290	0.157308	-0.421405	0.6774
C	1.693357	0.557733	3.036146	0.0059
@TREND	0.002763	0.000906	3.049062	0.0057

R-squared	0.994212	Mean dependent var	8.010383
Adjusted R-squared	0.992199	S.D. dependent var	0.091773
S.E. of regression	0.008106	Akaike info criterion	-6.560258
Sum squared resid	0.001511	Schwarz criterion	-6.148020
Log likelihood	113.9641	Hannan-Quinn criter.	-6.423612
F-statistic	493.8668	Durbin-Watson stat	2.086245
Prob(F-statistic)	0.000000		

*Note: p-values and any subsequent tests do not account for model selection.

Source: EViews output based on data of Feenstra *et al.* (2015) and Alvaredo *et al.* (2016).

Table C.3: Italy Model I, ARDL Bounds Test

ARDL Bounds Test
Date: 09/26/16 Time: 16:21
Sample: 1978 2009
Included observations: 32
Null Hypothesis: No long-run relationships exist

Test Statistic	Value	k
F-statistic	5.118364	1

Critical Value Bounds

Significance	I0 Bound	I1 Bound
10%	5.59	6.26
5%	6.56	7.3
2.5%	7.46	8.27
1%	8.74	9.63

Test Equation:
Dependent Variable: D(TOP10)
Method: Least Squares
Date: 09/26/16 Time: 16:21
Sample: 1978 2009
Included observations: 32

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(TOP10(-1))	0.250168	0.202404	1.235987	0.2289
D(TOP10(-2))	-0.052741	0.136577	-0.386164	0.7029
D(TOP10(-3))	0.079068	0.080420	0.983189	0.3357
D(TFP)	0.435149	0.138796	3.135177	0.0046
D(TFP(-1))	0.066290	0.157308	0.421405	0.6774
C	1.693357	0.557733	3.036146	0.0059
@TREND	0.002763	0.000906	3.049062	0.0057
TFP(-1)	0.072389	0.100335	0.721476	0.4779
TOP10(-1)	-0.259930	0.088716	-2.929902	0.0075

R-squared	0.670711	Mean dependent var	0.006477
Adjusted R-squared	0.556175	S.D. dependent var	0.012167
S.E. of regression	0.008106	Akaike info criterion	-6.560258
Sum squared resid	0.001511	Schwarz criterion	-6.148020
Log likelihood	113.9641	Hannan-Quinn criter.	-6.423612
F-statistic	5.855928	Durbin-Watson stat	2.086245
Prob(F-statistic)	0.000393		

Source: EViews output based on data of Feenstra *et al.* (2015) and Alvaredo *et al.* (2016).

Table C.4: Italy Model I, ARDL Cointegrating and Long-Run Form

ARDL Cointegrating And Long Run Form
Dependent Variable: TOP10
Selected Model: ARDL(4, 2)
Date: 09/26/16 Time: 16:23
Sample: 1974 2014
Included observations: 32

Cointegrating Form

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(TOP10(-1))	0.250168	0.202404	1.235987	0.2289
D(TOP10(-2))	-0.052741	0.136577	-0.386164	0.7029
D(TOP10(-3))	0.079068	0.080420	0.983189	0.3357
D(TFP)	0.435149	0.138796	3.135177	0.0046
D(TFP(-1))	0.066290	0.157308	0.421405	0.6774
D(@TREND())	0.002763	0.000906	3.049062	0.0057
CointEq(-1)	-0.259930	0.088716	-2.929902	0.0075

Cointeq = TOP10 - (0.2785*TFP + 6.5147 + 0.0106*@TREND)

Long Run Coefficients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TFP	0.278495	0.337876	0.824253	0.4183
C	6.514674	1.579250	4.125169	0.0004
@TREND	0.010629	0.000875	12.152719	0.0000

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table C.5: Italy Model I, ARDL Breusch-Godfrey Serial Correlation LM Test

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	1.936997	Prob. F(2,21)	0.1690
Obs*R-squared	4.983831	Prob. Chi-Square(2)	0.0828

Test Equation:
Dependent Variable: RESID
Method: ARDL
Date: 09/26/16 Time: 15:24
Sample: 1978 2009
Included observations: 32
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TOP10(-1)	0.555716	0.835256	0.665324	0.5131
TOP10(-2)	-0.125602	0.956701	-0.131287	0.8968
TOP10(-3)	-0.152996	0.266087	-0.574987	0.5714
TOP10(-4)	-0.001161	0.087647	-0.013245	0.9896
TFP	0.060528	0.165123	0.366567	0.7176
TFP(-1)	-0.359147	0.338461	-1.061118	0.3007
TFP(-2)	0.139572	0.325063	0.429370	0.6720
C	-1.411378	1.219088	-1.157733	0.2600
@TREND	-0.002799	0.002037	-1.373970	0.1839
RESID(-1)	-0.662795	0.816268	-0.811982	0.4259
RESID(-2)	-0.630584	0.380613	-1.656758	0.1124

R-squared	0.155745	Mean dependent var	5.32E-15
Adjusted R-squared	-0.246282	S.D. dependent var	0.006982
S.E. of regression	0.007794	Akaike info criterion	-6.604558
Sum squared resid	0.001276	Schwarz criterion	-6.100711
Log likelihood	116.6729	Hannan-Quinn criter.	-6.437547
F-statistic	0.387399	Durbin-Watson stat	2.260870
Prob(F-statistic)	0.938089		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table C.6: Italy Model I, ARDL RESET Test

Ramsey RESET Test
Equation: TOP10_ARDL
Specification: TOP10 TOP10(-1) TOP10(-2) TOP10(-3) TOP10(-4) TFP TFP(-1) TFP(-2) C @TREND
Omitted Variables: Squares of fitted values

	Value	df	Probability
t-statistic	1.377355	22	0.1823
F-statistic	1.897106	(1, 22)	0.1823

F-test summary:

	Sum of Sq.	df	Mean Squares
Test SSR	0.000120	1	0.000120
Restricted SSR	0.001511	23	6.57E-05
Unrestricted SSR	0.001391	22	6.32E-05

Unrestricted Test Equation:
Dependent Variable: TOP10
Method: ARDL
Date: 09/26/16 Time: 15:25
Sample: 1978 2009
Included observations: 32
Maximum dependent lags: 7 (Automatic selection)
Model selection method: Schwarz criterion (SIC)
Dynamic regressors (7 lags, automatic):
Fixed regressors: C @TREND

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
TOP10(-1)	9.288441	6.028916	1.540649	0.1377
TOP10(-2)	-2.862545	1.882686	-1.520458	0.1426
TOP10(-3)	1.227937	0.809104	1.517650	0.1433
TOP10(-4)	-0.689151	0.449910	-1.531755	0.1398
TFP	4.034266	2.616609	1.541791	0.1374
TFP(-1)	-2.741375	1.789913	-1.531569	0.1399
TFP(-2)	-0.630031	0.437421	-1.440332	0.1639
C	-17.46289	13.91875	-1.254630	0.2228
@TREND	0.026543	0.017288	1.535347	0.1390
FITTED^2	-0.528239	0.383517	-1.377355	0.1823

R-squared	0.994672	Mean dependent var	8.010383
Adjusted R-squared	0.992492	S.D. dependent var	0.091773
S.E. of regression	0.007952	Akaike info criterion	-6.580473
Sum squared resid	0.001391	Schwarz criterion	-6.122430
Log likelihood	115.2876	Hannan-Quinn criter.	-6.428645
F-statistic	456.3263	Durbin-Watson stat	2.057126
Prob(F-statistic)	0.000000		

*Note: p-values and any subsequent tests do not account for model selection.

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table C.7: Italy Model II, ARDL Regression

Dependent Variable: TOP5
Method: ARDL
Date: 09/27/16 Time: 11:52
Sample (adjusted): 1980 2009
Included observations: 30 after adjustments
Maximum dependent lags: 6 (Automatic selection)
Model selection method: Schwarz criterion (SIC)
Dynamic regressors (6 lags, automatic): TFP
Fixed regressors: C @TREND
Number of models evalulated: 42
Selected Model: ARDL(6, 0)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
TOP5(-1)	0.849982	0.146251	5.811820	0.0000
TOP5(-2)	-0.232415	0.191371	-1.214473	0.2380
TOP5(-3)	0.027893	0.198050	0.140836	0.8893
TOP5(-4)	-0.354938	0.162080	-2.189892	0.0400
TOP5(-5)	0.383602	0.086795	4.419659	0.0002
TOP5(-6)	-0.227552	0.060407	-3.766957	0.0011
TFP	0.326953	0.073771	4.431991	0.0002
C	2.545450	0.415419	6.127424	0.0000
@TREND	0.006687	0.000983	6.802004	0.0000

R-squared	0.997259	Mean dependent var	7.618951
Adjusted R-squared	0.996214	S.D. dependent var	0.113989
S.E. of regression	0.007013	Akaike info criterion	-6.838673
Sum squared resid	0.001033	Schwarz criterion	-6.418314
Log likelihood	111.5801	Hannan-Quinn criter.	-6.704196
F-statistic	954.9652	Durbin-Watson stat	2.162989
Prob(F-statistic)	0.000000		

*Note: p-values and any subsequent tests do not account for model selection.

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table C.8: Italy Model II, ARDL Bounds Test

ARDL Bounds Test
Date: 09/27/16 Time: 12:51
Sample: 1980 2009
Included observations: 30
Null Hypothesis: No long-run relationships exist

Test Statistic	Value	k
F-statistic	16.29864	1

Critical Value Bounds

Significance	I0 Bound	I1 Bound
10%	5.59	6.26
5%	6.56	7.3
2.5%	7.46	8.27
1%	8.74	9.63

Test Equation:
Dependent Variable: D(TOP5)
Method: Least Squares
Date: 09/27/16 Time: 12:51
Sample: 1980 2009
Included observations: 30

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(TOP5(-1))	0.582273	0.115738	5.030940	0.0001
D(TOP5(-2))	0.156135	0.139784	1.116975	0.2766
D(TOP5(-3))	0.070030	0.140418	0.498725	0.6232
D(TOP5(-4))	-0.108949	0.074802	-1.456496	0.1600
D(TOP5(-5))	0.291896	0.067729	4.309764	0.0003
C	2.461366	0.490278	5.020348	0.0001
@TREND	0.006198	0.001220	5.080637	0.0000
TFP(-1)	0.316703	0.111365	2.843824	0.0097
TOP5(-1)	-0.535012	0.098154	-5.450730	0.0000

R-squared	0.810287	Mean dependent var	0.008995
Adjusted R-squared	0.738016	S.D. dependent var	0.016197
S.E. of regression	0.008290	Akaike info criterion	-6.504160
Sum squared resid	0.001443	Schwarz criterion	-6.083801
Log likelihood	106.5624	Hannan-Quinn criter.	-6.369684
F-statistic	11.21171	Durbin-Watson stat	2.105816
Prob(F-statistic)	0.000005		

Source: EViews output based on data of Feenstra *et al.* (2015) and Alvaredo *et al.* (2016).

Table C.9: Italy Model II, ARDL Cointegrating and Long-Run Form

ARDL Cointegrating And Long Run Form
Dependent Variable: TOP5
Selected Model: ARDL(6, 0)
Date: 09/27/16 Time: 12:52
Sample: 1974 2014
Included observations: 30

Cointegrating Form

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(TOP5(-1))	0.403411	0.107397	3.756241	0.0012
D(TOP5(-2))	0.170996	0.118255	1.445988	0.1629
D(TOP5(-3))	0.198888	0.123885	1.605431	0.1233
D(TOP5(-4))	-0.156050	0.065237	-2.392067	0.0262
D(TOP5(-5))	0.227552	0.060407	3.766957	0.0011
D(TFP)	0.326953	0.073771	4.431991	0.0002
D(@TREND())	0.006687	0.000983	6.802004	0.0000
CointEq(-1)	-0.553429	0.075634	-7.317226	0.0000

Cointeq = TOP5 - (0.5908*TFP + 4.5994 + 0.0121*@TREND)

Long Run Coefficients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TFP	0.590777	0.099780	5.920804	0.0000
C	4.599416	0.467885	9.830228	0.0000
@TREND	0.012083	0.000328	36.815030	0.0000

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table C.10: Italy Model II, ARDL Breusch-Godfrey Serial Correlation LM Test

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	1.935286	Prob. F(2,19)	0.1718
Obs*R-squared	5.077142	Prob. Chi-Square(2)	0.0790

Test Equation:
Dependent Variable: RESID
Method: ARDL
Date: 09/27/16 Time: 12:51
Sample: 1980 2009
Included observations: 30
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TOP5(-1)	0.029023	0.164009	0.176961	0.8614
TOP5(-2)	0.110829	0.222694	0.497675	0.6244
TOP5(-3)	-0.175040	0.214188	-0.817226	0.4239
TOP5(-4)	0.084721	0.162036	0.522855	0.6071
TOP5(-5)	0.009174	0.083953	0.109275	0.9141
TOP5(-6)	-0.016188	0.058466	-0.276872	0.7849
TFP	-0.041259	0.074553	-0.553417	0.5864
C	-0.119694	0.416065	-0.287681	0.7767
@TREND	-0.000526	0.001015	-0.517613	0.6107
RESID(-1)	-0.141838	0.248588	-0.570577	0.5750
RESID(-2)	-0.498609	0.263135	-1.894876	0.0734

R-squared	0.169238	Mean dependent var	3.96E-16
Adjusted R-squared	-0.268005	S.D. dependent var	0.005968
S.E. of regression	0.006720	Akaike info criterion	-6.890751
Sum squared resid	0.000858	Schwarz criterion	-6.376979
Log likelihood	114.3613	Hannan-Quinn criter.	-6.726391
F-statistic	0.387057	Durbin-Watson stat	2.261185
Prob(F-statistic)	0.936853		

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).

Table C.11: Italy Model II, ARDL RESET Test

Ramsey RESET Test
Equation: TOP5_ARDL
Specification: TOP5 TOP5(-1) TOP5(-2) TOP5(-3) TOP5(-4) TOP5(-5) TOP5(-6) TFP C @TREND
Omitted Variables: Squares of fitted values

	Value	df	Probability
t-statistic	0.626757	20	0.5379
F-statistic	0.392824	(1, 20)	0.5379

F-test summary:

	Sum of Sq.	df	Mean Squares
Test SSR	1.99E-05	1	1.99E-05
Restricted SSR	0.001033	21	4.92E-05
Unrestricted SSR	0.001013	20	5.07E-05

Unrestricted Test Equation:
Dependent Variable: TOP5
Method: ARDL
Date: 09/27/16 Time: 12:51
Sample: 1980 2009
Included observations: 30
Maximum dependent lags: 6 (Automatic selection)
Model selection method: Schwarz criterion (SIC)
Dynamic regressors (6 lags, automatic):
Fixed regressors: C @TREND

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
TOP5(-1)	2.781508	3.085351	0.901521	0.3780
TOP5(-2)	-0.757994	0.860762	-0.880608	0.3890
TOP5(-3)	0.093235	0.226408	0.411801	0.6849
TOP5(-4)	-1.162606	1.299100	-0.894932	0.3815
TOP5(-5)	1.252642	1.389361	0.901596	0.3780
TOP5(-6)	-0.730119	0.804192	-0.907891	0.3747
TFP	1.067363	1.183705	0.901714	0.3779
C	-0.282200	4.531209	-0.062279	0.9510
@TREND	0.022179	0.024738	0.896562	0.3806
FITTED^2	-0.151763	0.242140	-0.626757	0.5379

R-squared	0.997312	Mean dependent var	7.618951
Adjusted R-squared	0.996102	S.D. dependent var	0.113989
S.E. of regression	0.007117	Akaike info criterion	-6.791457
Sum squared resid	0.001013	Schwarz criterion	-6.324391
Log likelihood	111.8719	Hannan-Quinn criter.	-6.642039
F-statistic	824.3585	Durbin-Watson stat	2.107100
Prob(F-statistic)	0.000000		

*Note: p-values and any subsequent tests do not account for model selection.

Source: EViews output based on data of Feenstra *et al*. (2015) and Alvaredo *et al*. (2016).